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ÁNFORA

Cognition, Inclusion, and Interculturality



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EDITORIAL

Cognitive Sciences, Inclusion, and Interculturality: Towards a More Inclusive Understanding of the Mind

Ciencias Cognitivas, inclusión e interculturalidad: hacia
una comprensión más inclusiva de la mente

Ciências Cognitivas, inclusão e interculturalidade: rumo
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Abstract

This special issue of the journal *Ánfora* delves into the intersection of cognitive sciences, inclusion, and interculturality, exploring the need to transcend traditional Eurocentric cognitive models. The articles collected here provide a broader and more complex view of mental processes, acknowledging the diversity of ways of thinking, feeling, and relating to the world. By analyzing cognition in intercultural contexts and among minority populations, the authors contribute to building more inclusive and equitable knowledge. The studies presented range from analyzing the relationship between culture and cognition, to implementing intercultural educational models, and exploring the cognitive experiences of individuals with neurodiversity.

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The findings presented in these articles have significant implications for education, psychology, neuroscience, and public policy. By highlighting the importance of cognitive and cultural diversity, these studies encourage a rethinking of educational practices and the building of fairer and more inclusive societies.

Keywords: cognitive sciences; interculturality; neurodiversity; cultural diversity; education; inclusion; cognitive models.

Resumen

Este número especial de la revista *Ánfora* profundiza la intersección entre las ciencias cognitivas, la inclusión y la interculturalidad, explorando la necesidad de trascender los modelos cognitivos tradicionales eurocéntricos. Los artículos reunidos aquí ofrecen una visión más amplia y compleja de los procesos mentales, reconociendo la diversidad de formas de pensar, sentir y relacionarse con el mundo.

Al analizar la cognición en contextos interculturales y en poblaciones minoritarias, los autores contribuyen a construir un conocimiento más inclusivo y equitativo. Los estudios presentados abarcan desde el análisis de la relación entre cultura y cognición, pasando por la implementación de modelos educativos interculturales, hasta la exploración de las experiencias cognitivas de personas con neurodiversidad.

Los hallazgos que presentan estos artículos tienen importantes implicaciones para la educación, la psicología, la neurociencia y las políticas públicas. Al destacar la importancia de la diversidad cognitiva y cultural, estos estudios invitan a repensar las prácticas educativas y a construir sociedades más justas e inclusivas.

Palabras clave: ciencias cognitivas; interculturalidad; neurodiversidad; diversidad cultural; educación; inclusión; modelos cognitivos.

Resumo

Este número especial da revista *Ánfora* aprofunda a interseção entre as ciências cognitivas, a inclusão e a interculturalidade, explorando a necessidade de transcender os modelos cognitivos tradicionais eurocêntricos. Os artigos reunidos aqui oferecem uma visão mais ampla e complexa dos processos mentais, reconhecendo a diversidade de formas de pensar, sentir e relacionar-se com o mundo. Ao analisar a cognição em contextos interculturais e em populações minoritárias, os autores contribuem para

construir um conhecimento mais inclusivo e equitativo. Os estudos apresentados abrangem desde a análise da relação entre cultura e cognição, passando pela implementação de modelos educativos interculturais, até a exploração das experiências cognitivas de pessoas com neurodiversidade. Os achados apresentados nestes artigos têm importantes implicações para a educação, a psicologia, a neurociência e as políticas públicas. Ao destacar a importância da diversidade cognitiva e cultural, esses estudos convidam a repensar as práticas educacionais e a construir sociedades mais justas e inclusivas.

Palavras-chave: ciências cognitivas; interculturalidade; neurodiversidade; diversidade cultural; educação; inclusão; modelos cognitivos.

The last two special issues of *Ánfora*, dedicated to Cognitive Sciences and Interculturality, represent a further step in exploring the boundaries of human knowledge. Building on the path set by the previous issue (Gutierrez & Montoya, 2024), which addressed the need to understand the complex relationship between mind, brain, and society, this volume delves deeper into how cognitive sciences, in their quest to unravel the workings of the mind, have experienced exponential growth in recent decades. Their interdisciplinary approach, spanning from philosophy and psychology to neuroscience and artificial intelligence, has significantly advanced our understanding of mental processes (Thagard, 2023). However, it is undeniable that this field has traditionally been Eurocentric, focusing on cognitive models based on Western populations (Dotson & Duarte, 2020).

The increasing globalization and awareness of cultural diversity have highlighted the need to expand the horizons of cognitive sciences and interculturality. As a conceptual framework, it invites us to recognize and value cultural differences, as well as to seek common ground that allows us to build more just and equitable societies, which is of particular importance in Latin America (CEPAL, 2023).

The articles in this special issue of *Ánfora* invite us to rethink the relationship between mind, culture, and society. By exploring the intersection of cognitive sciences, neurodiversity, and cultural diversity, the authors offer a broader and more complex view of mental processes. From the study of indigenous cultures to the analysis of the experiences of people with autism, the works gathered here highlight the need to transcend traditional cognitive models focused on Western populations and to recognize the diversity of ways of thinking, feeling, and relating to the world. This issue stands as a milestone in building more inclusive and equitable knowledge in Latin America, demonstrating the potential of cognitive sciences to address social challenges such as education, inclusion, and the construction of more just societies.

In a first line of work, several articles explore the challenge of including cognitive variables in response to social, cultural, and ethnographic diversity in theoretical, urban, and applied contexts. Among these is the work of Chaves and Hederich-Martínez, which presents an analysis of the relationship between cognition and culture through contemporary ecocultural models, highlighting the heuristic potential of cognitive style as an indicator of cognitive functioning in intercultural contexts—a variable previously considered purely individual. This presents various methodological challenges that require the development of new technologies for its assessment.

Similarly, Vera, Pacheco, and Hernández investigate the implementation of the Educating City model in Manizales, Colombia, following its adherence to the International Association of Educating Cities. A series of recommendations based

on a participatory diagnosis is presented, highlighting the relevance of citizen participation in urban governance. Their study emphasizes the importance of synergies between civil society, universities, and the public sector to consolidate Manizales as an "*Edutropolis*," strengthening this significant advancement in urban governance and city diplomacy.

In another study, Valbuena and Rodríguez-Pedraza conduct a bibliometric analysis on co-creation and virtual learning communities, identifying future lines of research focused on the implications of these practices for learning and educational innovation. Among their conclusions, they highlight that co-creation as a learning strategy, through virtual communities, promotes and facilitates participation. Notable modalities in this review include problem-solving with interactive experiences related to future knowledge, using digital narratives, gamification, and workshops grounded in tailored learning environments—that is, ecological and intercultural—work meetings with experts, and collaborative settings for problem-solving.

Meanwhile, Gutierrez de Blume, Montoya, Henao, and Hurtado examine how self-regulated learning and metacognition are experienced by the indigenous community "Katanzama," revealing six key themes that underscore the relevance of cultural context in these cognitive processes: contextual knowledge and cultural relevance in learning, regulation and adaptation in learning processes, diversification of teaching strategies, learning from mistakes, study planning and organization, and self-criticism and continuous improvement. They then discuss the implications for research, theory, and the practice of metacognition.

Continuing the study of interculturality and indigenous populations, Peñaranda, Corrales, and Márquez explored the recognition of cultural diversity, specifically the recognition of Colombian indigenous cultures among basic education students. The results indicate that students were unaware of the existence of Colombia's ancestral cultures. However, classroom activities sparked interest in learning more about indigenous cultures, as well as fostering respect for ethnic groups that the students had previously not recognized. Consequently, the need to include such activities and content within an intercultural framework for shaping young people's identity is emphasized.

The other thematic axis structuring this special issue is cognitive sciences in the face of the challenge of diversity, addressing specific issues related to neurodiversity.

Abello-Camacho and Pabón-Gutiérrez analyze the construction of signed discourses in deaf university students, highlighting the importance of specific didactic strategies such as explicit instruction, language analysis, vocabulary development, the creation of new signs, and reflective linguistic tasks to strengthen metalinguistic and metacognitive skills. This work emphasizes the need to

continuously strengthen metalinguistic processes in deaf students to improve their academic performance in higher education, underlining the necessity of creating specific teaching alternatives.

Similarly, Martínez-Álvarez and collaborators reflect on learning methods for deaf adults, emphasizing the need to understand and respect Deaf culture in contemporary methods. They identified neural methods, such as vibrotactile discrimination and the use of iconic words/signs; others validated in hearing populations tested on deaf adults, such as the Memory Simulation Test and Statistical Learning Mechanisms; serious games with animation, virtual reality, interactive games, and artistic media; three methods using technology; and two learning methods based on participants' cognitive abilities. The authors stress the need to continue this research to promote the deepening of inclusion processes for this population.

Lastly, two articles address the diversity of cognition in populations on the autism spectrum. Posada, Salazar, and Giraldo seek to understand, from an interpretive paradigm with a phenomenological approach, the lived experiences regarding cognition and learning environments for individuals with autism spectrum disorder. The results emphasize that the experiences revolve around difficulties in communication, social interaction, language, behavior patterns, interests, and the importance of sensory processing or integration adaptations through collaborative work with professionals and families.

In another study, Posada and collaborators, alongside Arboleda, explore the learning experiences of individuals with autism spectrum disorder from a social and neurophenomenological perspective. They found that autistic participants demonstrated greater heterogeneity in the functioning of the mirror neuron system and their interaction with the world, both in comparison to control participants and among themselves. Consequently, they argue for the need to develop inclusive educational strategies that respect the cognitive and cultural diversity of this population.

In summary, the articles in this issue of *Ánfora* offer an enriching overview of the intersections between cognitive sciences and diversity. By exploring cognition in intercultural contexts and minority populations, the authors contribute to broadening the horizons of this discipline and to building more inclusive and equitable knowledge. The findings presented have important implications for education, psychology, neuroscience, and public policy, and they encourage further exploration of the various ways culture shapes the mind and experience of the world. This issue represents a call to action to build a future where differences

are valued and where all individuals have the opportunity to fully develop their cognitive potential.

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COGNITION, INCLUSION,
AND INTERCULTURALITY

Research
& Reflection

Investigaciones y reflexiones
Pesquisa e reflexão

The Relationship Between Culture and Cognition: New Perspectives on Old Problems*

[English version]

La relación entre cultura y cognición: nuevas
perspectivas para viejos problemas

A relação entre cultura e cognição: novas
perspectivas para antigos problemas

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Abstract

Objective: The objective of this reflection paper is to provide a general overview of the theories and approaches that have addressed the relationship between cognition and

* This reflection paper is the result of a literature review and theoretical construction for the doctoral thesis project "Cognitive Styles in Contexts of Cultural Contact: the *Embera Chamí* case", which is being developed within the framework of the Doctoral Program in Cognitive Sciences at the Universidad Autónoma de Manizales. Funding: This project is funded by the authors' resources. Conflict of Interest Statement: The authors declare no conflict of interest. Data Availability: All relevant data are included within the article.

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culture, from classical models to more recent ones, in order to discuss the relevance of contemporary ecocultural frameworks and their application in studies on intercultural contexts. **Methodology:** This article begins with a historical review of cognitive anthropological theories and their articulation with cultural and differential psychology, based on the notion of cognitive style in the Field Dependence-Independence dimension (FDI). **Results:** The scientific implications of analyzing cultural and individual differences in isolation are discussed, and it is proposed to revisit ecocultural models from cross-cultural psychology to address the complexity of cognitive phenomena. **Conclusions:** In conclusion, the enormous potential of the ecocultural model in describing cultural influences on cognition is highlighted, using style as an indicator of individual cognitive functioning.

Palabras clave: cognition; culture; cognitive styles; ecocultural model; intercultural studies (obtained from the APA thesaurus).

Resumen

Objetivo: el objetivo de este artículo de reflexión es mostrar un panorama general de las teorías y enfoques que han abordado la relación entre cognición y cultura, desde los modelos clásicos hasta los más recientes, con el fin de discutir la relevancia de los marcos ecoculturales contemporáneos y su aplicación en estudios sobre contextos interculturales. **Metodología:** se parte de un recorrido histórico de las teorías antropológicas cognitivistas, y su articulación con la psicología cultural y diferencial a partir de la noción de estilo cognitivo en la dimensión dependencia-independencia de campo (DIC). **Resultados:** se discuten las implicaciones científicas de analizar las diferencias culturales e individuales de forma aislada, y se propone retomar los modelos ecoculturales de la psicología transcultural para abordar la complejidad de los fenómenos cognitivos. **Conclusiones:** en conclusión, se evidencia el enorme potencial del modelo ecocultural en la descripción de las influencias culturales en la cognición, al utilizar el estilo como indicador del funcionamiento cognitivo del individuo.

Palabras clave: cognición; cultura; estilos cognitivos; modelo ecocultural; estudios interculturales (obtenidos del tesauro APA).

Resumo

Objetivo: o objetivo deste artigo de reflexão é apresentar um panorama geral das teorias e abordagens que trataram da relação entre cognição e cultura, desde os modelos clássicos até os mais recentes, com o intuito de discutir a relevância dos quadros ecoculturais contemporâneos e sua aplicação em estudos sobre contextos interculturais. **Metodologia:** parte-se de um percurso histórico das teorias antropológicas cognitivistas e sua articulação com a psicologia cultural e diferencial a partir da noção de estilo cognitivo na dimensão Dependência-Independência de Campo (DIC). **Resultados:** discutem-se as implicações científicas de analisar as diferenças culturais e individuais de forma isolada, e propõe-se o retorno aos modelos ecoculturais da psicologia transcultural para abordar a complexidade dos fenômenos cognitivos. **Conclusões:** em conclusão, evidencia-se o enorme potencial do modelo ecocultural na descrição das influências culturais sobre a cognição, ao utilizar o estilo como indicador do funcionamento cognitivo do indivíduo.

Palavras-chave: cognição; cultura; estilos cognitivos; modelo ecocultural; estudos interculturais (obtidos do tesouro APA).

Culture and Cognition

Scientific interest in the relationship between cognition and culture has a long-standing tradition in disciplines such as philosophy, anthropology, and psychology. However, it was in the 1950s that this interest solidified into a specific field with the emergence of cognitive anthropology and cross-cultural psychology.

In anthropology, the notion of cognition as a dimension of human existence has been present since Edward B. Tylor's (1871) initial definition of 'culture'. Tylor defined culture as a complex whole that includes beliefs, arts, laws, morals, customs, and, importantly, the knowledge acquired by members of a society. Also well-known in the field are the works of Lévy-Bruhl (1910; 1922) on primitive mentality, influenced by the French sociological tradition of Émile Durkheim.

In later years and different regions, Margaret Mead's American cultural psychology emerged, focusing on relativizing the concept of a universal psyche through her theory of temperamental models. Mead explained that each individual is born with an innate temperament, and the surrounding society assigns them roles and labels that are either suitable or unsuitable for the culture (Mead, 1973). These roles and labels are tied to the construction that each culture makes of what it considers «innate». Thus, an umbilical cord wrapped around the neck predisposes an individual to be a painter and an artist; an epileptic, mad, or sick person is predisposed to be a leader or possess religious gifts; being born male predisposes one to be tough, strong, independent; while being born female predisposes one to be weak, emotional, and dependent. From this theoretical model, Mead (1973) classified cultures according to their temperamental model: warlike, pacifist, feminine, and masculine. As can be seen, cognition and thought, as objects of interest in explaining cultural differences, played a marginal role in anthropological discipline until 1950.

With the emergence of Cognitive Science in the mid-20th century, as an interdisciplinary approach that includes philosophy, anthropology, psychology, neuroscience, linguistics, and computer science, a favorable scenario was created for the rise of cognitive anthropology. This development was pioneered by the American anthropologist Ward Goodenough (1956), who, by defining the concept of 'culture' as everything that an individual has in their mind and must know to operate acceptably within their group, inaugurated a theoretical and methodological perspective to understand culture focused on the intersection of cognitive processes, the formal characteristics of language, and the ethnography.

American cognitive anthropology was a collective effort, with notable figures emerging during that initial period, such as Charles Frake, Benjamin Colby, Brent Berlin, and Paul Kay, and later generations like Roy D'Andrade, Claudia Strauss, Naomi Quinn, and Dorothy Holland (Blount, 2011; Reynoso, 1986). Although the approach began to decline in the 1970s due to the rise of interpretivist perspectives, it made several theoretical and methodological contributions, including componential analysis, ethnosemantics, and the notion of 'cultural models'.

Componential analysis, inspired by descriptive linguistics, aimed to identify the semantic domains of a language and their respective lexical elements or lexemes, understanding that culture determines the number of domains and lexical structures that comprise them, thereby providing evidence of the native's system of knowledge. Thus, the ethnographer's task was to analyze the components of each term in a language to locate it within a semantic domain, such as kinship terms or beverages (Frake, 1964; Goodenough, 1956).

A particularly interesting example of the ethnosemantics approach is the work of Berlin and Kay (1969) on color classification. They analyzed color terminology in 98 languages and concluded that there is a certain universality in chromatic terminology that evolves in seven cumulative stages: 1) terms for black and white, 2) terms for red, 3) terms for green or yellow, 4) terms for green and yellow, 5) terms for blue, 6) terms for brown, and 7) terms for violet, pink, orange, and/or gray. This model was later revisited by Eleanor Rosch's Prototype Theory, which expanded the discussion on the existence of natural categorization principles through which all human beings organize their reality (Rosch et al., 1976). This position contrasts with the earlier psychology and anthropology perspective, which viewed categorization as an arbitrary and learned process.

In the same vein, Holland and Quinn's (1987) proposal of cultural models suggests that it is not enough to identify the list of categories through which a culture organizes its world. Instead, it is necessary to reconstruct the discourses created from these categories to organize cultural knowledge and understand how these categories relate to behaviors; in other words, to establish the relationship between what people say and what they do.

The cultural comparisons made by anthropological studies have challenged some assumptions of universality in psychology and have revealed that many questions and approaches are not free from a cultural model, but rather reflect a distinctively Western analytical framework. In this context, it is assumed that the world operates with discernible and stable rules, contradiction is a problem to be resolved, and entities are seen as relatively independent agents. Context and relationships between people and objects are relatively minimized, or when examined, it is assumed that they operate under avoidable rules.

The above became evident in the work of European psychologists in Africa, particularly those related to the universality of the concept of ‘intelligence’. After a long list of unsuccessful studies, it was concluded that it is impossible to establish cognitive universals applicable to all cultures. This stance came to be known as «radical cultural relativism» (Berry, 1971). However, in differential psychology, a concept was being developed that could contribute to the description of cultural differences from a relativistic perspective: the concept of “cognitive style”.

Cultural Psychology, Differential Psychology, and Style

The notion of ‘personality’ and the idea that it is related to how cognition functions have deep roots in European psychology. In the field of differential psychology, the genesis of this idea can be traced back to Thurstone's studies on performance in perceptual tasks. According to his observations, two types of «attitudes» spontaneously adopted by people when making perceptual judgments are identified: one characterized by speed and closure strength, identifying individuals who tend to quickly close or organize incomplete or disorganized stimuli; and another by closure flexibility, showing the tendency to establish multiple reorganizations of the information present in the stimulus field. These two tendencies are also related to certain personality aspects: those with high closure speed tend to be sociable, while those with closure flexibility tend to be socially distant (Thurstone, 1944).

The notion of ‘perceptual attitude’ coined by Thurstone was quickly generalized to the concept of ‘cognitive attitude’ and later to ‘cognitive control’ by a group of researchers associated with the Menninger Foundation. The examination of these cognitive controls led to the proposal of multiple dimensions of cognitive style, most of which lost relevance over the years. Examples include the «leveling-sharpening» style (Holzman & Klein, 1954) and the «reflection-impulsivity» style (Kagan, 1966).

Parallel to the work at the Menninger Foundation, a group of Gestalt-oriented researchers led by Hermann Witkin developed a specific cognitive style dimension that remains relevant today: the field dependence-independence (FDI) dimension. From its inception, it aimed to show a coherence between the perceptual, social cognitive, and affective aspects of the individual, thus uniting the domains of cognition and personality into a single enterprise (Witkin et al., 1962).

The history of the FDI dimension is extensive and far-reaching. It originated from studying differences in verticality perception among U.S. aviators (Witkin & Asch, 1948). The results identified two types of subjects: «field-dependent» individuals (visual field), who used visual information to determine verticality, and «field-independent» individuals, who preferred proprioceptive information (not present in the visual field) for verticality perception. The FDI dimension quickly expanded to encompass other aspects of visual perception, initially related to a certain perceptual-analytical aptitude (Witkin et al., 1954), and later generalized to the cognitive domain as a mode of symbolic processing. Thus, this spectrum of relationships between perceptual and cognitive aspects was generalized into a new construct: field articulation (Witkin et al., 1962).

The field articulation construct soon began to show relationships with the social and affective dimensions of the individual, leading to its generalization and rethinking under a new form. This gave birth to the «Theory of Psychological Differentiation». From this perspective, one can distinguish between highly differentiated individuals—who experience themselves as highly segregated, both internally and externally (self-other segregation)—and highly integrated individuals. These levels of differentiation are directly related to high levels of neuropsychological differentiation (Witkin et al., 1962). A quick glance at the human types proposed by this theory places them, curiously, very close to those proposed by Thurstone's original perceptual attitudes.

In its latest formulation, FDI is assimilated into the construct describing the level of autonomy concerning external references (Witkin & Goodenough, 1985). In this case, subjects with high autonomy from external references, previously called «highly differentiated» or «articulated» or «restructuring», retain the original label of being «field-independent» (of the perceptual field). At the other end, subjects with low autonomy concerning references, «highly integrated» or with low restructuring levels, are still identified as «field-dependent».

The use of data, concepts, and methods related to "cognitive style" (the mode of functioning that characterizes an individual in their perceptual and intellectual activities) in cross-cultural research presents numerous methodological advantages.

As shown by the numerous studies dedicated to a privileged cognitive style corresponding to the Field Dependence–Independence (FDI) dimension, cognitive style can be extremely useful in characterizing qualitative differences in cognition, as it can be measured using objective techniques. The tests show a high degree of validity and reliability (Hederich et al., 2022) and make sense for socially diverse populations. Research has shown a close relationship between cognitive style and particular forms of child-rearing, making it a valuable

tool for identifying the outcomes of these methods in comparative studies of socialization patterns.

The same relationships between early family experiences and inter-individual differences along the continuum marked by Field Dependence–Independence, originally observed in Western settings, have also been observed in non-Western contexts. Furthermore, differences in the modal cognitive style of some non-Western groups have been found, which could have been predicted based on the differences observed in child-rearing practices. Additionally, the prevalence of sex differences in "articulated" or "global" styles across many cultures suggests that studying the role of sex in cognitive development could be a fruitful avenue for cross-cultural research (Witkin, 1967).

There is a broad knowledge base linking socialization and child-rearing practices with cognitive style within the FDI dimension. Generally, research attempting to confirm the influence of socialization and child-rearing practices on cognitive style within this dimension has been guided by two major hypotheses: 1) the hypothesis of fostering autonomy vs. continued dependence on family authority, and 2) the hypothesis of sex role modeling.

Regarding the first hypothesis, which links fostering autonomy with field independence and continued dependence on authority with field dependence, it should be noted that, although much data supports this hypothesis, the results have not been consistent in all cases.

Support for this hypothesis can be found in the classic studies collected by Witkin and Goodenough in 1981. In one of them, field independence and its relationship with various aspects of mother-child interactions were examined. The results showed that field-independent children differed from more field-dependent children in their views on how parental authority was exercised. Field-dependent children tended to perceive their parents as arbitrary, tyrannical, and inflexible, while more field-independent children viewed their parents as reasonable, flexible, and moderate in their demands. Additionally, field-dependent children were more likely to have mothers who were strict in toilet training, severely punished assertive behavior, and pushed them to meet high standards (Dyk & Witkin, 1965).

The hypothesis of fostering autonomy vs. dependence on authority has been examined using other methodologies, such as retrospective reports of subjects' childhood experiences, but the results have not consistently supported the hypothesis (Witkin & Goodenough, 1985). Similarly, consistency has not been found when applying questionnaires to parents (previously characterized by their cognitive style) about their attitudes toward child-rearing (Busse, 1969; Claeys & DeBoeck, 1976). Overall, it could be said that there is as much

evidence for as against the hypothesis of fostering autonomy vs. dependence on family authority (Hederich, 2007).

In previous work, the hypothesis of fostering autonomy vs. dependence on family authority has been reformulated, now referred to as the hypothesis of fostering individuation vs. social integration. According to this new hypothesis, child-rearing practices that emphasize social integration through the promotion of social values, such as solidarity or generosity, and consideration of others' needs, are associated with field-dependent individuals. In contrast, child-rearing practices that emphasize individuation through respect for personal space, leadership, and individual expression tend to lead to the formation of field-independent individuals (Hederich, 2007). The data gathered on child-rearing practices in terms of permissions, controls, and punishments among Colombian adolescents have strongly supported this conjecture (Hederich & Camargo, 2001; Hederich, 2007).

The second hypothesis guiding the examination of links between socialization and child-rearing practices and cognitive style is known as the «sex role modeling hypothesis». According to this conjecture, the tendency toward one pole of the FDI dimension can be learned as a result of a modeling process linked to sex roles. As the child identifies more closely with the same-sex parent, sex role modeling would extend to include cognitive style. This hypothesis would explain the perpetuation of cognitive style differences between sexes within families.

In general, this hypothesis is confirmed by the studies of Bieri (1960) and Lynn (1962). Similarly, studies examining the effects of the presence or absence of one of the parents on child-rearing have also been consistent in supporting this hypothesis (Hederich & Camargo, 1999; 1995; 2001).

The interest in studying the influences between socialization and child-rearing practices and cognitive style lies in how these can describe and explain differences between the modal cognitive styles of cultural groups. Indeed, while socialization and child-rearing practices can shape cognitive style, these practices themselves are transmitted from generation to generation as part of the cultural reproduction process, ensuring the relative permanence of a social group's cognitive style from one generation to the next. For this reason, characterizing socialization and child-rearing practices can naturally extend to the realm of differences between cultural groups.

Most of the research that has explored cognitive style within the Field Dependence-Independence (FDI) dimension as a variable describing cultural characteristics and differences has done so to test a hypothesis known as the «social conformity-autonomy hypothesis». According to this hypothesis, cultural groups that emphasize social conformity, characterized by a greater

focus on obedience to authority, larger role differences, and stricter and more severe child-rearing practices, will show a stronger tendency toward field dependence. In contrast, groups that lean towards social autonomy, characterized by greater tolerance for autonomy, smaller role differences, and more flexible and permissive child-rearing practices, will show a greater tendency toward field independence.

In 1975, Witkin and Berry published a review that included more than thirty studies, whose results generally supported the predictions of the social conformity-autonomy hypothesis. In 1976, Witkin and Berry presented additional evidence that supported the hypothesis regarding the contrast in cognitive style between hunter-gatherer societies and sedentary farming societies. According to their findings, nomadic hunter-gatherer groups, with less complex social structures, tended towards field independence, while sedentary farming groups, with more complex social structures and a greater emphasis on conformity, showed a tendency toward field dependence.

Despite this evidence, some dissenting voices have pointed out a situation that may be more complex. Bagley, for instance, demonstrated that the cognitive style of Japanese children, contrary to Witkin's predictions and what one might expect from that type of society, showed a strong tendency towards field independence (Bagley, 1988). Some argued that this trend could be related to the characteristics of Japanese ideographic writing, which could constitute a particular type of perceptual training. However, the same author showed that this relationship was not verified (Bagley, 1995).

From another perspective, it has been argued that, rather than the hypothesis that differentiates societies oriented towards social conformity or autonomy in their relationship with cognitive style, the evidence might be more consistent in the consideration of another type of cultural polarity widely developed in anthropology: the polarity that distinguishes collectivist societies from individualistic ones; however, the data have not been entirely consistent with this hypothesis. In some cases, it has been confirmed in large samples of Colombian cultural groups (Hederich, 2007). In other cases, with samples contrasting Chinese, Taiwanese, and Central European populations, the collectivism-individualism polarity did not prove to be a strong predictor of cognitive style (Lacko et al., 2020).

Although cognitive style researchers did not initially see this as a problem, most of their studies were conducted with subjects from "WEIRD" cultures: Western, Educated, Industrialized, Rich, and Democratic, with a majority of participants being American students (Grove, 2017; Henrich et al., 2010). This imbalance in cultural data has gradually been addressed over the past

two decades, not only by psychologists but also by cognitive anthropologists, sociologists, and neuroscientists, through new theoretical and methodological proposals.

As gaps in interpretative frameworks appropriate for the psychologies of non-Western cultures became evident, cross-cultural psychological perspectives also emerged. These perspectives sought to test theories of human development, especially those of Piaget and Vygotsky (Dasen & Mishra, 2000), and to propose strategies for understanding the complex interactions between physical and social contexts, educational practices, and cultural beliefs that shape human development (Berry, 2022b; Dasen, 2022). These new perspectives, which we will outline below, articulate differential cognitive style studies with ecocultural frameworks in non-Western cultures.

Cognitive Styles and Culture: New Perspectives

So far, a general overview of the approaches that have addressed the relationship between cognition and culture has been presented, along with a more detailed examination of individual differences and cognitive styles. Both have shaped a fertile field of research that continues to pose challenges around two fundamental questions: What theoretical and methodological constructs can be developed to analyze and understand the relationship among individual cognitive processes, the physical environment, and social and cultural dynamics? And how are these constructs relevant to any individual and cultural group?

One of the earliest proposals to address these questions is the ecocultural model developed by Berry (1979, 1980, 1983, 2022a). This model seeks to understand the links between ecological and sociopolitical contexts, cultural adaptations, and individual behavior. It provides a guide for studying behavior in cross-cultural settings by incorporating variables from these different domains, and it emphasizes the importance of examining multiple contexts and their influences on individuals and their behaviors (see Figure 1).

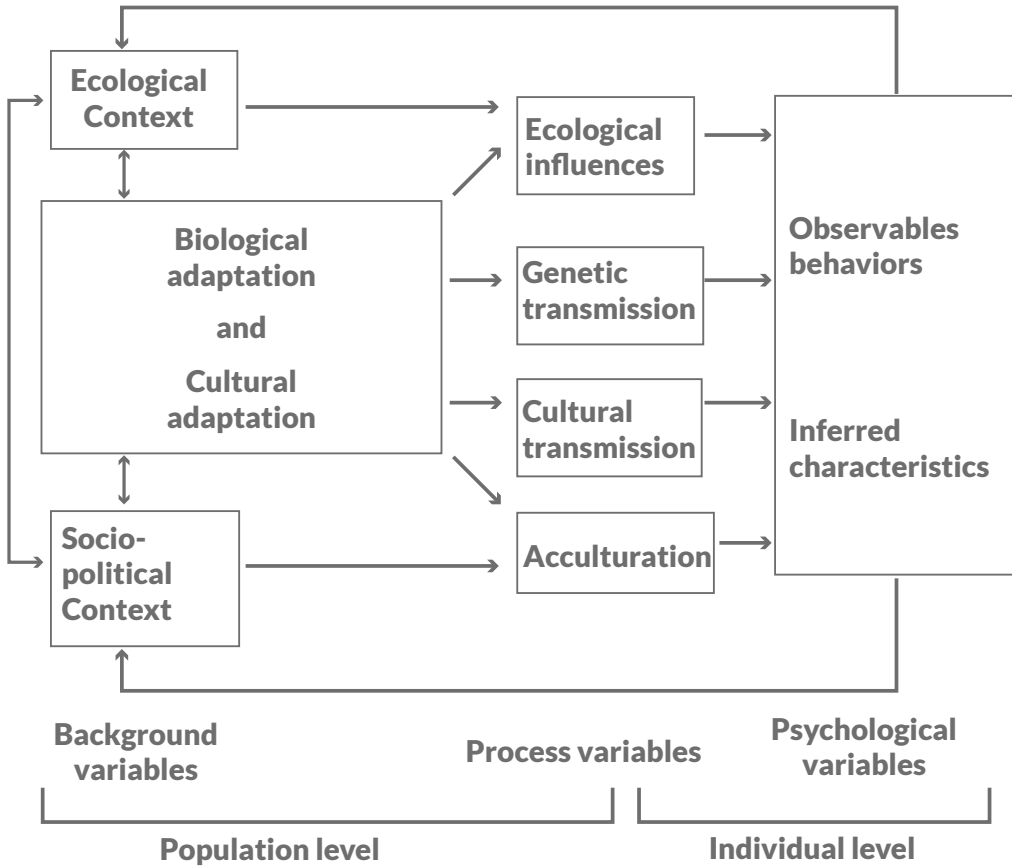


Figure 1. Ecocultural model.

Source: Berry, 2022a.

This model analyzes the origins of cultural and psychological diversity based on the influence of ecological and socio-political contexts on the biological and cultural adaptations of human groups. These group adaptations are transmitted to individuals through various means, such as genetic pathways, enculturation and acculturation processes, which are then reflected in their observable behaviors.

The ecological approach within the ecocultural model focuses on examining phenomena within their natural contexts and identifying the relationships between these phenomena and their ecological contexts. This includes factors

such as temperature and water availability, which can shape economic activities. The cultural approach, on the other hand, examines behaviors within the cultural contexts in which they develop and are shared through the enculturation process, such as practices of child socialization, the transmission of cultural values, and their expression in social and political institutions. When these examinations are conducted comparatively, they lead to the cross-cultural approach.

Similarly, within the ecocultural model, the sociopolitical context plays a predominant role in shaping behavior through the acculturation process, which occurs when individuals come into contact with other cultures. Indeed, the acculturation process has been shown to influence not only the original culture but also the behavior of the group, its members, and even the group's biology by modifying kinship structures that restrict or facilitate the formation of a couple with the contact culture. Thus, the ecocultural model helps to understand these complex interactions and their impact on behavior, providing a comprehensive approach to studying the influences of ecological, sociopolitical, and cultural contexts on human development (Berry, 2022b).

In addition to the ecocultural model, Berry (1979, 1980, 1983) proposes the «multilevel Arc Model» to specify the key contexts and their psychological outcomes. The model consists of four levels of arcs that link contexts to behaviors: 1) the molar arc, 2) the learning arc, 3) the performance arc, and 4) the evaluation arc.

At the highest level, the molar arc connects people's living situations in their ecological context or habitat with the general outcomes of their customs. The learning arc, at the second level, examines the specific experiences in which individuals engage within the ecological context and how they contribute to the development of their behavioral repertoire. The performance arc, at the third level, considers specific scenarios that promote or hinder the development and performance of specific behaviors appropriate for that scenario. Finally, the evaluation arc, at the fourth level, involves creating specific tests or tasks to assess individuals' behaviors based on their prior experiences, with cognitive style studies being the most commonly used by the author in his research (see Figure 2).

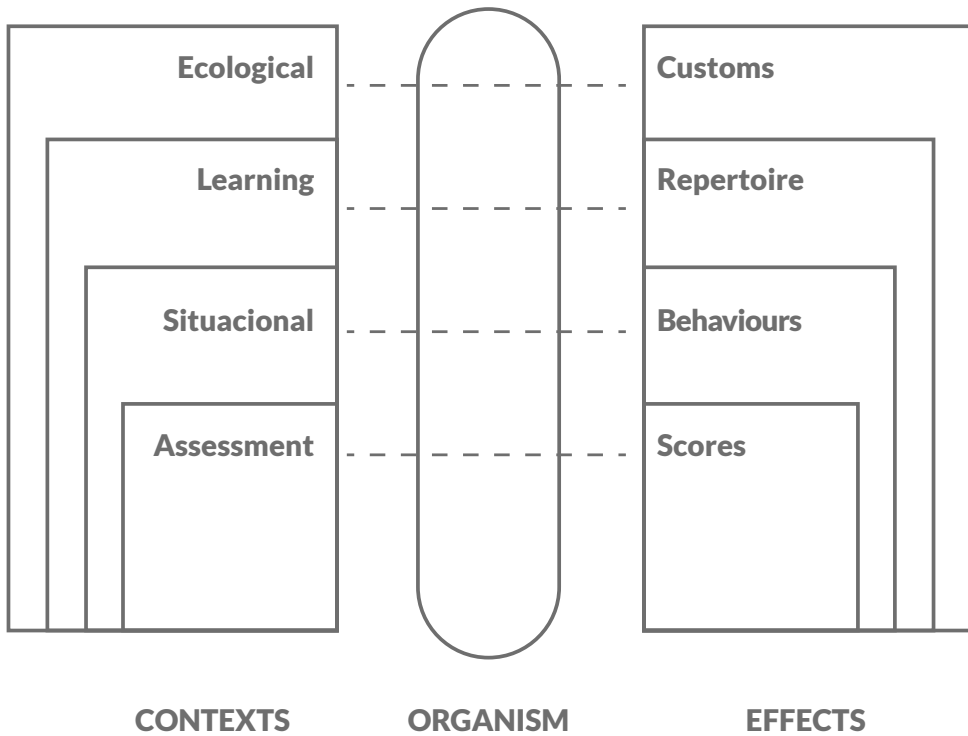


Figure 2. *Multilevel Arc Model.*

Source: Berry, 2022b.

The ecocultural model and the multilevel arc model are closely related. The former provides a general conceptual framework for understanding the links between ecological and sociopolitical contexts, cultural adaptations, and individual behavior, emphasizing the importance of considering multiple contexts and their influences on behavior. The multilevel arc model, on the other hand, is a specific framework within the ecocultural model that aims to specify the key contexts and psychological outcomes. It identifies four levels of arcs that link contexts to behaviors and provides a structure for understanding how different contexts influence behavior at various levels (Berry, 1979, 1980, 1983, 2022b).

Another proposal to address the fundamental questions is Dasen's (2022) «integrated theoretical framework» for cross-cultural study, inspired by the cognitive development work of Piaget and Vygotsky, and incorporating Berry's

ecocultural perspective through Bronfenbrenner's concentric circles model (1989). This model suggests that child development occurs within the microsystem of a «developmental niche», which consists of the physical body and the specific social contexts in which the child lives, educational practices, and parental ethnotheories. At the mesosystem level, enculturation and socialization processes are positioned as the primary mechanisms of cultural transmission, though acculturation processes must also be considered. Both the educational practices and parental ethnotheories found in the microsystem are connected to values and cosmologies present in the macrosystem, such as religious beliefs and practices (see Figure 3).

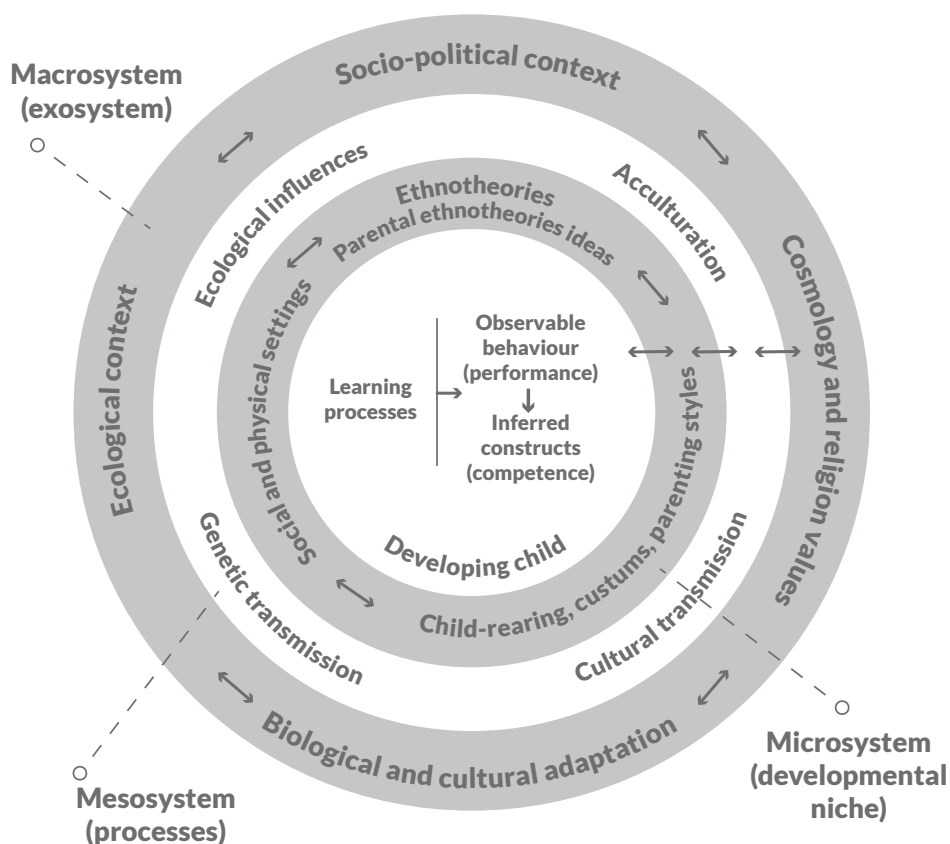


Figure 3. *Integrated Theoretical Framework*
 Source: Dasen, 2022.

It is interesting to note that within this model, the construct of cognitive style is revisited in relation to observable behavior and competencies, although it diverges from the FDI dimension. Indeed, Dasen argues that while FDI has been the most studied cognitive style cross-culturally, it has focused on comparative analyses between predominantly Western, mostly American, societies and other «non-Western» ones, such as Asian societies. This approach tends to identify style differences as a matter of the absence or presence of a particular cognitive process.

Considering that the integrated theoretical model is grounded in an eco-socio-cultural perspective, Dasen proposes a quasi-experimental methodology through the geocentric versus egocentric framework in relation to spatial orientation. In this context, some cultures locate objects on a small scale using large-scale geographical dimensions (north/south, east/west, upriver/downriver, mountain/sea), while others use body-relative dimensions (right/left) (Dasen, 2022; Dasen & Mishra, 2013; Dasen et al., 2018).

While the geocentric-egocentric framework suggests certain methodological relevance in terms of using appropriate tests for non-Western cultures, it is still based on a dichotomous relationship of perceptual processes regarding orientation relative to oneself or the environment. In this sense, the issue should not focus on the construct itself, which remains valid, but on the techniques used to operationalize it and how these can be adapted to the eco-socio-cultural conditions of the research setting.

The ecocultural and integrated theoretical models have had an impact on recent studies concerning the relationship between cognition and culture in contexts with ethnic, geographical, and vocational differences, among others. Generally, these investigations have decided to use the concept of cognitive style as an analytical variable, whether in the dimension of field dependence-independence, holistic-analytic, or collectivism-individualism, among others.

One of the areas with the most applications of this model is the educational context. Onyekuru (2015), for example, studied the relationship between FDI, university career choice, and gender in students nearing graduation from secondary school in Nigeria. A similar study was conducted by Hederich et al. (2022) with university students in Colombia. Both found a significant relationship between cognitive style and vocational training choices. Regarding the relationship between gender, training area, and cognitive style in educational contexts, Muhammad et al. (2015) found that there is a relationship between FDI cognitive style, gender, and academic achievement among biology students at a Nigerian university.

Another study in the educational area analyzed the influence of the ecological context on cognitive styles. This research was carried out by Aboritoli (2021) in rural and urban schools in Nigeria and demonstrated that the school's location

significantly contributes to the variations in cognitive styles adopted by rural and urban students. Thus, the physical environment could stimulate particular ways of processing information. Therefore, it is likely that the variation in cognition underlying cognitive styles changes fundamentally when the physical or sociocultural environment itself changes.

The work of Baess et al. (2022) is another example of the use of these models in cross-cultural research. Baess and colleagues studied how individuals from individualist cultures (Australians and Germans) and collectivist cultures (Chinese and Malaysians) encode space through cognitive processes to address the «Simon effect». This effect refers to a conflict between dual processing routes: one route based on instructions and another automatic route based on spatial stimuli, as occurs when a driver accustomed to driving on the right side must suddenly begin driving on the left, as it is in England or Australia. The results allowed the researchers to conclude the universality of the Simon effect, independent of individualist and collectivist styles.

In another example, Senzaki et al. (2014) studied drawing styles and types of pictorial representation of the horizon in Canadian and Japanese students. Their results indicated significant variations in representation styles. Specifically, they documented variations in the location of the horizon line according to the holistic ideology, predominantly present in Japanese children, versus the analytic one, present in Canadian children (Senzaki et al., 2014). These results were later compared with those obtained in a case study conducted in Mongolia, which indicated significant cultural differences between Mongolian, Canadian, and Japanese children, while simultaneously revealing universal patterns of human development regarding the concept of the horizon (Masuda et al., 2022).

In Colombia, comparative studies on cognitive styles have been conducted among students from different Colombian cultural groups (Hederich & Camargo, 1995, 1999; Hederich, 2007). These studies have shown how the cognitive styles of secondary school students from different Colombian cultural regions exhibit significant differences. Such differences, in turn, are linked to aspects related to family structure, the structure of authority within the family, and certain child-rearing practices, especially those indicating relative permissiveness and rigidity, closely related to content that is either limited or permitted. On one hand, if social activity was encouraged and individual autonomy was restricted, the results indicated a tendency for adolescents to lean toward the field-dependent pole. On the other hand, if a sense of separate identity was fostered, individual autonomy was intensified, and social activity was limited by controls and boundaries, the opposite cognitive style was encouraged (Hederich, 2007).

Conclusions

In conclusion, the ecocultural model demonstrates an important heuristic potential for studying cultural influences on cognition and using cognitive style as an indicator of an individual's cognitive functioning. Thus, cognitive style, which is initially an individual-level variable, can prove to be useful for describing the cognitive characteristics of a cultural group in such a way that they can be expressed in terms of the modal cognitive style of its members; therefore, it is still a valid tool for understanding intercultural phenomena. However, the methodological challenge will undoubtedly be guided by the review of existing tests to identify cognitive styles in light of their correspondence with the cultural specificities of the societies where they are applied, even requiring the development and validation of new instruments.

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Autism, Mirror Neurons and Being-in-the-World: An Approach from Neurophysiology to Neurophenomenology

[English Version]

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Abstract

Autism has been conceptualized as a neurodevelopmental disorder and as a different form of human cognition. From a neurophysiological perspective, the mirror neuron system (MNS) in autism has been investigated, focusing on measurable data. Neurophenomenology proposes to integrate scientific evidence with subjective experience. **Objective:** to understand the relationship between subjectivity and the brain, covering the neural processes involved in autism and the first-person experience of a group of children and adolescents from the city of Manizales. **Methodology:** mixed research, descriptive and inferential, including qualitative information, approached from an interpretive phenomenological approach. 35 children between 6 and 16 years old and 19 control peers participated. **Results:** autistic participants demonstrated greater heterogeneity in the behavior of the MNS and in their relationship with the world, both with respect to control participants and among themselves. A proposal for inclusive education called "Neurodiversity" was built, which won second place in the Premio Cívico Retos con los ODS. **Conclusions:** the importance of integrating neurophysiological evidence with first-person experience was demonstrated, allowing a broad understanding of the object of study and its applications in context.

Key words: neurophysiology; mirror neurons; autism; diversity; inclusion (obtained from the DeCS/MeSH Multilingual Thesaurus – Health Sciences Descriptors).

Resumen

El autismo se ha conceptualizado como una alteración del neurodesarrollo y como una forma diferente de la cognición humana. Desde la neurofisiología, se ha investigado el sistema de neuronas espejo (SNE) en el autismo, centrándose en datos mensurables. La neurofenomenología propone integrar la evidencia científica con la experiencia subjetiva. **Objetivo:** comprender la relación entre subjetividad y cerebro, abarcando los procesos neuronales implicados en el autismo y la experiencia de primera persona de un grupo de niños, niñas y adolescentes de la ciudad de Manizales. **Metodología:** investigación mixta, de tipo descriptivo e inferencial, con inclusión de información cualitativa, abordada desde un enfoque fenomenológico interpretativo. Participaron 35 menores entre 6 y 16 años y 19 pares controles. **Resultados:** los participantes autistas demostraron mayor heterogeneidad en el comportamiento del SNE y en su relación con el mundo, tanto respecto a los participantes controles como entre ellos mismos. Se construyó una propuesta de educación inclusiva denominada «Neurodiversidad», ganadora del segundo lugar en el Premio Cívico Retos con los ODS. **Conclusiones:** se demostró la importancia de integrar la evidencia neurofisiológica con la experiencia

de primera persona, permitiendo una comprensión amplia del objeto de estudio y sus aplicaciones en contexto.

Palabras clave: neurofisiología; neuronas espejo; autismo; diversidad; inclusión (obtenidos del Tesauro Multilingüe DeCS/MeSH – Descriptores en Ciencias de la Salud).

Resumo

O autismo tem sido conceitualizado como uma alteração do neurodesenvolvimento e como uma forma diferente de cognição humana. A partir da neurofisiologia, o sistema de neurônios-espejo (SNE) no autismo tem sido investigado, com foco em dados mensuráveis. A neurofenomenologia propõe integrar a evidência científica com a experiência subjetiva. **Objetivo:** compreender a relação entre subjetividade e cérebro, abrangendo os processos neurais implicados no autismo e a experiência em primeira pessoa de um grupo de crianças e adolescentes da cidade de Manizales.

Metodologia: pesquisa mista, de natureza descritiva e inferencial, com inclusão de informações qualitativas, abordadas a partir de uma abordagem fenomenológica interpretativa. Participaram 35 menores com idades entre 6 e 16 anos e 19 pares controle. **Resultados:** os participantes autistas demonstraram maior heterogeneidade no comportamento do SNE e na sua relação com o mundo, tanto em comparação aos participantes controle quanto entre eles próprios. Foi construída uma proposta de educação inclusiva denominada «Neurodiversidade», vencedora do segundo lugar no Prêmio Cívico Desafios com os ODS. **Conclusões:** foi demonstrada a importância de integrar a evidência neurofisiológica com a experiência em primeira pessoa, permitindo uma compreensão ampla do objeto de estudo e suas aplicações no contexto.

Palavras-chave: neurofisiologia; neurônios-espejo; autismo; diversidade; inclusão (obtidos do Tesauro Multilíngue DeCS/MeSH – Descriptores em Ciências da Saúde).

Introduction

The concept of autism has undergone significant evolution since its formulation in the 1940s. Initially, both Leo Kanner and Hans Asperger referred to autism as a condition in which their patients had difficulties establishing emotional contact with other individuals and meaningful relationships with the world (Asperger, 1944; Kanner, 1943).

Currently, there are two main views on autism. The first is the medical model, which is based on scientific evidence and continues to recognize dysfunctions in interaction with other individuals and with the world as a clinically significant characteristic of autism. Under this model, autism is called "autism spectrum disorder" (ASD), a neurodevelopmental disorder that presents difficulties in socialization and communication, stereotyped behaviors, restricted interests, sensory hypersensitivity or hyposensitivity (American Psychiatric Association [APA], 2014), as well as deficiencies in the understanding of symbolic language, in the theory of mind (ToM) and in imitation skills (Ramachandran, 2012).

The second approach is that of neurodiversity, an emerging model according to which autism does not constitute an alteration, but rather a diverse form of human cognition. It presents skills for specific aspects, such as visual-constructional tasks, learning of focused topics (Armstrong, 2012), attention to detail, systematic processing, and technical thinking (Baron-Cohen, 2013). From a social perspective, neurodiversity is the result of agitations and movements of people, mainly with autism, who have fought for inclusion in different contexts, such as education and work (Sánchez, 2020).

Although their conceptualizations are dichotomous, the medical model and neurodiversity share an idea: autism occurs within the framework of the individual's relationship with the world and with others. While the medical model considers that the person-world relationship is affected and neurodiversity sees it as a different way of relating to the environment, there is an inhabitation of the world implicit in autism that differs from the socially accepted view.

The relationship between the individual and the world has been a widely discussed philosophical problem. One of the authors who addressed this issue was Martin Heidegger, a German philosopher, who proposed the concept of "*Dasein*", a new ontological understanding that focuses on the individual's way of existing and places him in the world, with which he is in constant relationship. With the term "*Dasein*," which literally translates as "being-there" (Safranski, 1997), Heidegger emphasized a being whose essential constitution is that of being-in-the-world (*in-der-welt-sein*), that of being outside. In this sense, this is

a being immersed and active in a world with social and cultural characteristics, which he internalizes and transforms, while he also generates changes in his environment through his existence (Heidegger, 2003).

Etymologically speaking, the Greek word “*éxo*” (ἔξω), from which the verb to exist comes, means outside (Lidell & Scott, 1883). Thus, for Heidegger, *Dasein* is an entity, but it is more than something that merely is. *Dasein* is the being that asks about being. Unlike other entities whose character is categorial —such as the case of two entities that are in space as a being-inside or a being-there with something—, *Dasein* is not simply within the world or next to another entity, but its constitution is existential, so that its ‘*being next to*’ implies an inhabitation, a being in relation to the world establishing a familiarity with that which is outside or, in other words, existing (Heidegger, 2003).

Quoting Parmenides' phrase “*τὸ γὰρ αὐτὸ νοεῖν ἐστίν τε καὶ εἶναι*” (in effect, perceiving [thinking] is the same as being), Heidegger indicated that being occurs in identity and that identity has its place in thinking, which allows him to be himself with himself (Heidegger, 1988). This process of identity is mediated by sensitive experiences with others, through which the being is constantly revised, assuming an attitude towards his own existence (Contreras, 2006).

In this sense, identity is a process in which the experiences given in a sociocultural context, in a world of life (*lebenswelt*) and in thinking are found. There is no living or existing without a being-in-the-world in relation to internal states. This is convergent with the position of Varela et al. (2009), who affirm that the meanings regarding the world are mediated by social, linguistic and bodily processes.

Francisco Varela, a Chilean biologist, was one of the pioneers of neurophenomenology. A research program developed from neuroscience, phenomenology and the philosophy of mind, which emerges from the need to generate a dialogue between the rigor of the scientific method and quantitative data, obtained through neurophysiological and neuroimaging studies, and the first-person subjective experience of the participant in a research process. Neurophenomenology studies the relationship between subjective experience and the processes of the nervous system. Gallagher and Fernández (2020) state: “While Husserl proposed a purely phenomenological consideration of the intrinsic temporality of consciousness, Francisco Varela formulates a naturalized approach that integrates phenomenological and neurophysiological elements” (pp. 17-18). In this way, the objective and subjective views come together to obtain a more comprehensive perspective of the object of study.

Among the leading figures in the phenomenological tradition are Edmund Husserl, Martin Heidegger and Maurice Merleau-Ponty. Phenomenology studies the phenomenon (*φαινόμενον*) as it appears to the subject's consciousness, taking

into account his first-person experience (Zahavi, 2000). Husserl, Heidegger's teacher and considered the father of phenomenology, proposed that every assumption or judgment could be suspended or "*epoché*" (*ἐποχή*) in order to be captured in a pure manner, in its essence (Husserl, 2012). According to Heidegger (2003), phenomenology allows "[...] to make visible from itself that which is shown, and to make it visible as it is shown from itself" (p. 54).

Unlike Husserl, for Heidegger it is not possible to put all assumptions in parentheses, since, as mentioned above, Dasein is in relation to a social context that shapes it, so, although it remains fundamental to go to the thing itself, it is not possible to grasp it in a pure way. For Merleau-Ponty, the body and the senses mediate the perception of subjective experience, so the understanding of the world is not free of assumptions either (Merleau-Ponty, 1994). Despite their differences, Heidegger, Husserl and Merleau-Ponty converged on the importance of first-person experience and on understanding things from the way the individual experiences them in their daily lives.

The meeting point among autism, being-in-the-world and neurophenomenology is seen in the need to understand the relationship between the processes of the nervous system involved in this condition and the subjective first-person experience of those who have it. In other words, it is about identifying the neurobiological substrate of autism in relation to the being-in-the-world of autistic people and the meanings they attribute to their relationship with the world, strengthening the understanding of their own experience.

In the field of neuroscience, numerous studies have been conducted that have offered explanations regarding what happens in the brain of an autistic person. Some of these are neurophysiological studies that have explored the activity of mirror neurons or the mirror neuron system (MNS), a set of brain cells that are activated when an action is performed, as well as when it is observed by another individual (Rizzolatti & Craighero, 2004). The MNS circuits are said to be responsible for allowing human beings to mentally simulate the actions observed in others, learn through imitation, and establish connections from affective and emotional points of view (Gallese et al., 2004; Iacoboni, 2009). The MNS also allows us to create in our own mind a representation of what others feel and think, that is, the ToM (Ramachandran, 2012).

Various studies that have focused on MNS activity in autism using electroencephalography (EEG) have yielded conflicting results. Firstly, some studies (Bernier et al., 2007; Martineau et al., 2008; Oberman et al., 2005) suggest that the mu rhythm, an electrophysiological signal that occurs

between 8-13 Hz in the EEG (Palau-Baduell et al., 2011) and which has been considered a biomarker of mirror neurons that become desynchronised when performing and observing a movement performed by another individual (Ramachandran, 2012), is only suppressed when performing one's own movement, but not when observing it when the movement is performed by another person.

This would explain the difficulties that autistic people have in establishing a connection with an observed individual. On the other hand, studies also carried out with EEG (Bernier et al., 2013; Fan et al., 2010; Raymaekers et al., 2009) have revealed that participants with autism, in a similar way to control subjects, show a desynchronization or suppression of the mu rhythm when they observe another individual performing a movement, which concludes that they do establish some kind of connection with them. In the context of *Dasein*, they demonstrate that they exist, establishing a relationship with that which is in the world through inhabiting or familiarity with others.

Despite their divergent results, these investigations have two aspects in common: they all focused on the observable and measurable data obtained through neurophysiological recording, but none considered the subjective experiences of the participants regarding what it means to be-in-the-world as an autistic individual. While the rigorous study of the data allows us to understand how the brain works, allowing space for the individual's first-person experience broadens the understanding of the object of study, and facilitates its comprehension and subsequent intervention in the different contexts of life, such as the educational and social contexts.

Considering the above-mentioned background, this research had a neuro-phenomenological orientation. Its objective was to understand the relationship between subjectivity and the brain, covering the neural processes involved in autism and the first-person experience of a group of children and adolescents diagnosed with ASD from the city of Manizales, Caldas (Colombia). This study sought, on the one hand, to explore the functioning of the MNS in the participants and, on the other hand, to capture the subjective experience regarding their being-in-the-world as autistic people.

Methodology

Design

Mixed research. In quantitative terms, this study was descriptive and inferential. Qualitative information was included, approached from a Socratic procedure and an interpretive phenomenological approach.

Sample

35 children and adolescents diagnosed with high-functioning autism (ASD grade 1) participated in the study, linked to the *Instituto para el Desarrollo Integral del Niño en Condición de Autismo* (DINA) of the Universidad de Manizales, as well as 19 control peers. The participants were between 6 and 16 years old at the time the research was conducted. All the minors belonging to the autism group were diagnosed by an interdisciplinary team. Likewise, they had therapeutic support and were attending a public or private regular education institution in the city. It was verified that all participants had an intelligence quotient (IQ) equal to or greater than 85 points, through a prorating based on the Wechsler Intelligence Scale for Children, version IV (WISC-IV). Four participants were removed from the research due to having a psychiatric history that did not allow them to develop the cognitive tasks designed for the experimental conditions.

The research was approved by a bioethics committee, based on *Resolution 8430* (1993), which regulates the conduct of scientific studies in Colombia. Prior to the evaluation process, parents and minors were informed of the characteristics of the research, and their questions were answered. After the parents signed the respective informed consent and the minors gave their assent, the evaluation process was carried out.

Techniques and Instruments

To obtain quantitative data, an electroencephalogram (also called EEG) was used, a study that allows noninvasive exploration of the brain's electrical activity. Recording was done using frontal, central and parietal channels, as well as two headphones' references (A1 and A2) and a *ground* electrode. The channels used for recording were: F7, F8, F3, Fz, F4, C3, Cz, C4, P3, Pz and P4. The electrodes were placed on the scalp following the international reference system 10/20, which,

according to Iriarte et al. (2013) is called this way "[...] because the distances between the electrodes are 10% and 20% of the total distances measured, either in circumference or in a straight anteroposterior or transversal line" (p. 7). The impedance of each channel prior to electrophysiological recording was less than 5K Ω .

Event-related desynchronizations (ERD) of the EEG mu rhythm, considered biomarkers of the MNS (Ramachandran, 2012), located in the band between 8-13 Hz, were evaluated. Five experimental conditions were designed: baseline condition (BAS C), observation of movement performed by another individual or biological movement (OBS BIO), imitation of observed movement (IOM BIO), observation of a first non-biological movement (OBS NO BIO 1) and observation of a second non-biological movement (OBS NO BIO 2).

The qualitative information consisted of exploring the subjective first-person experiences reported by children and adolescents about their life and their being-in-the-world as individuals with autism. To do so, a Socratic style was used based on the proposal of Martínez (2009), according to which a conversational process begins from the phenomenal field of the interlocutor, from what interests him, reaching the essence of things themselves. This style of conversation does not have a rigid structure, but is flexible, and allows for the formulation of questions that follow the course of the conversation given by the interlocutor.

Since this is a conversational style with a phenomenological orientation, things are taken as they appear, such as the subjective first-person experiences related to a topic. In the case of this research, the questions were asked in a simple and concrete manner, without leaving room for ambiguity, especially in the case of participants with autism. It should be noted that not all individuals expressed a willingness to converse, so they were not pressured, but rather common ground was sought with them and dialogues were generated to the extent they allowed it.

Procedures

The conversations about subjective experiences took place in the facilities of the Neurophysiology Laboratory of the Universidad Autónoma de Manizales, prior to the neurophysiological recording, fostering an environment that invited participants to express their ideas. This was done by avoiding furniture barriers, as well as structured questions that gave the impression of being in a clinical interview. The participants were asked what their life was like on a daily basis, what relationships with others meant to them, and what they liked most about

their lives. The concept of autism was not emphasized, but it was used as a starting point to formulate some questions associated with socialization with peers, friendship, and family.

For the neurophysiological recording, participants were placed in a room free of sensory stimuli that could affect the focus of their attention. The procedure of Oberman et al. (2005) was replicated, showing the experimental conditions on a screen placed 1 meter away from the participants. Table 1 lists these conditions.

Table 1. *Experimental conditions of the stimulation protocol.*

Experimental Condition	Description	Duration
C BAS	Baseline recording, in which participants remained in a resting state. Under this condition, no ERD of the mu rhythm is present, demonstrating that there is no activity of the MNS.	5 seconds.
OBS BIO	Participants are presented with a video clip of a person moving an arm in an extension-flexion direction. This is when, under expected conditions, the ERD or suppression of the mu rhythm occurs, demonstrating the activation of the MNS when observing a movement performed by another individual.	20 seconds.
IMI BIO	The video clip from the previous condition is repeated with a different aspect: this time, participants are asked to imitate the observed movement. Under expected conditions, the MNS becomes desynchronized or suppressed when the movement is imitated.	20 seconds.
OBS NO BIO 1	A video clip is projected on the screen in which, on a white background, a black circle appeared moving in the same direction as the arm. No desynchronization or suppression of the mu rhythm would be expected in this condition.	20 seconds.

OBS NO BIO 2

A video clip with a gradient blue background is shown on the screen with several colored spheres falling and jumping. Unlike the previous condition, in this case a greater response from the brain would be expected. 20 seconds.

Note. The experimental conditions were repeated three times in order to average the electrophysiological signal.

Cadwell Easy® III EEG software was used through one of its DC or channels to discriminate the conditions of the stimulation protocol.

Information Processing

The data were analyzed using MATLAB® software, through which filters were applied to eliminate noise from the signals. The maximum peaks were identified while the band between 8-13 Hz was defined for analysis and the characteristics of the signals were extracted, averaging them for each experimental condition executed. The extraction of the powers per channel and per experimental condition was compared with BAS C through an ANOVA with alpha of 0.05. The qualitative information obtained in the conversations with the participants was processed through the ATLAS.ti Software, version 23. Subsequently, it was analyzed under an interpretive phenomenological approach, based on the updated proposal of Duque and Aristizábal (2019).

Results

Qualitative Findings

The conversations held with the participants revealed the heterogeneity of their thinking and their way of narrating themselves, especially in the group with autism. In all the conversations with the autistic participants it was possible to identify a person-world relationship, but in a way that was different from the ways of inhabiting the world of the participants in the control group.

Unlike the control group, where participants were more homogeneous in the length of their speech, interactions with participants with autism revealed dichotomous points, with children and adolescents being very willing to express their ideas, while others responded in a monosyllabic manner. Participants

them rudely. Before placing the electrodes on her scalp to perform the neurophysiological test, an autistic adolescent said: “I don’t like to talk much, but if you have to press hard on the head to do that, do it. I like it when you press hard, it doesn’t hurt at all” (personal communication, June 8, 2018).

In contrast, other autistic participants, especially some girls, showed a lot of social sensitivity, stating that they had friends and shared time with them at school and outside of it. One of them mentioned:

I have lots of friends. My school is fabulous, I love it. I can do what I like there and my friends like my ideas because I know a lot about fashion, and I tell them what looks good on them. They also love my dog and when they come to my house, they take pictures with her (Personal communication, June 8, 2018).

Another striking aspect of the discussions was that most participants in the autism group reported liking visual stimuli and visualconstructional tasks. In the control group, these interests were also found both in school activities and independently, but in the autism group, these interests proved to be more specific. For example, several autistic participants indicated that they liked drawing and painting. Some stated that they preferred gore anime and youth manga drawing, while others reported greater interest in figures with a lot of depth, three-dimensional effects, and optical illusions. Several participants with autism expressed an interest in puzzles, puzzle pieces, as well as models of machines and digital systems.

Quantitative Findings

The ERDs of the mu rhythm, located in the band between 8-13 Hz, proved to be negative both for the group with autism or ASD and for the controls. The channel that was of most interest among the central channels was the C3, considering the right laterality of the participants; as well as the mu rhythm, whose source is located in the sensorimotor cortex (Hamilton, 2013). The C3 channel was placed over this area, capturing its electrical signal.

Greater data dispersion was identified in the control group. However, it was in the group of participants with ASD that more atypical data were found, especially in channel C3, in the biological movement observation condition. Figure 2 illustrates this behavior.

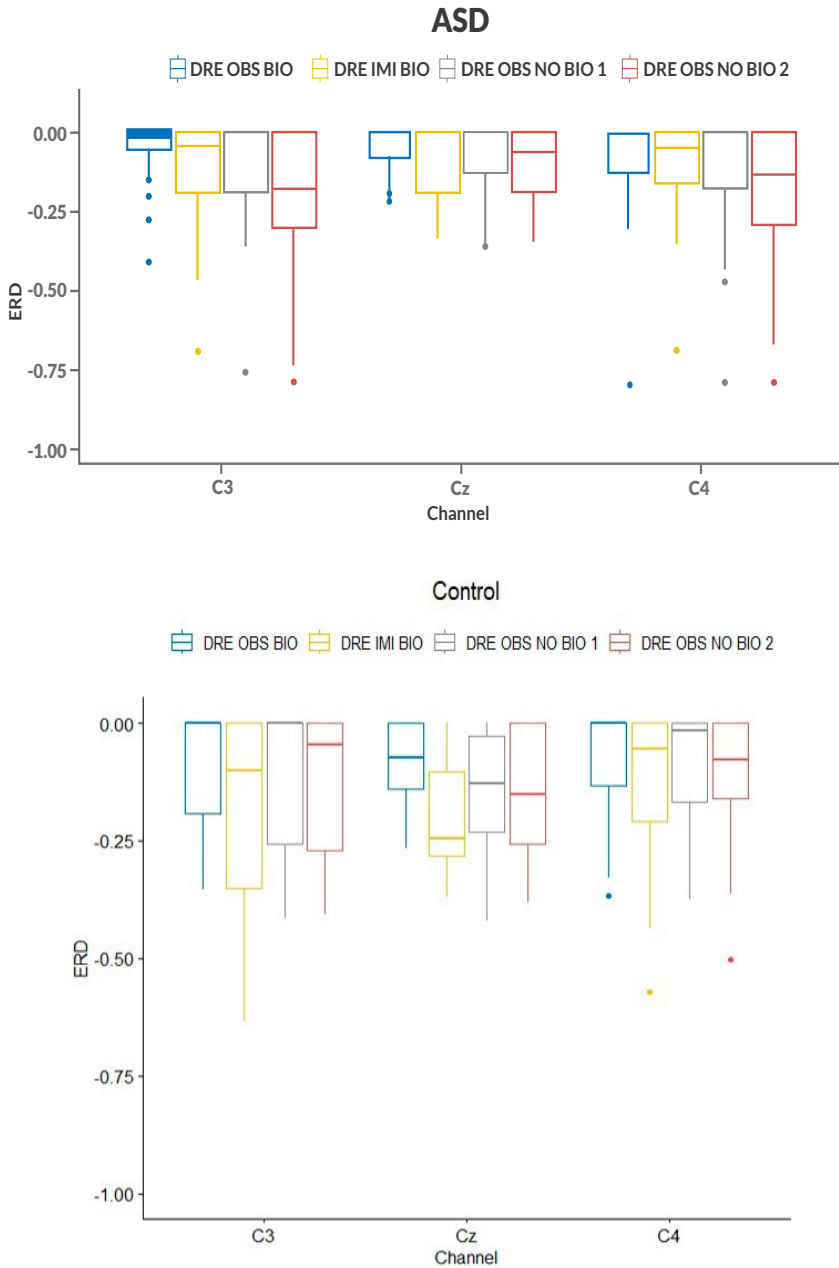


Figure 2. Data relationship between ASD and control groups.²

² ERD for central canals in the four experimental conditions, compared with BAS C.

In the Cz channel, significant differences were identified between the two groups. In the IMI BIO condition ($p = 0.000$), the ERD was higher in controls than in participants with autism, which is compatible with the theory that states that people with this condition have lower imitation abilities (Ramachandran, 2012). In the OBS NO BIO 1 ($p = 0.005$), the group with autism obtained a ERD of 724% compared to 14% of the control group. In the same channel, for the OBS NO BIO 2 condition, the group with autism obtained a ERD of 1010% compared to 15% of the control group of participants.

Regarding the hypothesis of an altered MNS in autism, measurable through the absence of ERD or suppression of the mu rhythm in the OBS BIO condition through the C3 channel (Oberman et al., 2005), the data revealed heterogeneous behavior in the population, which generated its activation in some participants, but not in others. This could be demonstrated by the suppressed electrophysiological signal in the band between 8-13 Hz in some participants (MNS activation), while in others the voltage fluctuation continued as if they were in a resting state (absence of MNS activation). Figure 3 shows this behavior between two subjects diagnosed with ASD.

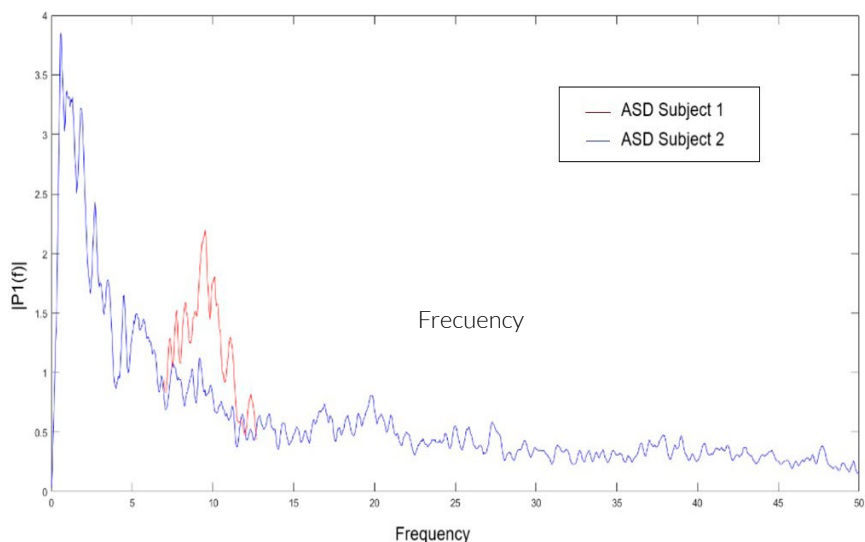


Figure 3. ERD Channer C3 for condition of biological movement observation Behavioral relationship of the MNS in two people with autism.³

³ The electrophysiological signal of subject ASD 1 does not present suppression in the band between 8-13 Hz, while in subject ASD 2 it is observed.

Discussion

The systematic narration of autistic participants, as observed in this research, is relevant in terms of meaning. For people in the autistic group, recounting their daily life step by step proved to mean organization, tranquility and reduction of anxiety, which was of little relevance and even indifference for the control participants. In terms of Heidegger (2003), systematization is part of their existential constitution, being this their way of being together with other individuals, of inhabiting the world, of being connected and of becoming familiar with it.

Based on the accounts of autistic participants, it was identified that the lack of systematization, together with disorganization in the context, for example, the absence of patterns or defined agendas, as well as stimuli that for them constitute specific interests, would represent a difficulty for their person-world relationship. This systematization would be a way of inhabiting the world of the autistic individual, as well as a way of giving meaning to what is outside.

In this research, this was not only observed in terms of schedules, routines and anticipations of previously unestablished situations – such as changes in school activities, transport routes, food, home furnishings or playlists of audiovisual content – but also in meanings, such as colors and shapes; the color red was related to anger, for example, and green to tranquility. By acquiring these meanings, these patterns of the outside world would require continuity in the autistic person which, when altered, would generate high levels of anxiety, as well as feelings of incomprehension by other individuals, as observed in one of the stories.

Other relevant aspects in the accounts of autistic people were the greater presence of suspicion and the differences in the attitudinal disposition towards conversation. The Coffee Region, where the participants of this research and their parents stated that they reside, is a region of Colombia characterized by an attitude of trust, emotional reciprocity and a significant interest in conversation, even among children and adolescents. This contrasts with the suspicion and lesser disposition to conversation of some participants with autism.

In terms of meaning, socio-affective reciprocity would mediate differently in the construction of the identity of the autistic person, taking into account aspects such as the clinical picture of autism from the medical model - restricted interests and alterations in sensory modalities - and the differences raised from neurodiversity- preference for specific topics or diverse ways of integrating information received through the sensory organs. For some autistic people, as observed in the present research, it would be of little significance and even

annoying to talk with individuals recently met or who talk about topics that are not or are not interesting at all, as well as to talk with people who talk loudly, quickly or too much, or in spaces that are not or are very stimulating in sensory terms.

According to Heidegger (2003), *Dasein* in autism could be less susceptible than others to being absorbed in the world as a fallen being, taking into account the lower reciprocity with other individuals and the alerts that are turned on in sensorial terms and that intervene in not opening up to some experiences. Otherwise, the absorption would occur mainly through the elements of the world with which the individual resonates most, as is the case of his particular interests.

On the other hand, the present results demonstrate the importance of integrating neurophysiological findings with first-person experience for autism research. It is possible to consider that the divergent results found in previous research on MNS functioning in ASD (Bernier et al., 2007; Bernier et al., 2013; Fan et al., 2010; Martineau et al., 2008; Oberman et al., 2005; Raymaekers et al., 2009), could be due to the ontological heterogeneity of people with autism, represented in a wide spectrum of the person-world relationship. In this research, the atypical data presented in Figure 2 and found in channel C3 in the OBS BIO condition would correspond to the diverse characteristics of the participants, which include the different ways of seeing themselves, of relating to others and of being absorbed by the world.

It should be noted that the divergent results found in Figure 3 corresponded to two participants who narrated themselves differently. The participant who did not present the ERD of the mu rhythm in the OBS BIO condition in channel C3, indicating what would be MNS inactivity, demonstrated distant proxemics and an attitude unwilling to interact. On the contrary, the child in whom the ERD was observed, considering what would be MNS activation, showed greater openness to conversation, talking about his interests and his relationship with the world, but also demonstrating an attitude of openness towards the story of the researcher with whom he interacted. Likewise, his proxemics were less rigid, making gestures to converse, smiling and listening attentively when spoken to.

One aspect that also stands out is the difference in the ERD in the two groups in the OBS NO BIO 1 and OBS NO BIO 2 conditions in the Cz channel, where the group with autism obtained higher percentages (724% compared to 14% and 1010% compared to 15%). These divergences would indicate that autistic people are more oriented towards the details of objects and the identification of patterns in elements of the world where other individuals are not present; such as video games, computer programs, machines and other systems (Baron-Cohen, 2013).

However, establishing relationships between subjective experience and neurophysiological findings, it is observed that, despite sharing the same

diagnosis, people with autism - it should be remembered that this is autism grade 1 - adopt different ways of being-in-the-world; not only in relation to non-autistic individuals, but also among themselves, observed in the behavior of the MNS, in the way of narrating, in particular interests, as well as in the divergences in relationships with friends, family and classmates.

Based on Heidegger's proposal (2003), the greater connection with stimuli not coming from other individuals, observed in some autistic participants in this research, could be understood from the encounter of another entity with *Dasein*. In this sense, the conditions OBS NO BIO 1 and OBS NO BIO 2 as entities (things or elements that are) are not simple entities without more but are determined by the being of *Dasein* (corresponding to the participant with autism) as entities, which acquire a meaning from which they are seen and represented. Therefore, this *Dasein*, as a being that exists, arranges and takes care of the entity that it discovers in its surrounding world in a different way than other individuals (control participants) do. The two forms of relationship imply being outside, leaving their internal spheres to a different extent, one more than the other, but both being in relation and inhabiting the world.

Although the present findings may reflect the heterogeneous ways in which the MNS behaves in autism, they do not provide us with answers, but rather with questions about the differences among autistic people. The atypical data observed in Figure 2 for the group of participants with autism could also be mediated by subjective characteristics of individual and internal experiences that could not be observed using techniques for exploring brain bioelectrical activity. However, through the present results, it is possible to consider that the ENS, as a neuronal circuit, mediates the subjective experience of the autistic person situated in the world, while this experience influences the MNS, stimulating its functioning. Thus, the differences in the MNS could also be mediated by the identities that are constructed through the experiences lived within the framework of social and cultural processes.

Relationship with the Objectives

Considering that the objective of this research was to understand the relationship between subjectivity and the brain, covering the neural processes involved in autism and the first-person experience of the participants, it was considered that the results could have a significant impact on an educational institution or local

school, this being the space most referred to by the participants and the one in which they expressed having the most significant experiences.

Based on the neurophenomenological nature of this research, an integrative educational intervention initiative was designed, based on the first-person experiences of the children and adolescents evaluated, as well as on the neurophysiological findings. From the experience of the participants, the interests they reported in the laboratory were taken into account, such as visual stimuli and visual-constructional tasks when acquiring new knowledge. The initiative was called "Neurodiversity: neuropsychopedagogical intervention program for the inclusive education of children and adolescents with autism in the city of Manizales" (abbreviated "Neurodiversity"), led by one of the researchers.

The two objectives of this initiative were: first, to design an inclusive classroom that is friendly to cognition and to the ways of inhabiting the world of students with autism; second, to co-construct with classroom teachers and guidance teachers new teaching-learning strategies for students with autism and their peers. The initiative won second place in the *Premio Cívico Retos con los ODS*, organized by the *Manizales Cómo Vamos* Corporation, its partners and allies.

The money given as part of the award prize was invested in the adaptation of the fourth-grade classroom of the San Pío X Educational Institution (E. I.) in the city of Manizales, which is a public institution. The fourth-grade classroom is located in the *La Capilla* location of the *La Enea* neighborhood, first block. This is a regular classroom attended by both boys and girls with autism and other conditions, as well as students without any other diagnosis. The space was conditioned based on the qualitative and quantitative findings of the research, as well as Armstrong's thesis (2012) for the creation of the neurodiverse classroom.

The materials acquired were 3D anatomical models, 3D books, adhesive and buildable pieces, art materials, pictograms for the sequential completion of tasks, games to strengthen social skills, English phrases, models of the human face and body, 80 cm x 120 cm banner prints to learn topics from different subjects by jumping (Spanish, English, Natural Science, Social Studies and Mathematics), portable sheets to strengthen semantic skills and two pouf chairs to change places in class. Considering that the "Neurodiversity" initiative was developed during the COVID-19 lockdown period, teachers were suggested to lend the materials to the children. Figure 4 shows the conditioned classroom.



Figure 4. Conditioned classroom at the E.I. San Pío X, fourth grade.⁴

It should be noted that the second objective of the “Neurodiversity” initiative was to co-create with classroom teachers and guidance counselors new teaching-learning strategies for students with autism and their peers. For this reason, 10 workshops were held with five classroom teachers and the guidance counselor from the E.I. San Pío X. These workshops were based on a horizontal relationship, in which the phenomenological method and the Socratic style based on the proposal of Martínez (2009) were also used. On this occasion, the aim was to learn about and understand the first-person experience of teachers regarding their work in the classroom with students with autism, expanding their phenomenological field for the generation of new ideas that facilitate teaching-learning processes in this population.

The workshops were held weekly for two hours using the *Google Meet* application. Although a researcher moderated and prepared a slide presentation for each meeting, the workshops were open to dialogue and the generation of ideas, based on the first-hand experience of the participants and on scientific evidence. The workshop topics were the following: 1) Generalities of autism:

⁴ The classroom seeks to adapt to the way students with autism inhabit the school world, which is why emphasis was placed on the purchase of visual-construction materials.

etiology, pathophysiology, sensory integration, emotion, cognition and behavior. 2) Neuropsychological and neurophysiological profiles of the child population with autism in the city of Manizales. 3) Children with autism in the school context: intervention strategies in the classroom, part 1. 4) Children with autism in the school context: intervention strategies in the classroom, part 2. 5) Work strategies by curricular areas with neurodiverse students. 6) Play as a tool for sensory integration and motor development. 7) How to create an inclusive and neurodiverse classroom. 8) Children with autism and their classmates. 9) Neurodiverse children, their families and their schools, part 1. 10) Neurodiverse children, their families and their schools, part 2. The workshops allowed teachers to share their understanding of their work in the classroom with their neurodiverse students, generating strategies with their classmates and acquiring new knowledge based on the results of the research.

Finally, four meetings were held with the parents, brothers and sisters of the students with autism from the E.I. San Pío X. These meetings were also based on the phenomenological method and on Martínez's proposal for Socratic dialogue (2009), questioning the interlocutors about being-in-the-world as a family member of a person with autism. The topics addressed scientific evidence but focused on the subjective experiences of the family members. The meetings, also held through *Google Meet*, were open and focused on the following aspects: 1) Generalities of autism. 2) Children with autism, their brothers and sisters. 3) Coping with stress in families of people with autism. 4) Children with autism in times of COVID-19: intervention strategies and care routes. During these meetings, parents expressed their feelings about their life world and the new ways of narrating themselves after the arrival of a child with autism in the family. Questions were asked that facilitated the identification of new possibilities to discover meaning in the face of the challenges that autism brings in childhood.

Conclusions

In the autistic person grade 1, as was the case of the participants in this research, a person-world relationship is observed, but given in a different way than that given in the person without this condition. From Heidegger's proposal (2003), the relationship in this research was between *Dasein* (way of existing of the participant with autism) and the entity (which is, in this particular case, conditions of observation of non-biological movements) that has a meaning for him; therefore, it does not constitute an entity without more, but it is shown and is represented

in his world, being determined by him and acquiring a particular meaning for him as an outstanding detail that follows a pattern or a systematic process.

In the educational context, it is essential to take this aspect into account, since it implies a recognition of the difference in the relationship between the autistic person and the world compared to the relationship between non-autistic person and the world. In a practical way, and as proposed by the “Neurodiversity” initiative, this underlines the need to create strategies that integrate the autistic student’s being-in-the-world. Although the educational context seeks to strengthen relationships between peers, autistic people also require their differences to be recognized and learning scenarios to be fostered not always involving social interaction—much less forced—but that also facilitate the completion of individual tasks and the relationship with other elements, for example, animals, plants, minerals, as well as with objects of particular and significant interest for autistic people.

In the meantime, it is essential to respect the interests of autistic people in the educational context and to understand their subjective experience, for example, by allowing them to refer to their topics of interest in the development of academic activities, understanding their different ways of integrating sensory information, giving value to systematization in teaching-learning strategies and anticipating changes in previously established routines.

As indicated in the previous paragraph, the aspects described would apply to people with autism grade 1, the diagnosis corresponding to the children and adolescents in this study. However, this could not be said for cases of people with autism grade 2 or grade 3, where the psychophysical restrictors are greater and influence the person-world relationship. The present findings allow us to consider that the degree of autism could be directly proportional to the existential constitution of *Dasein*. However, both the imbalance of the evaluated sample of people with autism with respect to the control participants and the absence of people with other degrees of autism in this study constitute limitations to generalizing the present results. For this reason, it is necessary to carry out more studies with more balanced samples and that include participants with autism grades 2 and 3, making use of other methodologies that facilitate the evaluation of different cognitive, motor, emotional and affective processes in these other two groups, as well as the understanding of their subjective experience and their set of meanings.

The present research demonstrated the close relationship between mirror neurons and being-in-the-world. Aspects such as social interaction and the construction of bonds with other individuals would be conditioned by subjective characteristics of first-person experiences, mediated by mental processes linked to brain circuits, such as the MNS. In turn, the world of life, in which culture

and society participate, would provide feedback to this circuit, stimulating its functioning through interaction with others. It is considered that the different ways of being-in-the-world of individuals with autism could be integrated into the proposal of cognitive differences, as referred to by the neurodiversity model, also recognizing the impairments in aspects such as social interaction and imitation that are described from the medical model.

Autism would constitute a philosophical problem, considering that the concept used could influence the way in which the person with this condition thinks, identifies and, in effect, is himself. Autism, conceptualized only from the set of organic alterations, could condition the way in which the person narrates and identifies himself, excluding him from what is considered functional and influencing his way of inhabiting the world. Based on the results of this research, it is considered important to integrate the scientific evidence that supports the medical model with the arguments presented by the neurodiversity model, recognizing both the difficulties and the strengths of the autistic person.

Likewise, this research has also made it possible to understand that it is essential to focus on the person rather than on the data, within the framework of a horizontal relationship that promotes dialogue and understanding of the phenomenon under study from the perspective of those who experience it in their daily lives. One way to understand the differences between findings, as has been the case with some research that has studied the relationship between mirror neurons and autism, would be through the recognition of the subjective experience of the participants and the understanding of the meanings in the construction of their identities.

In future research, conducted from neurophysiology, neuropsychology and cognitive neuroscience, it is recommended to adopt a neurophenomenological approach, in which, in addition to the observable and measurable variables, the subjective first-person experience of the individuals evaluated is taken into account. It is also recommended to integrate other philosophical positions in the approach to subjective experience, such as narrativity and hermeneutics from Paul Ricoeur, as well as corporality from Maurice Merleau-Ponty. The comprehensive nature of philosophy would allow neuroscientists to expand their phenomenal field with respect to the object of research, integrating previously unconsidered perspectives to understand new realities. In this sense, neurophenomenology would constitute a research program that would facilitate this dialogue, making use of evidence and experience for the generation of new knowledge and social transformation.

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Cognition and Learning Environments for Individuals with Autism Spectrum Disorder. A Social Perspective*

[English version]

Cognición y ambientes de aprendizaje para personas con trastorno del espectro autista. Una mirada social

Cognição e ambientes de aprendizagem para pessoas com transtorno do espectro autista. Uma perspectiva social

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Abstract

Objective: To understand the lived experiences related to cognition and learning environments for individuals with Autism Spectrum Disorder (ASD) from a social perspective. **Methodology:** Interpretative paradigm with a phenomenological approach. Data collection was carried out through semi-structured interviews and field journals. Participants: Three teachers, three experts, two mothers, and one person diagnosed with ASD. **Results:** The experiences revolve around difficulties in communication, social interaction, language, behavior patterns, interests, and conduct, among others. **Conclusions:** Across different domains and roles, emphasis is placed on adaptations concerning sensory processing (SP) or sensory integration (SI) through collaborative efforts involving professionals and families. Finally, the importance of implementing various strategies that support the development of social and communication skills, to improve the educational experiences of this population, is interpreted.

Keywords: cognition; educational needs; learning; educational environment (UNESCO Thesaurus).

Resumen

Objetivo: comprender las experiencias vividas acerca de la cognición y los ambientes de aprendizaje para personas con trastorno del espectro autista desde una perspectiva social. **Metodología:** paradigma interpretativo con enfoque fenomenológico. La recolección de datos se realizó mediante entrevistas semiestructuradas y diarios de campo. Participantes: tres profesores, tres expertos, dos madres de familia y una persona diagnosticada con TEA. **Resultados:** las experiencias giran en torno a las dificultades en comunicación, interacción social, lenguaje, patrones de comportamientos, intereses, conductas, entre otras. **Conclusiones:** desde los distintos ámbitos y roles se destacan las adaptaciones en cuanto al procesamiento sensorial (PS) o integración sensorial (IS) y mediante un trabajo que involucre a profesionales y familias. Finalmente, se interpreta la importancia de implementar diversas estrategias que favorezcan el desarrollo de habilidades sociales, comunicativas y con el objetivo de mejorar las experiencias educativas de esta población.

Palabras clave: cognición; necesidades educacionales; aprendizaje; ambiente educacional (Tesoro UNESCO).

Resumo

Objetivo: compreender as experiências vividas sobre a cognição e os ambientes de aprendizagem para pessoas com transtorno do espectro autista a partir de uma perspectiva social. **Metodologia:** paradigma interpretativo com enfoque fenomenológico. A coleta de dados foi realizada por meio de entrevistas semiestruturadas e diários de campo. Participantes: três professores, três especialistas, duas mães e uma pessoa diagnosticada com TEA. **Resultados:** as experiências giram em torno das dificuldades na comunicação, interação social, linguagem, padrões de comportamento, interesses, condutas, entre outras. **Conclusões:** destaca-se, a partir dos diferentes âmbitos e papéis, as adaptações em relação ao processamento sensorial (PS) ou integração sensorial (IS) e através de um trabalho que envolva profissionais e famílias. Finalmente, interpreta-se a importância de implementar diversas estratégias que favoreçam o desenvolvimento de habilidades sociais, comunicativas, com o objetivo de melhorar as experiências educacionais dessa população.

Palavras-chave: cognição; necessidades educacionais; aprendizagem; ambiente educacional (Tesouro UNESCO).

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder primarily characterized by limitations in communication and social interaction. These include difficulties establishing social relationships, understanding nonverbal cues, repetitive and restricted behavior patterns, and intense focus on specific areas of interest, often manifested in stereotyped behaviors, resistance to change, and other symptoms. The severity and presentation of these symptoms vary across individuals, forming the broad spectrum of this diagnosis (American Psychiatric Association [APA], 2014).

The term “spectrum” carries implications that extend beyond a mere change in terminology, particularly when compared to the International Classification of Diseases and Related Health Problems (World Health Organization [WHO], 2018), as it encompasses Autism, Asperger’s Syndrome, Childhood Disintegrative Disorder, and other unspecified pervasive developmental disorders (Grosso, 2021).

As aforementioned, the most prominent characteristics of individuals with ASD include deficits in communication and social interaction, especially with their peers. This phenomenon has been studied from various perspectives. Notably, studies by López et al. (2020), using critical epidemiology with a biopsychosocial approach, refer to the “social brain” of individuals with ASD and demonstrate the numerous theoretical gaps in the literature regarding its abnormal development, in terms of its physical appearance and connectivity.

Similarly, Gordillo et al. (2019) agree that ambiguity persists in the scientific literature regarding the anomalies observed in the social brain of individuals with ASD. However, they assert that the relationship between the amygdala and the prefrontal cortex has gained importance in recent years due to its fundamental role in regulating emotional processes related to social interaction.

Several authors have explored the family’s role as a key social actor in the diagnosis and treatment of this population. For instance, López et al. (2020) conducted a study using a critical epidemiology approach and concluded that variations in social and territorial conditions impact families’ lifestyles. In contrast, Parra (2017) examined families’ emotional responses through their testimonies regarding the diagnosis and specific conditions of children with ASD, highlighting the challenges they faced in this context.

Another perspective, considered from phenomenology, relates to the social interaction of individuals with ASD and their performance in the school context. Studies such as Buemo et al. (2019) highlight the need for adaptations in learning environments and greater awareness among those responsible for the educational and formative processes of individuals with ASD. Similarly, Zambrano and

Orellana (2018) investigated teachers' attitudes toward including students with ASD in formal education, drawing on their personal experiences.

Villamil (2017) discusses how a phenomenological understanding allows for the recognition of the experiences of individuals with ASD in relation to their environment and their interactions with others. From this perspective, studies have explored interventions in occupational therapy for children with ASD, addressing the difficulties experienced, family perceptions, and barriers to adaptations in the learning process (Rodríguez, 2017; Vives et al., 2022). Ruiz et al. (2022) examined the experiences of university students with ASD from a neurophenomenological approach. Their narratives revealed academic challenges and relational dynamics that exposed exclusionary practices within the university context.

The final approach to highlight involves a method that includes various intervention strategies through the participation of multiple social actors. In this regard, Restrepo (2021) proposed adapted communication strategies based on neurodiversity, derived from the experiences of several participants, including three school-aged children, two adults with ASD, four teachers, and one expert. This study emphasizes the importance of considering the role of each of these individuals in the communication process. Additionally, Coy and Martín (2017) explored social and communication skills through art as a medium of expression, using a phenomenological and ethnographic perspective, which revealed improvements in the socialization processes of the participants.

The present study addresses learning environments, cognition, and how a group of social actors in different contexts (personal, family, educational, and/or professional) and roles are related to the learning environments of individuals with ASD. Therefore, the general objective was to understand the lived experiences of a group of people who had some contact or relationship with individuals with ASD, based on the meanings they attributed to learning environments for this population. The specific objectives were: to understand the lived experiences of four educational social actors (teacher, family members or guardians, expert, and person with ASD) regarding learning environments for individuals with ASD; to compare common and different experiences through units of meaning related to learning environments of individuals with ASD; and finally, to interpret the meanings and divergences in how the phenomenon was experienced based on the lived experiences of the social actors.

Methodology

This study is grounded on an interpretative paradigm, with the objectives being approached through phenomenology. This perspective aims to determine the meaning given to phenomena, discover its significance, and understand how people describe their experiences in a specific event (Sabariego et al., 2009, p. 317). Thus, a dialogue is established with those who have lived certain experiences that, in one way or another, relate to the situation or phenomenon under study, including their contexts, circumstances, and anecdotes, among other aspects (Husserl, 1982, 1992). According to Van Manen (2003), this constitutes the interpretative study of expressions and texts, in an attempt to determine the correct meaning, they express (p. 11). From the same perspective, it tries to explain the meanings that are, in a sense, implicit in actions. Humans gain information through their bodies, relationships with others, and interactions with objects in the world (Van Manen, 2003, p. 11).

Unit of Analysis and Unit of Observation

The unit of analysis corresponded to “cognition and learning environments for individuals with ASD from different contexts and social roles”. Participants were selected based on their relationship with individuals with ASD in various contexts (family, educational, and/or professional).

The selection criteria were as follows: being of legal age and having some connection to a learning environment for individuals diagnosed with ASD in any capacity (personal—individual with an ASD diagnosis—familial, educational, professional, or expert).

Informed consent was obtained from nine individuals: three teachers (two secondary education teachers, and one higher education teacher in Arts and Humanities); three experts (a psychology expert, a medical expert trained in ASD testing and diagnostics, a consulting expert for families of individuals with ASD); two mothers of children diagnosed with ASD; and one adult woman diagnosed with ASD. After obtaining informed consent, the participants voluntarily attended the sessions and allowed the authors to access their daily environments.

Data Collection Techniques and Instruments

The semi-structured interview technique was chosen based on Creswell's (2007) recommendations on phenomenology and its procedures for engaging with a small number of subjects, through extensive and prolonged interviews to develop patterns and relationships of meaning (p. 25). This involved a protocol of basic questions (descriptive, anecdotal, experiential, example-based, and emic language, among others) related to the object of study and according to the participant's domain of action or social space to facilitate a fluent conversation (Corbetta, 2007).

These protocols were validated by expert judgment (a social sciences expert, a pedagogy expert, and a psychology expert). This process was carried out in four stages: design of the instruments, evaluation by expert judgment, adjustment, and redesign of the protocols. Based on the first version of the instruments, the judges evaluated each item's relevance using a 5-point Likert scale (1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree). Following the requested adjustments and approval of the changes, the final evaluation by the expert group yielded a Cronbach's alpha coefficient >0.90 , indicating high internal consistency. A pilot test was subsequently conducted to identify modifications, adaptations, and/or reasonable adjustments, particularly for the population with ASD.

Given the characteristics of a phenomenological study, additional questions that arose during the sessions were also asked. To safeguard each interviewee's identity, they were assigned a code: T (Teacher), Ex (Expert), M (Mother), PA (Person with ASD).

Another instrument used was the field journal, where detailed records of environments, reflections, events, and interpretations from the participants were kept (Restrepo, 2018) during the different sessions.

Data Collection Procedure and Analysis

The information analysis followed Creswell's (2007) guidelines for phenomenological studies, focusing on information management, reading and note-taking, description, classification, and interpretation.

The interview questions were organized according to the case (Teacher, Expert, Mother, Person with ASD) using a matrix in *Microsoft Excel*, which included: purpose of the interview, category, purpose of the question(s), type of questions, context, and observations. The interviews were recorded in real-time using *Google Meet* video service, with prior informed consent.

The data processing was supported by *ATLAS.ti* software (V.7.5.4). For the analysis, transcriptions of the responses obtained and the corresponding field journal notes were used.

Following Creswell (2007), during the interpretation phase, a “textural description” was created, identifying “common categories” (narratives shared by the interviewees) and “different categories” (narratives unique to each experience, depending on the context or field of action: personal—as an individual with an ASD diagnosis— familial, educational, professional, or as an expert). Finally, the “Discussion” section presents the categories with the greatest relevance.

Results

The unit of analysis, “cognition and learning environments for individuals with ASD from different contexts and social roles,” led to the establishment of the pre-category: “design of learning environments for individuals with ASD.” It is important to highlight that these questions were part of a more in - depth study. The study included other categories of analysis such as training, education, evaluation, contributions, and planning (Salazar, 2022).

Drawing from Creswell’s (2007) approach, the “textural description” is presented to answer what happened, compare experiences, identify common and different categories, and understand how the phenomenon was experienced.

Textural Description

Creswell (2007) proposes the development of a textural description to address the question, “What happened?”, in this case, by comparing the lived experiences related to the design of learning environments for people with ASD.

In this regard, a series of initial “guiding” questions were established to facilitate an understanding of the social actors’ personal experiences concerning the phenomenon under study through “anecdotal,” “example,” and “contrast” questions (Table 1).

Table 1. *Guiding Questions.*

Objective of the Question	Type of Question	Design of Learning Environments
To identify the experiences of the social actors (What do they feel? What do they think about it? What do they do?).	Anecdotal Questions	Can you describe how your first teaching-learning experience with a person with ASD was?
To understand the strategies for planning, designing, or preparing a learning environment.	Example Questions	Can you share an example of the planning, design, or preparation of a learning environment for individuals with ASD?
To obtain information about the design of a learning environment regarding successes and challenges that may arise.	Contrast Questions	What successes and challenges have you encountered when designing a learning environment for individuals with ASD?

Source: adapted from Salazar (2022).

The textural description was developed by comparing the data collection techniques (interviews and field diaries) (Creswell, 2007). Table 2 provides the textural description along with excerpts from the narratives gathered.

Table 2. *Textural Description*

Interviewee	Interview Excerpt
Teachers	
T1	What I did all the time was a sort of fieldwork in the classroom, like classroom ethnography. So, it allowed me to start identifying how the group was distributed, which students had more affinity with each other, which topics were easier for them, and what learning strategies were more user-friendly. I also asked the students to build together. (Personal communication, March 2, 2021).

Interviewee	Interview Excerpt
T2	<p>The first thing is that I wouldn't develop a strategy for a student of this type a priori, without first having had classroom experience with them. Let me say that what I would call evaluation of prior knowledge, usually done to students, I would do it first for myself.</p> <p>Second, I would be very concerned, at first, about the level of acceptance the student has in the classroom; for me, that is fundamental!</p> <p>Third, if you want written products, in this case, do collaborative work, and you will get written work. (Personal communication, April 16, 2021).</p>
T3	<p>So, we use color palettes to do an emotional check, I use images or play a song; at these moments, they receive printed cards which they can fill in, we can write "collaborative work" to work on socio-emotional skills...</p> <p>I believe that if we manage to work on and develop some socio-emotional skills with the group and with the boy or girl, we will make significant progress! ...we will make progress...because I feel that they will understand him/her from a more integral, much more emotional perspective, not just because of his/her diagnosis. (Personal communication, May 2, 2021).</p>
Experts	
Ex1	<p>It is very complex because there isn't something very generic, and it all depends on the particular case. Always keep the literal part in mind... the language when providing an explanation or during an evaluation; it is very important that the statements are clear, that there is no double meaning.</p> <p>Many multiple-choice questions, one with the other, are very similar, and that is going to confuse and frustrate people with autism. Consider the sensory aspect, whether the classroom where the evaluation is taking place, or the classroom itself, is too hot, too cold, or too humid. (Personal communication, May 12, 2021).</p>

Interviewee**Interview Excerpt**

Ex2

The first is a strategy I call “economy of words” [...] people with autism process information in a different way and at a different speed than we do, and that will depend a lot on each particular child. A second strategy is “sensory breaks”; usually, for a child with autism, sitting still, concentrating, and staying engaged with what is happening in a class for the same periods as their peers is a great challenge! Many children with autism need to move, need to reduce auditory stimulation, need to spin, need something we call sensory breaks. And third, when the child has to do group work, the teacher must ensure that the expectations and the child’s role within the group are clearly defined. (Personal communication, May 22, 2021).

Ex3

I would tell you that there are strategies for each child, but “I’ll tell you in general what most people with autism share... many children with autism in the classroom get irritated by noise, with all the students talking at the same time, with certain lights, with the amount of decoration and information stimuli around; so, we have to be very careful with the sensory part. (Personal communication, June 3, 2021).

Ex3

The vast majority of people with autism are visual thinkers, but I also have some auditory ones, and I need to know that!... If I’m going to give a one-hour lecture to a visual thinker, that child won’t learn! But if I show them a concept map, the child will probably take a mental snapshot of it... many of them have photographic memories, and that will be enough... or if I show them a video, the video will capture their attention. And lastly, I recommend, and what I always insist on, is being very precise and literal, also with language, because they tend to be very concrete. (Personal communication, June 3, 2021).

Mothers

M1

A different curriculum should be adapted. I don’t think there’s much to change in the school, Carlos⁵ was in first, second, third grade because those were his needs. (Personal communication, April 22, 2021).

5 The original name has been changed.

Interviewee	Interview Excerpt
M2	Well, we move a lot based on “developmental milestones” [...] We start setting goals, and as he achieves them, we set new goals. Playing has been very important for him because he is very playful! Visual aids, when we want to tell him something, and he doesn't understand us, we draw it for him, or when he wants to tell us something, and we don't understand him, he draws it for us, and we understand each other perfectly! (Personal communication, May 18, 2021).

Person Diagnosed with ASD	
PA	Those strategies were not used for the whole group; they were used on me. During breaks, I would go with my teachers to see what they were doing. I don't know what they thought of me! “the weird little bug,” “kind of nerdy,” “nerdy and a half,” they asked me to sit down and made me grade exams... and there... I started to understand the mistakes others made, why they made them, and I could see how others processed things. It's by understanding why mistakes are made that we can avoid making those same mistakes ourselves! (Personal communication, June 12, 2021).

Source: Adapted from Salazar (2022).

From Creswell's (2007) perspective, after textural description, researchers establish “units of meaning” through comparing experiences, identifying “common categories” and “different categories”. Below, such categories are presented based on the narratives.

Common Categories

According to the experiences expressed by the participants, the common categories identified were: language, visual aids, sensory processing, and collaborative work. Table 3 presents some excerpts where these aspects are mentioned.

Table 3. *Common Categories.*

Common Categories	Person (Code)
Language	
Keep the literal part in mind. Always! [...] the language when providing an explanation or during an evaluation; it is very important to include clear statements with no double meaning.	Ex1
The first is a strategy I call "economy of words" [...] People with autism process information differently and at a different speed than we do; that will depend a lot on each particular child.	Ex2
And last, what I always insist on is being very precise and literal, also with language, because they tend to be very concrete.	Ex3
Sensory Processing	
With certain lights, with the amount of decoration and information stimuli around, so we have to be very careful with the sensory part.	Ex 3
A second strategy is "sensory breaks"; usually, for a child with autism, sitting still, concentrating, and staying engaged with what is happening in a class for the same periods as their peers is a great challenge!	Ex2
Consider the sensory aspect, whether the classroom where the evaluation is taking place, or the classroom itself, is too hot, too cold, or too humid.	Ex1
Visual Aids	
Visual aids, when we want to tell him something, and he doesn't understand us, we draw it for him, or when he wants to tell us something, and we don't understand him, he draws it for us, and we understand each other perfectly!	M2
The vast majority of people with autism are visual thinkers, but I also have some auditory ones, and I need to know that!	Ex3
Many of them have photographic memories; if I show them a video, the video will capture their attention.	Ex3
The vast majority of people with autism are visual thinkers.	Ex3

Common Categories	Person (Code)
I use images or play a song.	D3
So, we use color palettes to do an emotional check.	D3
Many children with autism in the classroom get irritated by noise, with all the students talking at the same time.	Ex3
Collaborative work	
Third, if you want written products, in this case, do collaborative work, and you will get written work.	D2
Collaborative work, to work on socio-emotional skills; I believe that if we manage to work on and develop some socio-emotional skills with the group and with the boy or girl, we will make significant progress!	D2
When the child has to do group work, the teacher must ensure that the expectations and the child's role within the group are clearly defined.	E2

Source: adapted from Salazar (2022).

Different Categories

The different categories identified include: play, teamwork, differentiated or differential curriculum, goal setting, classroom acceptance, challenges, and abilities. Table 4 contains some excerpts corresponding to these aspects.

Table 4. *Different Categories.*

Different Categories	Person (Code)
Fieldwork What I did all the time was a sort of fieldwork in the classroom, like classroom ethnography.	T1

Different Categories	Person (Code)
<p>Play Play has been very important with him because he is very playful!</p>	M2
<p>Observing Processes They asked me to sit down and made me grade exams... and there... I started to understand the mistakes others made, why they made them, and I could see how others processed things. It's by understanding why mistakes are made that we can avoid making those same mistakes ourselves!</p>	PA
<p>Setting Goals We start setting goals, and as he achieves them, we set new goals.</p>	M2
<p>Differentiated or Differential Curriculum A different curriculum should be adapted. I don't think there's much to change in the school, Carlos was in first, second, third grade because those were his needs.</p>	M1
<p>Abilities and Challenges Focusing on what their abilities are, what comes easily to them, and also identifying what is difficult for them.</p>	T3
<p>Acceptance in the Classroom I am very concerned, at first, with the level of acceptance they have in the classroom; for me, that is fundamental!</p>	T2
<p>Not Designing Strategies A Priori The first thing is that I wouldn't develop a strategy for a student of this type a priori without first having had classroom experience with him/her.</p>	T2 T2
<p>I also asked the students to build together.</p>	T1

Source: Adapted from Salazar (2022).

Discussion

The discussion of the main categories is presented based on the common categories (language, sensory processing, visual aids, and collaborative work) and the different categories (fieldwork, play, observing processes, goal setting, differentiated or differential curriculum, abilities and challenges, classroom acceptance, and not designing strategies a priori), as referred to by Creswell (2007) as the “essence of the experience”.

Communication and Reciprocity

This aspect plays a fundamental role in teaching and learning processes due to the communication difficulties present in individuals with ASD (Aguilera & Orellana, 2017). Some of these difficulties, such as selective mutism, phonological-syntactic syndrome, semantic-pragmatic language disorder, and echolalia (Marzo & Belda, 2021, p. 58), are related, among other factors, to a deficit in central coherence, also known as “weak central coherence” (Marzo & Belda, 2021). According to Hahn et al. (2015), individuals with ASD are frequently reported to have difficulties integrating information into its broader context (p. 3) and often have an information processing style that favors detail processing over global meaning (Gambra et al., 2017, p. 10). Therefore, central coherence is related to the pragmatic use of language and adaptation to the communicative context, where linguistic, social, and cognitive skills converge, and involves understanding the social context (Mendoza & Garzón, 2012).

Consequently, information loaded with numerous statements, extensive instructions, double meanings, metaphors, jokes, or sarcasm tends to confuse students with ASD (Gambra et al., 2017).

Based on the narratives, the more complex the information used by the teacher or others to communicate, the more difficult it will be for the person with ASD to interpret and comprehend its meaning.

Learning Environments and Sensory Processing

Sensory Processing (SP) or Sensory Integration (SI) relates to the perception, organization, and interpretation of sensations captured through sensory systems and their transformations, leading to adaptive responses (Ayres, 2005; Kilroy et al.,

2019; Fonseca et al., 2020). For this reason, there is a close relationship between sensory integration and learning (Vives et al., 2022, p. 1).

According to Sinclair et al. (2017), sensory processing difficulties in ASD manifest as hypersensitivity, sensory stimulus avoidance, diminished sensory response, and/or sensory-seeking behavior (p. 236). In this regard, Torres et al. (2021) state that Sensory Processing Disorder (SPD) is a problem that affects more than 90% of the population with ASD through hypersensitivity or hyposensitivity (p. 1).

In the experiences of the interviewees, some individuals diagnosed with ASD presented either hyposensitivity or hypersensitivity to certain environmental factors such as noise, smells, lights, temperature, and colors, among others. In this sense, bright lights, strong odors, noise from furniture or many people talking simultaneously, and dirty or poorly maintained implements affected adaptive responses.

Hyposensitivity is expressed as indifference to sensations such as pain; in contrast, hypersensitivity relates to demonstrating heightened sensitivity to certain environmental sensations. Wing (1998) states that some children do not like the feeling of clothing, especially socks, and shoes (p. 64), or may exhibit hypersensitivity to touch regarding caresses and hugs (Frith, 2008), as well as to the perception of smells, tastes, lights, among others. According to Güçlü et al. (2007), many children with ASD have unusual reactions to certain sensory stimuli. These reactions vary along a continuum from hyper to hypo-response (p. 21).

Grandin and Panek (2013) affirm that sensory hypersensitivity is completely debilitating for some people and mild for others. Sensory problems can make it impossible for some people with autism to participate in normal family activities, let alone hold a job (p. 5).

There are three sensory patterns traditionally present in individuals with ASD: hyporeactivity, hyperreactivity, and sensory seeking; a fourth pattern known as “enhanced perception” is also proposed (Posar & Visconti, 2018). When these conditions occur in a learning environment, having a record of sounds or noises that may cause disturbance, as well as pleasant stimuli is suggested (Tárraga et al., 2019).

In summary, there are factors that, due to the sensory particularities of individuals with ASD, depending on the case, may cause confusion, expressions of stress, varying states of alertness, affect concentration, and, therefore, impact academic outcomes (González & Ruiz, 2021). Consequently, when designing a learning environment, having knowledge about sensory patterns, as well as the hyposensitivity or hypersensitivity present in the individual with ASD toward perceived environmental stimuli is necessary.

Learning Environments and Cognitive Profile

Regarding the cognitive profile and attentional characteristics of individuals with ASD, Seijas (2015) states that the performance of children with ASD in tests reveals difficulties in shifting attention between stimuli or tasks, a preference for objects over faces, and underdevelopment of joint attention (p. 581). Fernández and Onandia (2022) propose that the cognitive functioning of individuals with ASD differs significantly from those with “typical development.” These specific alterations manifest in certain subdomains and cognitive processes, particularly related to how they process information, which, in turn, affects other areas and domains such as attention, memory, executive functions, language, and social cognition (Seijas, 2015; Fernández & Onandia, 2022).

Pérez and Martínez (2014) emphasize how individuals with ASD perceive their reality, process information, and utilize memory, among other factors. This needs an understanding of personality traits, considering that while there are general characteristics of ASD, these may differ in diagnoses of “High-Functioning Autism” and “Asperger’s Syndrome.”

Interviewed social actors mentioned the close relationship that should exist between the characteristics of a suitable learning environment design and the cognitive profile of the individual with ASD. They also expressed the need for prior knowledge of the individual and their diagnosis in terms of attention, memory, executive functions, time, places, and stimuli, among others; this would allow for a more pleasant environment and greater self-regulation in learning.

From their experiences, one mentioned not starting from a pre-designed model; in the sense of first getting to know the individual, their cognitive profile, and the requested supports. In this process, beginning with observation to identify “primary learning styles” is suggested (Schneider, 2018).

In this regard, some interviewees resorted to different strategies that included a more detailed knowledge of the individual before the start of classes. These strategies varied according to academic training, classroom experiences, and length of experience with these populations. In some narratives, acceptance, respect, and recognition within the group were also mentioned as factors which can significantly influence adaptation processes.

Sharma and Rangarajan (2019) suggest combining different learning strategies to have various perspectives, as part of an eclectic approach in teaching and assessment processes.

Process-based Learning

Among the narrated experiences, “process-based learning” was mentioned. In this regard, it is worth highlighting the experience of the TEACCH Division (Treatment and Education of Autistic and Related Communication Handicapped Children), which proposes structured learning that includes various techniques with an emphasis on social and communication skills that the individual acquires throughout life, where family involvement is fundamental and considered throughout the training process (Hume, 2018, 2020).

Progressive Collaboration

Some individuals with ASD have difficulties with written communication, low muscle tone, and/or dysgraphia (Mayes et al., 2019). In the narratives, one teacher used collaborative learning as a support strategy for students with ASD to overcome certain barriers that had been identified. In this regard, the teachers emphasized the need for receiving approval from the student with ASD and that the student is supported by another person, gradually increasing the number of accompanying individuals.

Information Representation

Many individuals with ASD are visual thinkers (Grandin, 2006; Bled, et al., 2021). In this respect, Grandin (2006), from his lived experience as a person with ASD, states:

I think in pictures. Words are like a second language to me. I translate both spoken and written words into full-color movies, complete with sound, which run like a VCR tape in my head. When somebody speaks to me, his words are instantly translated into pictures (p. 17).

Thus, in classes, some social actors used images, pictograms, and other visual resources for learning. Similarly, one mother used drawing as a communication strategy with her son. Regarding this, Grandin and Panek (2013) state that understanding what type of thinker someone is can help you respect their limitations and, equally important, leverage their strengths (p. 5).

When designing learning environments for individuals with ASD, contrasting formal theory with documented experiences, using Augmentative and Alternative Communication (AAC) with both external supports (pictograms, images, etc.) or without external supports (gestures, signs, etc.) is recommended (Benítez & Belda, 2022).

Allen et al. (2009) and Quintin et al. (2013) emphasize the importance of music in facilitating communication; likewise, it becomes a support in the development of intersubjective relationships, sustained attention, and/or non-verbal communication, mood, emotions, and affective states in individuals with ASD (Allen et al., 2009). Some interviewees highlighted these possibilities where, on certain occasions, they used music to approach academic content or, in other cases, it became a support to capture attention.

In the current literature, the implementation of Universal Design for Learning (UDL) is suggested as a support for multiple forms of information representation, engagement, action, and expressions of learning, as elements that consider diversity in the classroom (Blanco et al., 2016; Alba, 2019; Puente, 2022). Among other adaptations, auditory devices are part of these communication possibilities.

Recording Experiences

One of the teachers interviewed described how, despite lacking the necessary training for the educational approach to students with ASD, he recorded all his experiences in what he called “fieldwork” to obtain information about the students, both inside and outside the classroom. This strategy allows for greater understanding and trust with the target population since, as interaction becomes more consistent, the observer ceases to be seen as a stranger (Restrepo, 2018).

Based on these inquiries, the teacher gathered inputs to design increasingly relevant strategies and, through participant observations, he analyzed the relationships within the groups to identify, for instance, who they related to more, who they excluded, and who was more extroverted or introverted, among other qualities and skills.

Setting Adapted Goals

Among curricular adaptations, Sánchez (2016) highlights three types of objectives based on brain networks: “affective (affective networks), cognitive (recognition networks), and procedural (strategic networks)” (p. 68) objectives that should be considered in terms of learning and coherence with the dominant network.

From the perspective of social actors, mothers emphasized that learning objectives were adapted to the particular needs of their children according to their strengths and learning styles. They provided support from home and requested assistance from educational institutions.

According to Sánchez (2016), learning objectives or challenges should be progressive and “should be proposed up to where the child’s cognitive ability allows them to advance” (p. 63); meanwhile, individual characteristics should be considered when projecting their scope. Furthermore, parents or guardians of individuals with ASD are encouraged to participate in the evaluation of the proposed objectives. In this regard, González et al. (2016) stress the need for an evaluation they call “multi-informant,” which allows for contrasting the information obtained with the performance contexts.

Formal Education or Homeschooling?

Among the narratives, “homeschooling” was mentioned as an educational alternative for individuals with ASD, along with the necessary adaptations to the formal curriculum. They suggest that these should be “personalized” according to the necessary skills, potentialities, and requirements. Some social actors expressed controversies regarding enrollment in the formal system, particularly for individuals at level 3 on the DSM-5 scale (“requiring very substantial support”). For this and other reasons, constructing an adapted curriculum jointly, between the family, the educational institution, therapists, and related professionals was necessary.

Among the requested supports, in several cases, the figure of the “shadow therapist” or “shadow teacher” was highlighted concerning the educational and/or formative support provided both at home and within the formal institution.

Conclusions

Based on the stated objectives, the following conclusions are drawn:

As far as the first objective is concerned, “to understand the lived experiences of four educational social actors (teacher, family or guardians, expert, and individual with ASD) regarding learning environments for individuals with ASD,” the narratives revealed several elements related to planning and appropriate designs. According to the expressed views, considering their particularities and clinical diagnosis was necessary. They also mentioned the arrangement of spaces, distribution of students, content or thematic axes, locative resources, materials, human resources, curricular adaptations, and specific or disciplinary didactics, among other aspects. In the same line of thought, they emphasized prior dialogue with students about their preferences, learning styles, and inquiries into their cognitive profile through various sources of information (family, teachers, experts). Some of the strategies mentioned included inquiries and observations during classes to determine resources, strategies, and adaptations toward the acquisition of learning and socio-emotional skills.

The second objective, “to compare common and different experiences through units of meaning related to the learning environments of individuals with ASD,” allowed for an understanding that a common experience among the social actors was the development of a bond and empathy toward the person with ASD. Such an understanding involved, among other aspects, getting to know them, listening to them, understanding them, and learning from them; in the words of one of the social actors, “humanizing” them, beyond a clinical diagnosis or being seen as “a patient”.

This stems from a commitment by the social actors involved to acquire greater knowledge about ASD, to understand its particularities, potential, and differences, moving beyond a deficit-focused approach. In this regard, they agree that educational institutions and teachers should be prepared to recognize that each student presents a “spectrum,” which is perceived through their different ways of feeling, learning, and communicating.

Regarding the third objective, “to interpret the meanings and divergences in how the phenomenon was experienced based on the lived experiences of the social actors,” the interpretation of the experiences highlights the importance of prior knowledge about the teaching and learning processes of people with ASD. This includes, among other aspects, the didactics of specific knowledge, the cognitive profile and learning styles, as well as identifying those elements of the environment that favor sensory processing or integration, the balance between hyper or hyposensitivity, visual and auditory aids, language and communication

strategies (verbal and non-verbal), knowledge of their clinical diagnosis, initial contact, and social skills.

However, when designing collaborative work strategies, the consent of the individual or student should be obtained for the development of activities, where support and evaluation are suggested.

Finally, the importance of formal education and homeschooling is emphasized through a joint effort between the family or guardians, caregivers, teachers, and other professionals involved in creating an appropriate environment for facilitating the learning process of this population.

Study Limitations

One of the factors identified as limitations in the understanding of the phenomenon of ASD is the scarce narrative about experiences of individuals with this condition. This is due to the fact that during this study it was possible to interview only one of them. Additionally, there is a lack of information and research on ASD and gender perspectives, considering the increase of women with late diagnosis.

Another factor is related to the time required to conduct the interviews and the availability of participants, as being a phenomenological study. To conduct in - depth interviews is suggested and this entails a high number of meetings which brings time constraints.

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Learning in Deaf Adults. The Importance of Understanding Deaf Culture in Contemporary Methods*

[English version]

El aprendizaje en adultos sordos. La importancia de la comprensión de la cultura sorda en los métodos contemporáneos

Aprendizagem em adultos surdos. A importância de compreender a cultura surda nos métodos contemporâneos

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Abstract

Objective: Learning is a constant process in human beings. This paper reviews the relationship between learning methods of deaf adults and the respect held for their culture in several countries of the world. **Methodology:** Scientific papers in Spanish and English over the last five years were reviewed. From 244 articles, 19 were chosen for their relevance to the research goal. **Results:** Results were grouped by topics of interest in deaf adult learning. Five neural methods were found, four validated in hearing people and tested in deaf adults, five serious games, three methods using technology, and two learning methods according to participants' cognitive abilities. **Conclusions:** Nineteen papers observed that there are professionals from all areas interested in this issue; in addition, there is a growing interest in learning about the deaf culture. There is a need to research further on the results of the methods in social and/or working contexts to improve the inclusion of this population.

Keywords: Learning method; adult learning; cultural minority; deaf; culture (obtained from the UNESCO thesaurus).

Resumen

Objetivo: el aprendizaje es un proceso constante en el ser humano. En este artículo se hace una reflexión sobre la relación entre los métodos que se han propuesto para el aprendizaje de los adultos sordos, y el respeto por su cultura en diversos países del mundo. **Metodología:** se revisaron textos científicos en los idiomas español e inglés de los últimos cinco años. En la búsqueda de información se localizaron 244 estudios, y 19 fueron seleccionados por su relevancia para el objetivo del estudio. **Resultados:** los resultados se agruparon por temas de interés respecto al aprendizaje de adultos sordos. Se encontraron cinco métodos neuronales, cuatro validados en población oyente probada en adultos sordos, cinco juegos serios, tres métodos que usan la tecnología, y dos de aprendizaje según las capacidades cognitivas de los participantes. **Conclusiones:** en los 19 escritos examinados se puede observar que en este proceso están interesados profesionales de todas las áreas de estudio; además de un creciente interés por el conocimiento de la cultura sorda. Es necesario enfatizar en la necesidad de continuar esta investigación, aplicando los resultados de los métodos en contextos sociales y/o laborales para mejorar la inclusión de la población.

Palabras clave: método de aprendizaje; aprendizaje de adultos; minoría cultural; sordo; cultura (obtenidos del tesoro UNESCO).

Resumo

Objetivo: a aprendizagem é um processo constante no ser humano. Neste artigo, reflete-se sobre a relação entre os métodos propostos para a aprendizagem de adultos surdos e o respeito por sua cultura em diversos países do mundo. **Metodologia:** foram revisados textos científicos nos idiomas espanhol e inglês dos últimos cinco anos. Na busca de informações, foram localizados 244 estudos, dos quais 19 foram selecionados por sua relevância para o objetivo do estudo. **Resultados:** os resultados foram agrupados por temas de interesse em relação à aprendizagem de adultos surdos. Encontraram-se cinco métodos neurais, quatro validados em população ouvinte testados em adultos surdos, cinco jogos sérios, três métodos que usam a tecnologia e dois de aprendizagem segundo as capacidades cognitivas dos participantes. **Conclusões:** nos 19 escritos examinados, observa-se o interesse de profissionais de todas as áreas de estudo nesse processo; além de um crescente interesse pelo conhecimento da cultura surda. É necessário enfatizar a necessidade de continuar essa pesquisa, aplicando os resultados dos métodos em contextos sociais e/ou laborais para melhorar a inclusão da população..

Palavras chaves: método de aprendizagem; aprendizagem de adultos; minoria cultural; surdo; cultura (obtidas do tesouro UNESCO).

Introduction

Currently, governments, charity organizations, and individuals spend high amounts of research funding on the development of latest treatments for deaf people (Saifan et al., 2018). However, and as expected, the research focuses on care, protection, and the ways deaf children learn. The research tests games to assess the attention level of deaf children (Kandemir & Kose, 2021), it analyzes the syntax and structure of information (Duncan & Lederberg, 2018), and identifies the differences in the development of deaf children (Hall et al., 2018). The influence of religion on the education of deaf children has even been determined (O'Connell, 2014), as well as the commitment of governments worldwide to the education and protection of this population (Khairuddin et al., 2018; Takala & Sume, 2018; Pfister, 2017; Suranata et al., 2017).

There are models that allow significant learning advances for deaf people, but due to the large quantities of information, which models are the most used and under what criteria they are effective is not clear (Hoffman et al., 2017; Rodrigues et al., 2022). Researchers have been interested in designing and testing digital platforms regarding learning in deaf adults (Pappas et al., 2018). Furthermore, researchers examined their reading comprehension practices using the translanguaging technique (Hoffman et al., 2017), and how it reduced access to auditory phonology and changed in visual attention during early deafness, leading to a unique neurocognitive profile for reading in deaf adults (Emmorey & Lee, 2021). Other researchers mapped the international scientific production related to music education for this population (Silva et al., 2020). Also, over the last two decades, they analyzed haptic sensory substitution technologies (Sorgini et al., 2018) and reviewed the technological innovations designed to favor people with complex communication needs (Smith, 2019).

Deaf Culture

Sensory hearing impairment (SHI) is characterized by significant limitations to hearing in a world oriented for the hearing (Malaia et al., 2020), even if the world does not decide to understand deaf culture, or the need for educational adjustments for this population to be involved productively into society (Lawyer et al., 2018).

The interest in studying deaf culture started toward the end of 20th century. The first references to this culture, according to Padden (1980) and Kyle and Woll (1985), were based on aesthetic descriptions of productions of this population and, from an anthropological approach regarding their daily lives.

Authors explain that “deaf culture” has been used as a broad term including sign language, collectivity and identity, deaf values and behavior, uses of technology by deaf people and deaf arts (Friedner & Kusters, 2020). The deaf community is also understood as having unique social, linguistic, and cultural needs (Kung et al., 2021), and is characterized by visual-gestural communication. Among contemporary disability models, the cultural model gains increasing strength and acceptance in the community of people with disabilities (CPD), especially by several theorists of deaf culture (Retief & Letšosa, 2018).

Learning forms of deaf adults became relevant when the World Health Organization (WHO) stated that there were approximately 466 million deaf people in the world; that is, 5% of the world population, 432 million adults (93%), and 34 million children (17%). It is warned that by 2050 one out of four people will have hearing problems (OMS, 2021). These results should be reflected not only in preventive measures, but also in designing communication and interaction between deaf and hearing people. Despite warning figures, there are few studies focused on the learning needs of deaf adults, which makes increasing knowledge related to the issue necessary (Bailey et al., 2021). Within the context of adult learning and deaf culture, five areas were identified based on literature review: 1) neural methods; 2) validations in hearing population tested in deaf adults, 3) serious games; 4) methods using technology; and 5) learning methods based on participants' cognitive abilities.

Methodology

According to Weiss (2003), the state of the knowledge is a long-range research technique. This technique favors “a systematic analysis and valuing knowledge regarding a field of research during a given period” (p. 4).

The methodology was a qualitative and interpretive documentary design. The selection of articles was carried out in two stages. First, the title and abstract, and the full text reading was used to define eligibility: original articles on quantitative and qualitative methodologies, cases and controls or mixed, papers related to the objectives and published between 2017 and 2023, in any language and with available abstract and full text. PubMed, Scopus and Web of Science were the browsers utilized.

In a bibliographic matrix, 19 papers were organized in Excel, analyzed and organized in Table 1 (see Annex). Only scientific articles were reviewed.

Categories emerged from reading and organizing the state of knowledge: neural methods, validated methods in hearing population tested in deaf adults, serious games, methods using technology, and learning methods based on participants' cognitive abilities.

Discussion and Results

Thematic axes were identified simultaneously with the emerging categories:

Research

Category 1: Use of Neural Methods

Four methods were grouped in this category.

1. Vibrotactile discrimination: the use of this technique showed that after a training period, quantitative measurements of electroencephalogram (EEG) registered unique neurophysiological patterns. The patterns are characterized by larger and more diffuse delta band magnitudes in deaf people. In addition, there is a general decrease in absolute power, which could mean a facilitation process linked to the learning process (Ruiz-Stovel et al., 2021).
2. Use of words/iconic signs: deaf adults find learning sign languages easier, because the signs are more rooted in a perceptive and motor experience. During the learning process, deaf adults show greater sensitivity to the visual characteristics of signs, and their phonological processing seems less automated. They focused on the more detailed phonetic properties of the signs (Malaia et al., 2020). In deaf people the upper temporal cortex (UTC) activates in response to visual stimuli revealing plausible neural pathways for auditory reorganization. In addition, correlations were observed between reorganized cortical area activations and developmental factors. They provide unique evidence to understanding the neuronal circuits involved in intermodal plasticity (Que et al., 2018).

3. Sequence memory task: The findings of this research indicate that the dorsal visuomotor neural system plays a role in verbal learning process through sign language facilitating connection with the conventional linguistic network of the left hemisphere (Kanazawa et al., 2017).
4. Socialization with another human being: according to the brain alterations found, a second language is a main requirement (Yusa et al., 2017).

Category 2: Use of Validated Methods in Hearing Population

1. Administration of Performance Validity Test (PVT): Memory Simulation Test (TOMM), a widely validated method in hearing populations was used to evaluate its effectiveness in deaf people communicating through sign language. The aim was to determine whether there were differences associated with use of semantic knowledge and remembrance of signs instead of spoken phonemes. The results showed that non-verbal intelligence of this population was within the average skill range. No participant scored under the standard cutoff score for the trial. These findings support the applicability of the same standard cutoff score established for hearing people in culturally deaf people using sign language (Chovaz et al., 2021).
2. Statistical Learning Mechanisms (SLM): Studies conducted with hearing people indicate that this technique supports the development of reading and writing skills (Giustolisi & Emmorey, 2018). Conducting similar research with an adapted version of the test in deaf people showed that humans can effectively develop sequencing skills, even in situations without sound.
3. Reading understanding practices using translingual techniques: Hoffman et al. (2017) identified seven key aspects: (a) family background/history; (b) communication/language; (c) education; (d) reading/historical experience; (e) bilingualism; (f) translation; and (g) professional/school experiences (in a translingual context), as key factors in language learning process in adults with hearing impairment.

4. Interactive dictionaries: TERC, Inc. conducted research at the Boston Museum of Science in 2017 to analyze the usefulness of a Dictionary of Science with Mobile Sign Language. The results showed that the visual features of these dictionaries make them valuable learning tools for deaf or hearing-impaired people who visit science museums. They provide users with effective access to the content of the exhibitions.

Category 3: Use of Serious Games with Specific Topics

1. Animation: high-quality videos with American sign language were created for administering math tests. They present one version with human interpreters and another with avatars. Deaf adults showed a remarkable preference for the first option, perhaps to higher expressiveness and fluency in human interpretation (Hansen et al., 2018).
2. Virtual Reality: to address the time processing difficulties encountered by deaf people when learning the "Code of Traffic," a program that exposes deaf adults to four driving scenarios (advancing, negotiating roundabouts, highways and intersections) was designed to ask them to make decisions regarding whether to proceed or not. There was better performance in animated condition compared to static as deaf participants made better decisions (Laurent et al., 2019).
3. In addition, Serious Games (SG) were introduced to bridge the communication gap between hearing and deaf people. It offers a tool to facilitate sign language learning for adults. Quantitative data support the effectiveness of SG in supporting the learning of a sign language. However, the qualitative data suggest possible improvements in SG design, on refining the movement in the environment, improving interactivity, and optimizing the game mechanics to a more memorable experience (Economou et al., 2020).
4. Interactive games: *MatLIBRAS Racing* is an educational game tested and evaluated to determine its impact on the process of learning of Brazilian sign language. In gameplay, all participants rated this variable as "good." They highlight the presence, participation, and fluidity promoted by the game during its execution. The graphical interface of the game

was rated as good for 89.5% of students while 10.5% rated it as “fair.” The evaluation of the controller design with touch screen devices was positive; 97.4% of students rated it as suitable.

5. The level of difficulty of MatLIBRAS Racing was evaluated differently by participants: 65.8% rated it as "fair," 28.9% as "easy," and 5.3% as "weak." In addition, 89.5% of participants rated motivation to learn sign language thanks to MatLIBRAS Racing as “good.” Most of the students (97.4%) recognized gaming as a “good” learning tool for sign language, although 2.6% disagreed. A total of 71.1% of students learned five or more signs, representing half of the total signs in the game (Paiva et al., 2020).
6. Artistic media: participants perceived the narration of life stories of deaf people as an educational process to obtain new knowledge regarding their lives through art. These specific learning modalities and participation in the creation of life stories of deaf people must be contextualized considering the barriers in education and society. This helps enrich the theoretical understanding of this approach, as an innovative biographical intervention that drives broad concepts and therapies, culturally sensitive and related to the well-being of deaf people (De Clerck, 2019).

Category 4: Use of Technologies

1. Movement Recognition: Professors at the Faculty of Engineering at Al-Azhar University in Cairo, Egypt, introduced a dynamic system to recognize Arabic sign language using Microsoft Kinect. After that, the Ada-Boosting technique was used to improve system recognition. The approach evaluated 42 medical-related Arab gestures, and the experimental results revealed recognition rates of 93.7% after applying Ada-Boosting (Hisham & Hamouda, 2019).
2. A year later, the same team of researchers introduced another Arabic Sign Language (ArSL) recognition system using a *Leap Motion Controller* and *Latte Panda*. Ada-Boosting technique was implemented to improve precision, followed by DTW (Dynamic Time Wrapping) technique compared to AdaBoost. The system was applied to 30 hand gestures

and included 20 one-handed and 10 two-handed gestures. Experimental results showed that DTW achieved an accuracy of 88% for one handed, and 86% for two-handed gestures. In general, the recognition rate of the proposed model reached 92.3% for one-handed, and 93% for two-handed gestures when applying Ada-Boosting. Finally, a prototype of the model was implemented on a single board (Latte Panda) to improve the reliability and mobility of the system (Hisham & Hamouda, 2021).

3. Performance and ease of use of a voice-to-sign translation assist device: the real-time performance assessment revealed that the inclusion of attention-based feedback led to a 16% reduction in translation error rates (measured by the sign error rate), and a 5.4% increase in the accuracy of translation (bilingual assessment), compared with a reference system without these real time features. The findings of usability indicated that the assist device was pleasant and satisfactory for deaf users (Otoom & Alzubaidi, 2018).

Category 5: Cognitive Analysis for the Development of Learning Methods

1. E-learning platforms: deaf adults still face social exclusion, especially as they experience difficulties during the transition from school to work. Thus, the cognitive characteristics of deaf adults, as well as their learning preferences, were examined to design innovative, easy-to-use e-learning platforms according to their educational needs. Participants preferred e-learning modules that maintain consistency in content, provide questions of understanding during sessions, and offer practical exercises at the end. In addition, participants expressed positive attitudes toward the incorporation of special graphics and explanatory videos (Pappas et al., 2018).
2. Phrase repetition test: Manual and non-manual aspects of sentences were examined to determine whether, and to what extent, they could be distinguished between three groups of deaf people using sign language, namely native, beginner, and late signing deaf people. Statistical analyses reveal that test scores based on the precise repetition of the manual gestures of each sentence, are significantly negatively correlated with the

age at which the signs were acquired. Incorporating accurate repetition of non-manual elements into the score is suggested to increase the reliability of the evaluation process (Sze et al., 2020).

Malaia et al. (2020) examined the neuronal responses of a group of deaf signers who learned sign language at different ages. The order of marked words was found to be negatively correlated with the age of acquisition of syntax and information structure, indicating that the older the learning age, the higher the cognitive load during this process. For this reason, the use of cognitive, technological methods or serious games are an interesting option for this population to socially interact (Glezer et al., 2018), and develop representations closed to the written word with its visual form.

These reasons support that the learning process of adult deaf people must have special characteristics, because reading demands a high possibility of errors in understanding the message, and a cognitive load expressed through procrastination and abandonment of the process. Understanding deaf culture improves the cognitive and emotional processes of deaf adults by allowing the individuals to feel more relaxed during interactions.

Challenges in early oral language acquisition in individuals with deep deafness and the impact of those challenges on cognitive neurodevelopment were also studied (Ruiz-Stovel et al., 2021). Studies concluded that portable technology can be very useful for all users, especially for deaf people. It helps them in their daily lives by reducing problems in effective communication with others (Tang et al., 2018). Other methods, such as observational learning, appear to be more suitable for learning in children than in deaf adults (Van de Weijer et al., 2019).

Learning techniques in deaf adults have a number of features that can be used in several educational contexts. The repetition technique is used for sign learning by Sze et al. (2020), and described by Silva et al. (2020) for learning melodies, as well as detailed by Pappas et al. (2018) for the cognitive assessment for the adjustment of learning technique. However, only Silva et al. show that family support during learning processes is crucial to achieving goals.

Sorgini et al. (2018) reviewed the literature on aptic assistance technologies for sensory hearing and vision impairments, and provided evidence that sensory replacement aids can mitigate deficits in learning of language, communication and movement of deaf, and blind and deaf people. They also showed that touching can be a means of communication for providing certain information to people with

sensory disabilities. Ruiz-Stovel et al. (2021) evaluated the temporal perception of stimuli (pure tones, trumpet sounds and vocal sounds) by means of vibration in deaf adults.

Smith (2019) aimed to determine the impact of technological innovations by evaluating the extent to which they improved social interaction. The author classified the innovation as: (a) Innovations in Communication Tools - Hardware; (b) Innovation in Input/Access Methods; and (c) Innovations in Voice Broadcasting Technologies. These innovations, developed by learning techniques used in this research, provide opportunities to support full participation of deaf people in society.

Conclusions

Over the last five years, the inclusion of technology has been very important in all aspects of life. Technology has been a constant through the use of avatars, digital platforms, virtual reality, animations, etc. However, for the achievement of the desired learning in each research study, interaction among human beings showed higher results, indicating that work should be done regarding raising the awareness of hearing people for the interest of communication with individuals in deaf cultures.

The categorization of methods provides significant knowledge regarding innovative and effective strategies in the education of adults with hearing loss. The exploration of e-learning platforms, adapted to the cognitive needs and learning preferences of deaf adults, highlights the importance of personalizing educational methods especially for this demographic group. The successful introduction of technologies such as Microsoft Kinect and Leap Motion Controller has proven to be a promising pathway that provides practical solutions for sign language recognition, and improves communication. Furthermore, a conscious attention to visual features and real-time spectator-based feedback has led to substantial improvements in accuracy and reduction of errors in sign language interpretation.

The reflection on the transition from education to work for deaf adults highlights the need to address social challenges and improve inclusion in professional environments. The detailed evaluation of learning preferences, assessment of cognitive skills, and implementation of results-oriented e-learning systems

highlight the importance of adapting pedagogical strategies to optimize learning and skills development.

This project enriched the understanding of educational needs of deaf adults, and also provided practical and technological approaches to significantly improve their learning experiences. This path to contemporary methods and adaptive technologies lays the foundations for a more inclusive and effective educational future for the deaf community.

Understanding the identity, customs and communication methods of deaf people allows for better interaction. The use of signs makes deaf people feel respected, and facilitates learning of academic and/or work tasks.

Limitations

No comparative articles were chosen between hearing and deaf learning modes that did not provide solutions.

Recommendations for Further Research

Neural methods provide results applied to objects, machines, tools and spaces that facilitate the process of working and social inclusion of deaf culture individuals.

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Annex

Table 1. *List of Texts Consulted in the State of the Knowledge.*

Author	Title	Year	Location
(Ruiz-Stovel, González-Garrido, Gómez-Velázquez, Alvarado-Rodríguez, & Gallardo-Moreno)	Quantitative EEG Measures in Profoundly Deaf and Normal Hearing Individuals while Performing a Vibrotactile Temporal Discrimination Task	2021	https://www.sciencedirect.com/science/article/abs/pii/S0167876021001653
(Laurent, Boucheix, Argon, Hidalgo-Muñoz, & Paire-Ficout)	Can Animation Compensate for Temporal Processing Difficulties in Deaf People?	2019	https://onlinelibrary.wiley.com/doi/abs/10.1002/acp.3617
(Economou , et al.)	Using Serious Games for Learning British Sign Language Combining Video, Enhanced Interactivity, and VR Technology.	2020	https://www.researchgate.net/publication/354596022_Using_Serious_Games_for_Learning_British_Sign_Language_Combining_Video_Enhanced_Interactivity_and_VR_Technology
(Hisham & Hamouda)	Arabic Sign Language Recognition Using Ada-Boosting Based on a Leap Motion Controller	2021	https://link.springer.com/article/10.1007/s41870-020-00518-5
(Pappas, et al.)	E-Learning for Deaf Adults from a User-Centered Perspective	2018	https://www.researchgate.net/publication/329220758_E-Learning_for_Deaf_Adults_from_a_User-Centered_Perspective
(Paiva, Furlan, & Pinheiro)	An Educational Game to teach Numbers in Brazilian Sign Language while having Fun	2020	https://www.sciencedirect.com/science/article/abs/pii/S0747563218305892

Author	Title	Year	Location
(Sze, Xiao Wei, & Lam)	Development of the Hong Kong Sign Language Sentence Repetition Test	2020	https://pubmed.ncbi.nlm.nih.gov/32427328/
(Chovaz, Rennison, & Chorostecki)	The Validity of the Test of Memory Malinger (TOMM) with Deaf Individuals.	2021	https://pubmed.ncbi.nlm.nih.gov/31797722/
(Malaia, Krebs, Roehm, & Wilbur)	Age of Acquisition Effects Differ Across Linguistic Domains in Sign Language: EEG Evidence	2020	https://pubmed.ncbi.nlm.nih.gov/31698097/
(De Clerck)	Creative Biographical Responses to Epistemological and Methodological Challenges in Generating a Deaf Life Story Telling Instrument	2019	https://www.researchgate.net/publication/323803834_Creative_biographical_responses_to_epistemological_and_methodological_challenges_in_generating_a_deaf_life_story_telling_instrument
(Hisham & Hamouda)	Supervised Learning Classifiers for Arabic Gestures Recognition Using Kinect V2	2019	https://link.springer.com/article/10.1007/s42452-019-0771-2
(Giustolisi & Emmorey)	Visual Statistical Learning with Stimuli Presented Sequentially Across Space and Time in Deaf and Hearing Adults.	2018	https://onlinelibrary.wiley.com/doi/full/10.1111/cogs.12691
(Hansen, et al.)	Usability of American Sign Language Videos for Presenting Mathematics Assessment Content	2018	https://pubmed.ncbi.nlm.nih.gov/29659894/
(Otoom & Alzubaidi)	Ambient Intelligence Framework for Real-Time Speech-to-Sign Translation.	2018	https://pubmed.ncbi.nlm.nih.gov/28152342/

Author	Title	Year	Location
(Que, et al.)	Language and Sensory Neural Plasticity in the Superior Temporal Cortex of the Deaf	2018	https://pubmed.ncbi.nlm.nih.gov/29853853/
(Vesel & Robillard)	Accessing Science Museum Exhibits with Interactive Signing Dictionaries	2017	https://www.tandfonline.com/doi/abs/10.1080/1051144X.2017.1397310
(Kanazawa, et al., 2017)	Phonological Memory in Sign Language Relies on the Visuomotor Neural System Outside the Left Hemisphere Language Network.	2017	https://pubmed.ncbi.nlm.nih.gov/28931014/
(Hoffman, Wolsey, Andrews, & Clark)	Translanguaging Supports Reading with Deaf Adult Bilinguals: A Qualitative Approach	2017	https://nsuworks.nova.edu/tqr/vol22/iss7/12/
(Yusa, Kim, Koizumi, Sugiura, & Kawashima)	Social Interaction Affects Neural Outcomes of Sign Language Learning As a Foreign Language in Adults	2017	https://pubmed.ncbi.nlm.nih.gov/28408872/

Construction of Signed Speeches by Deaf University Students*

[English version]

Construcción de discursos signados de
estudiantes Sordos universitarios

Construção de discursos sinalizados de
estudantes Surdos universitários

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Abstract

Objective: This article aims to analyze the construction of signed speeches by Deaf university students (users of sign language) based on teaching systematization in the deepening cycle of *Strengthening Colombian Sign Language* (CSL) as a subject, between 2010 and 2020. The goal of this subject is to provide students with the tools to develop and enhance metalinguistic and metacognitive skills for creating academic discourses in CSL. **Methodology:** A qualitative approach was adopted. Analytical programs of the

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subject, in-depth interviews with the teacher in charge and papers by the students were analyzed. This analysis identified patterns and issues in CSL teaching. **Results:** The concept of *visual text* is introduced in Sign Language (SL) as an alternative to written text, essential in the context of the subject. In addition, theoretical foundations from metalinguistics and metacognition are established, and five didactic strategies to foster these skills in students are detailed. **Conclusions:** The importance of continuously strengthening metalinguistic processes in deaf students in order to improve their academic performance in higher education is emphasized, highlighting the need to generate specific teaching alternatives.

Keywords: deaf education; sign language; higher education; cognition (obtained from the UNESCO thesaurus).

Resumen

Objetivo: en este artículo se analiza la construcción de discursos signados en estudiantes universitarios Sordos usuarios de la lengua de señas partir de la sistematización de la enseñanza en el ciclo de profundización de la asignatura *Fortalecimiento de Lengua de Señas Colombiana*, entre 2010 y 2020. La asignatura tiene como objetivo brindar al estudiante herramientas para que desarrolle y potencie habilidades metalingüísticas y metacognitivas para la elaboración de discursos académicos en LSC. **Methodología:** se adoptó un enfoque cualitativo, analizando los programas analíticos de la asignatura, realizando entrevistas a profundidad con la docente titular y revisando los trabajos entregados por los estudiantes. Este análisis permitió identificar patrones y temas emergentes en la enseñanza de la LSC. **Resultados:** se introduce la noción de *Texto visual* como una alternativa en LS al texto escrito, fundamental en el contexto de la asignatura. Además, se establecen fundamentos teóricos desde la metalingüística y la metacognición, y se detallan cinco estrategias didácticas aplicadas para fomentar estas habilidades en los estudiantes. **Conclusiones:** se resalta la importancia de fortalecer continuamente los procesos metalingüísticos en los estudiantes sordos para mejorar su desempeño académico en la educación superior, subrayando la necesidad de generar alternativas de enseñanza específicas.

Palabras clave: educación de sordos; Lenguaje de signos; enseñanza superior; cognición (obtenidos del tesoro UNESCO).

Resumo

Objetivo: este artigo analisa a construção de discursos sinalizados em estudantes universitários Surdos usuários da língua de sinais, a partir da sistematização do ensino no ciclo de aprofundamento da disciplina Fortalecimento da Língua de Sinais Colombiana, entre 2010 e 2020. A disciplina tem como objetivo fornecer ao estudante ferramentas para que ele desenvolva e potencialize habilidades metalinguísticas e metacognitivas para a elaboração de discursos acadêmicos em LSC. **Metodologia:** adotou-se uma abordagem qualitativa, analisando os programas analíticos da disciplina, realizando entrevistas em profundidade com a professora titular e revisando os trabalhos entregues pelos estudantes. Esta análise permitiu identificar padrões e temas emergentes no ensino da LSC. **Resultados:** introduz-se a noção de Texto visual como uma alternativa em LS ao texto escrito, fundamental no contexto da disciplina. Além disso, estabelecem-se fundamentos teóricos da metalinguística e da metacognição, e detalham-se cinco estratégias didáticas aplicadas para fomentar essas habilidades nos estudantes. **Conclusões:** destaca-se a importância de fortalecer continuamente os processos metalinguísticos nos estudantes surdos para melhorar seu desempenho acadêmico no ensino superior, sublinhando a necessidade de gerar alternativas de ensino específicas.

Palavras-chave: educação de surdos; Linguagem de sinais; ensino superior; cognição (obtidas do tesouro UNESCO).

Introduction

Deaf people¹ are considered a linguistic and cultural minority due to the use of Sign Language (SL) which plays a main role in building their unique identity and experiences (Humphries et al., 2022; Tarazona, 2003). This recognition is based on different linguistic and cultural features, especially related to Sign Language use.

The main characteristic of Deaf people as a linguistic minority is the use of sign languages; such as Colombian Sign Language (CSL), American Sign Language (ASL), Brazilian Sign Language (LIBRAS) and others, as natural languages with their own grammatical and syntax rules (Lillo-Martin & Hochgesang, 2022). These languages passed from generation to generation within the Deaf community and became the main means of communication for Deaf people (Ladd, 2011). The sign languages as distinct linguistic systems establish the Deaf as a recognized linguistic minority.

Deaf culture is intrinsically linked to SL use and plays a significant role in Deaf identity. This culture embraces beliefs, values, customs, and social norms that are different from listening culture, it reinforces the sense of community for Deaf people. Cultural practices, such as storytelling, art and events of Deaf pride contribute to the cultural cohesion and resilience of this community (Ladd, 2011).

The recognition of the Deaf as a linguistic minority is crucial to protecting their linguistic rights and access to education. Relying on policies and practices in educational contexts to foster positive attitudes toward SL, and generating empowerment scenarios is also essential, especially when working on training Deaf teachers who are expected to be life models for new generations and to feel proud of SL and of being Deaf (Shantie & Hoffmeister, 2000).

The recognition of SL as the natural language of the Deaf community and the need to foster and strengthen its use in educational environments (such as universities) is the core of the proposal for inclusion of the *Universidad Pedagógica Nacional (UPN)*. It leads the “*Hands and Thought*” project for designing and implementing reasonable supports and adjustments for the inclusion of Deaf students in the University. To achieve this goal, several activities are taken and two of them are discussed in this paper: the approval and creation of visual

1 The word “Deaf” will be distinguished in the text as capitalized according to the convention of emphasizing cultural factors of deafness further than audiological features (Sánchez, 1990; Ladd, 2011)

texts as academic publications, and the subject of *Strengthening Colombian Sign Language* (Rod et al., 2009).

However, SL use depends on the user's communication skills, so that the user can communicate thoughts effectively and contribute to academic dialogue (Alawajee, 2022). Thus, designing alternatives to strengthen the SL user becomes necessary. In 2023, as part of the inclusion strategies of Deaf students, UPN created the subject *Strengthening Colombian Sign Language*. It has ten levels and is divided into three cycles (Rod et al., 2009).

Reviewing and updating the training proposal in light of the changes in the realities of Deaf people, training models, academic approaches, and societal shifts over the past 20 years. This paper presents a systematization of the subject in the advanced cycle, between 2010 and 2020. The research combines educational experience based on key documents and recent academic work to understand and improve SL teaching. The qualitative approach allowed for exploring in-depth how theoretical foundations and pedagogical strategies have evolved.

The curriculum was reviewed as a source of information. In-depth interviews with professors were conducted and some of the final papers delivered by students were also reviewed. This analysis revealed patterns and common topics that enrich the understanding of how SL has been taught in the advanced cycle.

The data codification and topic analysis enabled the data organization and facilitated a critical reflection on educational practice. It also allowed a structured organization of theoretical bases to support the subject. This reflection included the course experience with the most recent empirical findings and theoretical discussions on the acquisition and strengthening of SL as the natural language of deaf people and on the development of metalinguistic and metacognitive skills as the main elements of the academic proposal.

Metalinguistics and Metacognition as the Main Axes of the Proposal

Metalinguistic awareness and metacognition are two interconnected cognitive processes that play an important role in learning and developing a language (Pinto et al., 2012). “Metalinguistic consciousness” refers to the ability to think and reflect on language as an object of study, while “metacognitive” refers to higher-order cognitive processes involved in the control and regulation of one’s own thinking and learning. These processes interact and influence

each other in several ways; they contribute to communicative competence and comprehensive cognitive development.

Metalinguistic consciousness and metacognition have a bidirectional relationship in which they encourage each other. The first supports the second by providing students with knowledge and tools to reflect and regulate their language learning processes (Howerton-Fox & Falk, 2019). Students can consciously choose the right learning strategies, control their understanding and production, and make the necessary adjustments by understanding the structures and rules of a language. Metacognition promotes metalinguistic awareness by encouraging students to self-reflection, ask questions, and to actively look for opportunities to explore and analyze the forms and functions of language.

Metalinguistic skills play a crucial role in language learning and, in this case, for deaf-signer students, as they enable students to formulate a deeper understanding and analysis of the structures, patterns, and rules of their own language (Borgna et al., 2011). This understanding allows students to make sense of linguistic forms used in their natural language; SL, as a target language, ensures accurate and appropriate use of this language. However, exploring the benefits of the development of metalinguistic and metacognitive skills in the context of strengthening SL as a first language is convenient. The care of these skills provides many crucial advantages.

First, metalinguistic skills support language analysis. Deaf-signer students with strong metalinguistic skills can deconstruct and analyze components of SL, in relation, for example, to the training parameters of signs (handshape palm orientation, hand's location in relation to the body, hands and face movement), facial expressions with meaning, as well as grammatical rules. This analysis helps them to understand and produce signs accurately, enabling effective communication within the Deaf community and with hearing people.

Metalinguistic skills are important in language learning for several reasons supported by findings from several research projects. Metalinguistic awareness has been demonstrated to significantly predict reading comprehension skills in Deaf-signer students. The ability to analyze and understand structures, patterns and rules of language was also identified as a key factor in the mastery of the language (Berke, 2013; Varela et al., 2017). For example, a Deaf-signer student with metalinguistic skills can recognize and understand specific linguistic features in SL, such as classificatory constructions or non-manual markers for grammatical purposes. This awareness improves understanding, production and mastery of SL.

Second, these skills foster the resolution of language problems. Deaf-signer students with developed metalinguistic skills can use their knowledge and ability

to analyze to overcome language challenges. They can decode unknown signs, infer the meaning of complex grammatical structures, and adapt their sign style according to the communicative context and the audience's needs (Davidson *et al.*, 2014).

Strong and Prinz (1997) studied the role of metalinguistic skills in the resolution of linguistic problems in Deaf-signer students. They identified that those with higher metalinguistic skills were more effective at decoding unknown signs and adjusting their sign style to contextual signs for better communication results. An example is a Deaf student who faces a new sign during a conversation, uses metalinguistic skills to disaggregate the sign components, compare it with familiar signs, and infers its meaning based on contextual keys and linguistic knowledge. This problem-solving approach enables effective communication and helps when a student is deep in disciplinary aspects in which new vocabulary is introduced daily in the classroom.

Finally, metalinguistic skills benefit language acquisition. Deaf-signer students can take advantage of their understanding of structures and patterns in their SL to support themselves in learning a new language, such as written Spanish or another SL. They can identify similarities and differences to strengthen knowledge and skills (Hermans *et al.*, 2008; Mayberry *et al.*, 2011) based on conscious analysis and comparison of linguistic elements between their native language (SL) and the target language.

An example is when students have the opportunity to be at lectures or assist at a lecture using international SL. It joins the roots of many languages and demands a great ability of the signer to infer contextual keys and transposition of elements from their language to another (Rosenstock, 2008).

Wang and Chen (2018) highlighted the impact of metalinguistic skills on language acquisition in Deaf-signer students. Those students who could consciously analyze and compare linguistic elements in their native SL and target language demonstrated greater competence and ease in learning the target language. For example, a Deaf-signer who interacts with another signer from a different SL and can use metalinguistic skills to analyze the communication structure, identify key words, and quickly make language arrangements to achieve effective communication. This metalinguistic awareness combined with the structural similarities of two languages (e.g. languages of French origin) promote a more efficient learning process and improve the ability to adapt and use language in different contexts.

Research emphasizes the importance of metalinguistic skills for Deaf-signer students in language learning, although there is interest mainly in favoring skills development in the use of a majority language. However, through the promotion of early acquisition of SL, language analysis and problem-solving, metalinguistic

skills foster a deeper understanding and effective use of language forms. Through the strengthening of metalinguistic skills from different educational scenarios, Deaf students can improve language development and communicative competence as Deaf-signers. It improves the general communication and learning skills of other languages.

However, a key question arises as to whether metalinguistic skills are the same for written languages as for SL, so that strategies can be interchanged to improve the creation of written and visual texts. It is a complex issue and demands careful consideration of the unique characteristics and modalities of each language. While there are similarities in metalinguistic abilities between languages, there are also important differences in the specific properties of each language and its expression.

In written language, metalinguistic skills often involve the ability to use written symbols, analyze the utterance structure, and understand grammar rules and conventions (McCutchen, 2011). For example, a competent writer can identify and correct grammatical errors or restructure sentences to improve clarity.

In SL, metalinguistic skills include the ability to analyze and reflect on shapes and sign structures, including handshape, movement, location and non-manual characteristics; such as facial expressions and body movements. SL users can participate in metalinguistic tasks, such as identification and explanation of some specific signs, sign components analysis, or signs comparison in different dialects or regional variations (Jarque, 2011; Safar et al., 2018).

While there are shared aspects of metalinguistic skills between written language and SL, there are also clear differences from expression modes of each mentioned language. For example, in SL, non-manual signals such as facial expressions and body movements, play a crucial role in transmitting grammatical information and changing signs' meaning (Barreto & Cortés, 2014). These non-manual characteristics require metalinguistic awareness and interpretation that may not be the same as in written language.

Furthermore, SL's visually-spatial nature presents unique metalinguistic challenges. SL users should consider the spatial layout of signs, visual iconicity and the coordination of multiple linguistic elements simultaneously. These aspects of SL's metalinguistic skills are not directly applicable to written language (Berke, 2013; Emmorey, 2021).

Therefore, while there are overlapping cognitive processes involved in metalinguistic skills across different languages, it is important to recognizing

the distinct characteristics of each modality. Metalinguistic skills for written language and SL are influenced by different characteristics and properties of these languages. This is why educators and researchers should consider the specific metalinguistic demands of SL and develop appropriate educational strategies to support the metalinguistic development of deaf people (Howerton-Fox & Falk, 2019; Tomaszewski et al., 2019).

Strengthening of Metalinguistic and Metacognitive Skills

The inclusion of metacognitive and metalinguistic skills in programs for the education of Deaf people is an important component of language. While there is a rising recognition of the importance of metacognitive and metalinguistic skills in language learning, in the context of Deaf-signer people, the integration of specific curricula or programs aimed at developing these skills for SL use and knowledge is still limited.

One aspect to highlight is the small number of research involving metalinguistic skills in SL and their impact on discursive ability in this same language. On the contrary, there is extensive literature and research on how to improve metalinguistic skills and their influence on the reading and writing processes of majority languages. (Albalhareth & Alasmari, 2023; Ausbrooks & Gentry, 2014; Benedict et al., 2015; Berke, 2013; Borgna et al., 2011; Hermans et al., 2008, Howerton-Fox & Falk, 2019). This fact shows how even in educational contexts, programs and strategies to strengthen SL function as a bridge language, rather than a target language. This is how the creation of the subject of *Strengthening Colombian Sign Language* at the university was mainly based on metalinguistic and metacognition to strengthen the first language in listeners and, those developed with the Deaf population, designed to favor second language.

From metacognition, as the basis of the curriculum, several classifications of metacognitive strategies for writing and oral communication are reviewed. Thus, the use of visual texts in CSL is one of the main strategies (López, 2015; Herrera, 1997; Rojas et al., 2019).

The developing and strengthening of metacognitive skills can significantly benefit Deaf students in their SL discourses by improving self-awareness, strategic thinking, and self-regulation of the communication process. Metacognition allows people to monitor and control their own thinking to achieve a more effective and efficient language production. In the case of Deaf students who use SL as

their main way of communication, the development of metacognitive skills can contribute to their linguistic fluency, clarity and general expressive skills.

Self-awareness is a key aspect of metacognitive skills that supports the improvement of SL speech, and it is an aspect mediated by metalinguistic skills. To be aware of their own language skills, Deaf students can identify aspects to improve and focus on specific language characteristics to strengthen. For example, they can reflect on the speed at which they sign, use their own facial expressions that are consistent with the meaning of the message, and the structure of the sign space that should be organized at the time of sending a message in SL, among other aspects, to evaluate its effectiveness communicating an idea. With better metalinguistic skills, Deaf students can make conscious adjustments and refine their speeches to ensure better communication results.

Moreover, metacognition involves strategic thinking (Castro, 2017), which plays a vital role in SL discourses. Deaf students can use metacognitive strategies such as planning and organizing the topic and its sequence, selecting the signs they want to use, the way they will use the sign space, appropriate facial expressions, and other elements that will enable them to structure their speech effectively. For example, they can use classifiers strategically (handshapes that represent objects or actions) to provide visual details and create vivid mental images for the audience. With strategic thinking, Deaf students can optimize the impact and understanding of SL discourses.

Monitoring as an essential component of metacognition is important to bear in mind, as it allows Deaf students to report and control their communicative performance (Borgna et al., 2011). Deaf students can also evaluate their own understanding and adjust the way they express accordingly, ensuring that they are effectively communicating the intended message. For example, if a Deaf student identifies confusion or misunderstandings from the audience, he or she can moderate sign speed, clarify signs, or provide additional contextual information to improve understanding and ensure the communicative purpose of the message. By actively self-regulating, Deaf students can adapt their discursive strategies in real time to achieve more effective communication.

Skill and strategy practices in SL discourses with an audience allows students to predict and estimate their future discursive actions in a visual text. When creating a visual text, the audience and its response are envisioned, and prior responses nourish this image, therefore exposure to audiences is essential.

Research provides evidence of the positive impact of metacognitive skills on language production. For example, Schunk and Zimmerman (2001) highlight the importance of self-regulation and strategic planning to improve oral

communication skills. Although this research focuses on oral language, the underlying principles of metacognition can also be applied to SL speeches.

The integration of metacognitive strategies into an SL curriculum helps Deaf students develop a deep understanding of language structures, speech structure, and communication strategies. For example, teaching Deaf students metacognitive strategies such as self-control and self-correction during SL production can improve their accuracy and linguistic competence (Buitrago et al., 2021).

Thus, the aim of pedagogical work is to improve self-awareness, strategic thinking and self-regulation. Deaf students can improve their linguistic fluency, clarity and overall expressive skills in SL. Through reflection, planning and conscious adjustment, they can optimize the content, structure and expression in SL to effectively communicate.

Visual Texts in SL

SL lacks a standardized writing system. Despite many initiatives, preserving and transmitting information represents a significant challenge. According to this situation, looking for alternatives to ensure accessibility and the possibility for it to serve for future references is imperative. The solution lies in the use of a visual video recording called as "visual text". The recording and presentation of content in video allows the capture and transmission of SL's own gestural expressions, movements and spatial locations, which facilitates a more complete and faithful understanding of an original message (Burch, 2004).

Visual texts benefit the Deaf community, including teachers, who become valuable resources for overcoming linguistic and cultural barriers, and enable a greater reach and dissemination of the expressive wealth of SL (Rosenthal, 2009; Wurm, 2018).

Visual text offers the advantage of serving as a reference to different times and contexts. They are especially valuable in academic and research contexts. The access to SL texts in this manner ensures greater preservation of information, and wider and more effective dissemination of knowledge. Maintaining an academic record in SL broadens the knowledge base accessible to Deaf individuals across different educational levels in their native language. It favors the understanding and the strengthening of training and research processes by the Deaf community from the legitimization of SL.²

2 In this link a degree project of a Deaf-signer student performed in the visual text mode can be checked

However, the implementation of this modality also presents technical and logistical challenges. Proper infrastructure and technology are required to record, store, and disseminate videos. In addition, collaborative and meticulous work is required to ensure quality in the production of visual texts in SL, linguistic and cultural particularities of this language have to be respected.

The challenge of editing SL texts must also be taken into account. In the case of written texts, the editing process allows making changes to letters or a word as a minimum work unit. However, editing recorded discourses in SL is more complicated in the case of errors, since the minimum unit for correction is not a sign but a pre-defined section between corporal pauses.

Visual text is an innovative and effective solution for preserving and sharing the content of this manual-view-gestural and visual-spatial language. It provides a valuable tool for promoting inclusion, disseminating knowledge and strengthening communication between Deaf and hearing people. Its use in educational contexts and its evaluation as written texts for the Deaf community represents an important step towards the evaluation and recognition of linguistic and cultural diversity in our society (Burch, 2004).

Proposal for the Strengthening of Sign Language in Higher Education

This section presents teaching strategies for the course on *Strengthening Colombian Sign Language*, which is an exclusive course designed for Deaf-signer students at the university. This subject was created in 2003 as part of the proposal for the inclusion of Deaf students of *Universidad Pedagógica Nacional (UPN)*, led by the «Proyecto Manos y Pensamiento» (Abello et al., 2022; Rodríguez et al. 2009, 2021). Currently, this is a four-level subject exclusive and mandatory for Deaf students.³

The strategies are intended to enhance metalinguistic and metacognitive skills in Deaf students to foster understanding, elaboration, and the presentation of academic documents in SL. These strategies include explicit instruction, language analysis activities, vocabulary development and reflective language tasks. Each one is developed as follows.

The first strategy deals with explicit instruction. Teachers clearly explain and exemplify metalinguistic concepts, such as phonetic rules, grammatical

<http://repository.pedagogica.edu.co/handle/20.500.12209/16537>

3 This subject is approved as a mandatory subject for strengthening Spanish (e.g.: text production, oral communication), by recognizing CSL as a first language of Deaf people in Colombia.

structures, and vocabulary strategies. Practical tasks are provided to develop students' awareness and understanding. For example, teachers explicitly and in-depth teach handshape parameters in SL, phonology, or grammatical characteristics, such as verbal concordance (Bermúdez, 2003; Martínez et al., 2018; Oviedo, 2001).

One of the activities is teaching grammatical structures with a pedagogical diary or fieldwork in CSL. This is a regular task for UPN students, as they are graduating in pedagogical programs. It explains how to report the day, date, and place of the action, and then make a detailed description of events without making interpreting facts. Clear examples of pedagogical diary structure are presented using material from previous classes. Then, practice tasks are offered for students to apply this structure in their video-recorded CSL pedagogical or fieldwork diaries. Then they are reviewed and commented on by the whole classroom.

The second strategy is based on language analysis, students are encouraged to analyze its forms and structures. These activities may include sentence analysis exercises, sign categorization tasks, or discussions on language use in different contexts. By participating in these activities, students develop critical thinking and metalinguistic reflection skills, enabling a deep understanding of SL structure (Benedict et al., 2015; Singleton & Newport, 2004).

An example of the activities developed within the strategy is presenting students with a visual text in CSL, from which they are asked to identify different types of verbs, such as simple, directional, and representative. Students also analyze sentence structure, handshapes, and movement to categorize verbs and discuss how they convey different meanings and actions. These exercises are usually performed using CSL pedagogical material and reviewing productions of different types of signers.

The third strategy focuses on vocabulary development. Teachers provide explicit instruction on strategies, such as the use of context keys, identification of roots and affixes of words, and practice of sign association. Significant vocabulary activities are created, such as sign-word games, sign diaries and debates with multiple words, to improve students's lexical knowledge and widen their repertoire. These strategies support the development of metalinguistic skills related to word recognition and word relationships (Alawajee, 2022; Jarque, 2011; Singleton & Newport, 2004).

A sign root analysis is carried out to identify word roots and affixes in CSL signs, part of vocabulary development (Barreto & Cortés, 2014; Martínez et al., 2018). Students learn to divide signs into meaningful components and explore connections between signs with roots or shared affixes. They participate in

activities to identify these elements and discuss how they contribute to these signs meaning.

The fourth strategy has to do with the process of creating new signs to name specific academic concepts. Sometimes, when a student is in a classroom with no experience with Deaf students, the sign language interpreter is confronted with new concepts that do not have a sign. In these cases, dactylogogy, i.e. spelling in SL, should be used to show how the word is written. However, the common use of this word in a teacher's speech forces the creation of a new sign. These cases are discussed in class to find out if the sign already exists but is unknown or if proceeding to the creation of a new one that reflects its concept is appropriate.

To illustrate the above, some of these linguistically challenging concepts for students and teachers have been “epistemologically” and “hermeneutically” approached. Deaf teachers and listeners, Deaf students and interpreters, through collaborative work, discuss and analyze linguistic aspects. Visual creativity leads to the creation of a new sign that visually represents the intricate concept (Barreto, 2023; Barreto-Muñoz, 2015). This process emphasizes the synergy between linguistic innovation and academic knowledge; it reflects the dynamic nature of SL as it adapts to meet the specific linguistic demands of several academic domains.

Through this joint analysis strategy, Deaf students develop skills that enable them to critically evaluate the effectiveness of a sign to convey complex concepts and foster metalinguistic awareness.

In the fifth and last strategy, reflective language tasks are integrated into SL learning activities. Students are encouraged to analyze and compare different speech samples, discuss language use options in specific situations, or reflect on their own use and progress. These tasks promote metalinguistic awareness and self-reflection in which students monitor and evaluate their metalinguistic skills (Borgna et al., 2011; Marschark & Knoors, 2012).

An example of these tasks is assigning students the creation of a visual text in CSL in which they describe a personal experience or explain a topic they consider mastering. They are then asked to reflect on their language choices, such as the use of a sign, sign classifiers, or non-manual markers, and discuss how these choices help in the clarification and general expression of the narrative.

Table 1. Summary of Strategies.

Strategy	Description
Explicit Instruction	Explain metalinguistic and grammatical concepts with clear and practical examples.
Language Analysis	Promote structure analysis and use of CSL to develop critical skills.
Vocabulary Development	Build practical use exercises that promote the widening of students' vocabulary.
Creation of New Signs	Dialogue to create new signs for new academic concepts within the corpus.
Reflective Language Tasks	Integrate reflective activities for students to cooperatively evaluate their use of CSL.

Table 1 summarizes five didactic strategies. They are intended to encourage the development of metalinguistic and metacognitive skills in Deaf students. Through explicit instruction, language analysis, vocabulary development, creation and reflection around new signs, and reflective language tasks, students improve their understanding and CSL use. These strategies support their language mastery, critical thinking skills and metalinguistic awareness to succeed academically and participate effectively in their respective fields of study.

Findings in Pedagogical Process and Individual Learning

Moderating Variables

In general, the experience over the years on the subject of the *Strengthening of Colombian Sign Language* reflects positive results. Through the different levels, students' progress in recognition and mastery of their language overcomes its

basic use to a metalinguistic consciousness that strengthens the appropriation and value of SL and its communicative capacity. The results from the program implementation support previous research and demonstrate potential for developing advanced metalinguistic skills in SL Deaf-users with a direct impact on their identity as Deaf people.

The correspondence of these results with previous research on metalinguistic processes in users of American Sign Language (ASL) reinforces this perspective. The findings conducted on Deaf children with ASL show high levels of metalinguistic awareness, in phonological consciousness and grammatical structure (Schick et al., 2007). In addition, profound knowledge of syntax, morphology and phonology in ASL among native signers supports deep analysis and extensive discussion of several aspects of SL (Humphries et al., 2022).

However, it is important to note that Deaf students do not constitute a homogeneous category due to the uniqueness of each individual in a human diversity context. Multiple factors, such as culture, family, education, age, and type of hearing loss, influence levels of metalinguistic skills in users. Cultural immersion in a rich linguistic environment, early exposure to SL, and family context fosters and enriches active communication to promote higher levels of metalinguistic consciousness in Deaf users. The age at which SL is acquired and the education level also play a significant role in the development of metalinguistic skills. These aspects are hereby presented in more depth.

Cultural factors play a main role in metalinguistic skills formation in Deaf individuals. Those within a solid Deaf culture who have early and extensive exposure to SL tend to have higher levels of metalinguistic awareness. Immersion in culture and an enriching linguistic environment benefits metalinguistic analysis and exploration of several language features (Humphries et al., 2022; Mayberry & Lock, 2003).

The acquisition age of SL also has a significant impact on individuals' cognitive processes, especially in Deaf individuals who experience linguistic deprivation with short, medium, and long-term repercussions. Cognitive deprivation arises when the individual is not exposed to a natural language during the critical period of language acquisition (Hall et al., 2019; Humphries et al., 2022). Students who had acquired SL at an early age tend to show more advanced metalinguistic skills due to greater exposure and longer periods of language acquisition (Hall, 2017).

Family factors also influence metalinguistic skills. Deaf users born in families that use SL as the main way of communication and are actively involved in linguistic interactions tend to have better metalinguistic skills. However, it is uncommon for a Deaf child to be raised in a family environment where SL is used as the primary mode of communication. At the UPN, for example, only 2% of students have Deaf-signer parents. This reality is widely consistent; approximately 10% of Deaf children have hearing parents (Karchmer & Mitchell, 2004). In Colombia the figures are similar: an estimated 5% of children are born from hearing loss parents, and around 2% grow up in households where SL is the main language (INSOR, 2020).

The Deaf children of hearing parents show significant differences in text comprehension compared to children whose parents are hearing, especially in families with several generations of Deaf individuals. This is because familial environments where SL is used provide opportunities for metalinguistic discussions (Schick et al., 2007). This type of environment also improves a Deaf individual's ability to grasp visual messages, which is consistent with Hermans et al. (2008).

Education also has a significant impact on the metalinguistic skills of Deaf students. Formal education with explicit instruction on metalinguistic concepts, grammar, and language analysis can improve metalinguistic awareness (Shantie & Hoffmeister, 2000). Those students who had access to bilingual education showed higher metalinguistic skills and, in the students' stories, the figure of deaf teachers stands out as an essential aspect of identity, use, and preference for the language.

The bicultural bilingual approach recognizes SL as the first language and Spanish as the second; it also promotes interculturality where distinct cultures converge and are shared. This aims at recognizing and addressing the diversity of Deaf people. This diversity promotes their integral development and participation in educational communities. Strategies such as classes for Deaf children in primary school, inclusion by interpreters in secondary school and an *Individual Plan of Reasonable Adjustments* are implemented to enrich exchange and inclusion in the educational field.

However, considering all students who have been part of UPN as bilingual is not possible without first recognizing the educational history of the Deaf community in Colombia. The implementation of a bilingual bi-cultural approach began in the early 90s in some private schools and has been regulated in Colombian public education since 2017; in general, its implementation can be considered as recent. This shows that the first generations of Deaf students in UPN started their educational process through an oral approach, including total communication in primary school and, then, the inclusion of interpreters

in high school in regular classes. In many cases, access to SL occurred late (Rod et al., 2009).

Final Reflections

The progress observed in students throughout the course is aligned with the research presented by Mayberry and Lock (2003) on metalinguistic and metacognitive skills in SL Deaf users. It can be partially attributed to the educational opportunities through formal instruction in SL, which provided greater exposure to metalinguistic concepts and explicit instruction.

This aspect becomes meaningful as UPN trains Deaf teachers, most of whom are expected to train and guide future generations of Deaf children in the acquisition of their first language. Formal education that explicitly addresses metalinguistic concepts, grammar, and language analysis, and a bilingual bi-cultural approach that articulates Spanish and SL, help to raise metalinguistic consciousness in Deaf students. Deaf teachers in the educational process also play a crucial role in the formation of metalinguistic skills. Nevertheless, despite these advances, continuing research and developing effective, comprehensive educational approaches that further foster metalinguistic skills in education for Deaf people is essential.

Moving forward with proposals that recognize SL as a target language is imperative and essential for the development of metalinguistic skills in that language. This goes beyond merely improving reading and writing processes in a second language. The training of future Deaf teachers must be based on the understanding that being competent in a language implies its use, as well as the recognition of its main elements and mastery of its components. This aims at enriching the cognitive and communicative skills of students who will be future professionals in the area. This perspective leads to a constant evolution in education for Deaf people within metalinguistic development as a vital cornerstone.

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Interculturality towards the Recognition of Colombian Indigenous Cultures in Basic Education Students*

[English Version]

Interculturalidad hacia el reconocimiento de las culturas indígenas colombianas en estudiantes de educación básica

Interculturalidade: para o reconhecimento das culturas indígenas colombianas em alunos da educação básica

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Abstract

Objective: This research article, derived from a doctoral thesis, aims to analyze the impact of interculturality on the recognition of Colombian indigenous cultures among Basic Education students. **Methodology:** The study employs an action research approach within a qualitative and descriptive framework. The population consisted of fourth-grade students at a bilingual basic education school. The methodology involved a series of interventions using class planners, field diaries, and institutional guidelines. **Results:** The diagnostic test results indicated a lack of awareness about Colombian ancestral cultures. The implementation of the classes sparked the students' interest in learning more about indigenous cultures and fostered respect for ethnic groups previously unrecognized by the students. **Conclusions:** The findings revealed that students lacked sufficient knowledge to recognize the various indigenous groups in the region. This is significant from an intercultural perspective, as understanding and recognizing indigenous cultures is crucial for identity formation.

Keywords: Amerindian cultures; intercultural education; identity; language preservation (obtained from the UNESCO thesaurus).

Resumen

Objetivo: el presente artículo se deriva de una tesis doctoral, y tiene como objetivo analizar la incidencia de la interculturalidad hacia el reconocimiento de las culturas indígenas colombianas en estudiantes de educación básica. **Metodología:** se lleva a cabo un acercamiento a la interculturalidad por medio de la investigación acción, de tipo cualitativo y de alcance descriptivo, con una población de estudiantes de grado cuarto de un colegio bilingüe de educación básica. En la investigación se relacionan una serie de intervenciones, cuyos instrumentos fueron planeadores de clase, diarios de campos y lineamientos institucionales. **Resultados:** los resultados arrojados en la prueba diagnóstica reflejan un desconocimiento sobre la existencia de culturas ancestrales colombianas. La orientación de las clases generó interés en los estudiantes por conocer más sobre la cultura indígena, así como por el respeto por aquellos grupos étnicos que los estudiantes no habían podido reconocer. **Conclusiones:** Se pudo observar que los estudiantes no contaban con conocimiento suficiente para reconocer a los diferentes grupos indígenas de la región, conocimiento que es importante y necesario desde el marco intercultural para la formación de la identidad.

Palabras clave: Cultura amerindia; educación intercultural; identidad; preservación de las lenguas (obtenidos del tesoro de la UNESCO).

Resumo

Objetivo: este artigo de pesquisa, derivado de uma tese de doutorado, tem como objetivo analisar o impacto da interculturalidade no reconhecimento das culturas indígenas colombianas entre os alunos da Educação Básica. **Metodologia:** o estudo emprega uma abordagem de pesquisa-ação dentro de uma estrutura qualitativa e descritiva. A população foi composta por alunos da quarta série de uma escola de educação básica bilíngue. A metodologia envolveu uma série de intervenções usando planejadores de aula, diários de campo e diretrizes institucionais. **Resultados:** os resultados do teste diagnóstico indicaram uma falta de conscientização sobre as culturas ancestrais colombianas. A implementação das aulas despertou o interesse dos alunos em aprender mais sobre as culturas indígenas e promoveu o respeito por grupos étnicos que antes não eram reconhecidos pelos alunos. **Conclusões:** os resultados revelaram que os alunos não tinham conhecimento suficiente para reconhecer os vários grupos indígenas da região. Isso é significativo em uma perspectiva intercultural, pois a compreensão e o reconhecimento das culturas indígenas são fundamentais para a formação da identidade.

Palavras chaves: Culturas ameríndias; educação intercultural; identidade; preservação do idioma (obtido do thesaurus da UNESCO).

Introduction

Since education is the means to guide knowledge, it is important that interculturality is supported by the recognition of English as a foreign language. Through teaching this language, educators can transcend mere grammatical instruction, providing opportunities to impart deeper cultural knowledge. As globalization gains importance, interculturality also becomes crucial, facilitating effective and harmonious coexistence and collaboration in an increasingly diverse society. Therefore, education has started to emphasize the significant importance of fostering intercultural awareness.

Interculturality involves understanding and valuing the cultural diversity present in the world and within communities. This study enables the learning of different cultures, ways of life, and beliefs, thereby strengthening awareness both as individuals and as a society. Another objective is to help build an inclusive society where, through interculturality, people can embrace their own roots and understand the differences in their environment, overcoming stereotypes and cultural prejudices.

The researchers aim to reinforce the teaching of culture in Colombia. One of the fundamental challenges that educational institutions face in the 21st century is promoting cultural education. To achieve this objective, particular emphasis must be placed on the promotion of intercultural teaching as a central element to foster democratic and inclusive citizenship. In this sense, higher education is committed to promoting well-being and social progress, adapting to the continuous changes in contemporary reality. This involves the implementation of educational practices based on values such as solidarity, tolerance, and understanding of different cultures, with the aim of promoting genuine intercultural dialogue (Alcalá et al., 2020).

Teaching cultures is important for students, as it enables them to acquire the knowledge and skills necessary to appreciate and respect the cultural diversity in the world. Cultural education helps students understand the complexity of different societies and appreciate the richness of various ethnic groups. This fosters the development of intercultural competences and effective communication with people from diverse cultural backgrounds. Additionally, it guides students toward a deeper understanding of history and cultural heritage. Through learning about the beliefs, traditions, customs, and values of different cultures, students can better understand the perspectives and viewpoints of others.

Cultural education is crucial for the development of an inclusive society, as it enables students to overcome cultural stereotypes and barriers that often hinder effective communication and collaboration between people from diverse

backgrounds. Through cultural education, students learn to value individuals for who they are rather than judging them by their backgrounds, contributing to a more equitable and respectful society.

This paper explores the impact of interculturality on the recognition of Colombian indigenous cultures among fourth-grade students in a bilingual school. The study observed students' perceptions of indigenous cultures in their locality through classroom activities, comparing these perceptions with information about indigenous cultures from other countries.

Colombia, one of the largest countries in South America, boasts a privileged geographical location with thousands of kilometers of coastline along both the Pacific and Atlantic Oceans. Its tropical climate and diverse flora and fauna have attracted various social groups over centuries, resulting in significant cultural richness and historical hybridization. This cultural wealth is reflected in hundreds of customs and traditions.

Colombia is a multiethnic country where diverse cultures coexist. Interculturality involves the coexistence of indigenous worldviews within an environment of interaction between different cultures. It emphasizes the recognition of cultures beyond one's own, existing within the same territory. Interculturality seeks to challenge the dominant history of one culture over others, aiming to empower traditionally excluded identities. This approach fosters respect and legitimacy among all societal groups in daily life (Walsh, 1998).

One objective of interculturality is to foster improved relations between social groups of diverse cultures, cultivating citizens who can recognize and respect cultural differences. This approach aims to promote collaboration in creating a fairer, more equitable, and pluralistic society that benefits everyone. It acknowledges that denying or making other cultures invisible is no longer tenable.

Building on these concepts, Espinoza et al. (2019) assert that interculturality involves fostering relationships between different cultures based on principles of respect and equality. It strives for equal rights and opportunities for all cultural groups involved, ensuring their equal participation without dominance by any single group over another.

There has always been ongoing contact and interaction between cultures, illustrating the "relational" aspect of interculturality. The functional perspective of interculturality is explained by Quintriqueo et al. (2020) when they claim that functional interculturality becomes rhetoric, without implications in practice itself, being relegated to the official discourse since the public politics. Therefore, it does not generate changes in society and in hegemonic structure of power, resulting in the social structure remains unchanged and that knowledge and knowledge continue to prevail as a way of relating from western knowledge. In this regard, Walsh (2005a) describes interculturality as aiming "to develop an

equitable interrelationship between peoples, persons, knowledge and culturally different practices" (p. 45).

This research aims to assess the impact of interculturality on the recognition of Colombian indigenous cultures among basic education students. Its objective is to identify effective pedagogical methodologies that can stimulate students' awareness and encourage them to understand, recognize, and respect the cultures of indigenous groups within their community. Increased knowledge of diverse cultures in their surroundings can foster greater understanding, respect, and tolerance among students, contributing to improved societal coexistence.

Ethnic groups are communities of people who share a culture, traditions, language and other aspects of their collective identity. There are many types of ethnic groups around the world, each with its own characteristics and peculiarities.

One of the main characteristics of ethnic groups is their cultural diversity as each has its own unique cultural traditions and practices, often including its own language, religion, clothing, music and art. This cultural diversity can be a source of richness and creativity, but it can also be a source of conflict and tension. The importance of ethnic groups lies in their contribution to cultural diversity and the preservation of human cultural heritage.

Ethnic groups also play an important role in building people's identity and self-esteem. By identifying with a particular group, people can feel part of a larger community and have a sense of belonging that can be critical to their emotional and psychological well-being. Those groups often face inequalities and barriers in access to education, employment and other social resources, and may be subject to discrimination and cultural stereotyping. However, many of them have fought for their rights and promoted equality and social justice.

Before the arrival of the Spaniards in Colombian territory, the local population encompassed a diverse array of cultures, each with their own symbols, traditions, and extensive knowledge and wisdom. Sadly, much of this cultural richness was disregarded, scorned, and largely obliterated by the conquistadors driven primarily by aspirations of wealth and dominion, with little regard for cultures other than their own.

The arrival of the Spaniards precipitated significant environmental changes in the Americas through the introduction of new plants and animals brought from Europe, as well as the influx of new people from Europe and Africa, each bringing their own cultural practices and traditions that ultimately altered the existing ecosystems, social structures, and cultural landscapes of the region. These changes undoubtedly had a profound impact on the identity, sense of belonging, and social cohesion of the indigenous populations. According to Dunbar (2023), the great civilizations of the Western Hemisphere were systematically dismantled,

halting the gradual progress of humanity and setting a course characterized by greed and destruction.

During the colonial period, there was a significant decline in the indigenous population, marked by both physical and cultural extinction. This decline resulted from several factors: the arduous labor imposed on them as porters or miners, exposure to diseases brought by the conquerors such as smallpox, and efforts to "civilize" them by imposing the culture of the invaders, which undermined their dignity and restricted their ability to express their own thoughts.

According to the DANE (2019) population census, the number of indigenous groups has shown an increase compared to the 2005 census. This growth is attributed to indigenous communities migrating and establishing themselves in border areas. This suggests that the living conditions in their original territories may not have been conducive, prompting them to seek better conditions in rural areas elsewhere.

It should be noted that the recognition of Colombia's ethnic diversity and the participation of indigenous communities in public and political life were not formalized until the enactment of the Political Constitution of Colombia in 1991. This constitutional milestone granted indigenous communities the right to participate in elected office, allowing indigenous congressmen to introduce a project to the House of Representatives of the Congress of the Republic in 2003. This project aimed to empower indigenous groups to develop plans for their territories and establish land use plans in accordance with their own cultural values.

Despite these efforts to protect indigenous rights, the implementation of prior consultation, a fundamental principle in international law aimed at ensuring the active involvement of indigenous and tribal peoples in decisions that affect them, remains a contentious issue regarding its effectiveness (Figuera & Ortiz, 2019).

Indigenous peoples constitute one of the most marginalized groups, a consequence of evolutionary and historical social processes dating back 500 years. During this period, discriminatory practices, including the dispossession of their territories, persist to this day, often exacerbated by violent activities within the country, which disrupt their way of life and well-being. Recognizing and respecting the ancestral customs and cultures of indigenous peoples is crucial for understanding their origins and fostering the consolidation of their cultural identity.

Quijano (2012) argues that since the colonial era, the imposition of Eurocentric modernity has entrenched a dualistic framework of reason versus nature, replacing ethnic and racial differences in a hierarchical manner. This has perpetuated the exploitation and plunder of indigenous lands, undermining

not only the land itself but also the integrity of indigenous peoples and their knowledge systems.

The education of indigenous communities focuses its actions on culture, identity, autonomy, collective memory and elements that allow you to adapt to new ways of life and community and social development from the project's own educational and life plans (Giraldo & Taborda, 2020). Therefore, it is necessary to continue promoting adequate spaces so that indigenous groups can live in harmony with their ancestral cosmogony, living according to their customs and traditions. This approach not only supports their human development but also provides opportunities for coexistence with other cultures.

To avoid relegating indigenous cultures to mere historical footnotes and instead recognize and integrate them into daily life, Santos (2017) argues for moving towards an "ecology of knowledge". This approach acknowledges that reality encompasses diverse epistemological, cultural, spatial, and temporal dimensions. Encouraging this diversity, Santos suggests, means "enlarging the world and enlarging the present".

It is worth mentioning that previous research, such as Stavenhagen's (2010) work entitled "Indigenous Identities in Latin America," describes the evolving identities of indigenous peoples in response to time and circumstances. Stavenhagen also addresses the concept of indigenous communities, which is closely linked to the daily lives of these peoples and their aspiration to safeguard their self-determination. This effort to preserve their identity serves as an alternative within interculturality against the economic modernism that threatens indigenous culture and leads to their social and economic marginalization.

Another relevant document is Rojas' (2020) work, «El sistema educativo indígena propio en la legislación colombiana-SEIPEI». This document aims to address the historical and contextual problems faced by indigenous education in Colombia. It begins by describing the perceived identity of indigenous peoples according to their language and culture to better understand the application of their educational rights.

Rojas also highlights the necessity of having centralized communication that effectively collects and addresses the concerns of indigenous communities. This communication should be conducted in an atmosphere of respect and tolerance to help indigenous peoples regain confidence in the government. These backgrounds reveal a significant gap between policies (text) and reality. Historically, indigenous people have faced numerous challenges regarding identity and language. In some contexts, intercultural policies may favor certain dominant cultures to the detriment of others, perpetuating inequalities and marginalization. Often, the dominant culture is privileged in areas such as education, legislation, and access to resources, while other cultures are relegated or ignored.

Barabas (2014) presented a study called “Multiculturalism, Cultural Pluralism, and Interculturality in the Context of Latin America”. In this study, the author examines interculturality within the social sciences, referring to the interactions between different cultures and the ideology of egalitarian relationships among them. This framework is constructed within the broader contexts of globalization and human rights policies.

There is also an article by Monje (2015) «El plan de vida de los pueblos indígenas de Colombia, una construcción de etnoecodesarrollo», in which the author proposes methodological alternatives on how indigenous people can build life plans that are closer to their social reality to achieve the cohesion of these indigenous communities in the municipalities that host these collectives, from the approaches of agroecology. This study mentions the concept of eco-development, according to Sachs (1981) this process seeks to define the coevolution between the peasantry, its way of life and nature, the relationship with its social and economic environment, but under the deep look of a functional and balanced knowledge of the ecosystems it intervenes. The author proposes to give fulfillment to a real request so that the life plans are far beyond the simple conception, adjusted to the indigenous reality and not of a merely theoretical construction.

Although geographical location and fieldwork can facilitate coexistence and acculturation between cultures, it is crucial that this process occurs in a respectful and equitable manner. This involves promoting intercultural dialogue, mutual respect, and appreciation of cultural diversity. Furthermore, it is essential to ensure that all people have equal rights and opportunities, regardless of their cultural background. In short, these documents emphasize the importance of recognizing land as a vital component of life. Social science is a field in which students can learn about and appreciate the diversity of the community.

The vicissitudes faced by indigenous peoples as they encountered other cultures gave rise to what is currently known as interculturality, the interaction of different cultures, including native indigenous, Creole indigenous, and Afro-descendant communities within Colombian territory. However, due to the historical disdain and minority status of the indigenous population, there is often a noticeable lack of interest among students in learning about and recognizing indigenous cultures, despite their daily coexistence with these communities.

Disappointment arises among teachers when basic education students are unable to identify indigenous groups in their municipality despite daily interactions. For example, students often fail to recognize indigenous mothers in distinctive attire with their children in public spaces or selling their handicrafts. Teachers find it perplexing that people fail to recognize the proximity and presence of indigenous groups in their communities.

The culture of indigenous groups is often not valued. It would be worth asking students: What aspects of indigenous culture make you feel proud or embarrassed, considering that these ancestral cultures are part of your past? Additionally, why do these aspects generate pride or shame? These answers would undoubtedly be interesting and insightful.

Therefore, the main purpose is to analyze the incidence of interculturality on indigenous culture in fourth-grade basic education. Promoting interculturality among students is essential for developing good citizens who are tolerant, participative, and collaborative members of society. It is important to foster students' interest in acquiring knowledge about indigenous cultures, including their origins, to help them recognize the diversity of native groups. Unfortunately, it is evident that there is a lack of sufficient knowledge about the indigenous cultures of the region.

The general objective of this study is to analyze interculturality with respect to the recognition of Colombian indigenous cultures among basic education students. The specific objectives are: first, to assess the students' level of knowledge about indigenous cultures, including the largest Colombian indigenous groups, their native languages, and their main locations within the national territory; second, to design and implement intercultural pedagogical practices aimed at enhancing the recognition of Colombian indigenous cultures; and third, to evaluate the degree of knowledge gained in this area. Consequently, the study aims to reinforce students' identities through interculturality, focusing on knowledge, competencies, behavior, and values.

Numerous native indigenous groups are present throughout the national territory, and people should take pride in these groups as they are integral to their ancestral roots. These indigenous peoples and their cultures existed in this territory long before the arrival of the Spaniards. Therefore, there is a pressing need to preserve their culture, language, and identity.

Considering that all cultures are dynamic and evolve through the incorporation of elements from other cultures, it is important within communities to recognize the elements that have been adopted. From this perspective, a pedagogical approach that promotes the analysis and development of decolonial pedagogical proposals is essential. Such proposals aim to challenge and dismantle material, symbolic, and cultural chains, working towards societies characterized by justice, equity, and dignity (Walsh, 2013).

Teachers have a crucial role in helping students recognize the importance of valuing, understanding, and acknowledging indigenous cultures. They are central figures both in the classroom and the community as agents of interculturality. Consequently, teachers need to continually build and refine their knowledge, behaviors, competencies, values, and attitudes concerning cultural diversity. This

development is essential both as individuals with their own backgrounds and cultural experiences and as educators (Walsh, 2005b).

Recognizing the presence of other cultures is beneficial as it allows individuals to contextualize their own existence and appreciate human diversity across different environments. Therefore, engaging with other ways of thinking and understanding—through stories from diverse individuals or literature addressing diversity—are effective approaches for fostering intercultural awareness. According to Papini et al. (2019), there is a belief that a social pact among social groups can benefit humanity by promoting development and democracy, as well as introducing innovations at cultural and institutional levels.

Method

In this research, action research has been adopted as the primary method. Action research, described by Clark et al. (2020) as "learning by doing", helps teachers or researchers improve educational practices by enhancing the quality of their decisions and actions, which ultimately boosts student engagement, teaching, and learning, thereby improving educational processes. This method involves identifying a problem, taking action to address it, evaluating the results, and, if necessary, making further adjustments.

In this study, a series of interventions were conducted with fourth-grade students at a bilingual school. These interventions consisted of two-hour sessions held over a period of ten weeks, focusing on activities related to interculturality, knowledge, competencies, behavior, and values. The objective was to facilitate the recognition of Colombian indigenous cultures among the students.

Following the curriculum of the institution, students are expected to explore the linguistic families of Colombia, including the Chibchan, Caribbean, and Arawak families, and to discuss their political, social, religious, and economic organizations. Additionally, fourth-grade students are at a developmental stage where they can engage meaningfully with aspects of indigenous culture.

The interventions began by showing students images about these indigenous tribes. Without any prejudice involved, the teacher encouraged students to express their thoughts about the people depicted in the images. This elicited responses such as, "Professor, they are poor people, people from other countries", "What strange clothes!" and "Why do they use those accessories?", which highlighted the students' limited understanding of their own native roots.

In the same way, teacher allowed them to socialize it in order to catch the information that they had in the moment regarding these cultures. As a second step, the teacher played native music from the indigenous tribes. Students recognized some of the music but identified others as originating from countries such as Peru or Ecuador. This feedback revealed that the students lacked concrete information about the linguistic families of their own country.

The teacher guided the students in recognizing indigenous tribes, their locations, histories, and the reasons they have become a minority in the country. The teacher posed questions such as, "Why don't indigenous people study?" "Why do the natives speak another language?" and "Why do most of them live in poverty?" Then, through exploring the history of these tribes, the teacher facilitated an understanding of the societal differences between mainstream society and indigenous groups. The goal was to foster empathy towards these minorities, highlighting their significant role in the country's history. This approach aimed to change students' perspectives by providing accurate information about indigenous history and emphasizing the importance of preserving their cultural roots.

The project adopted a descriptive scope, which facilitated the characterization of various aspects such as age range, group size, practices, and recognition. According to Alban et al. (2020), descriptive research aims to describe fundamental characteristics of similar groups or phenomena using systematic criteria, revealing their structure and behavior. It provides systematic and comparable information with other sources and helps to illuminate the angles or dimensions of an event, scene, setting, or situation.

In this study, it was essential to have a sufficient repertoire of prior knowledge about interculturality and indigenous peoples. Therefore, the objective was to enhance the recognition of indigenous cultures among the target population. The descriptive scope was developed through practicing speaking, listening, reading, and writing with simple and short phrases that describe physical and cultural characteristics.

In this research, qualitative methodology has proven valuable for describing, understanding, and transforming contextual and ideographic issues to generate substantive theories. Such issues could not have been effectively addressed through abstractionist and generalizing approaches (Pearse, 2021). Qualitative research often relies on non-statistical data collection methods, such as description and observation, which were utilized in this project.

Questions and thoughts frequently arise as part of the practice, with the research process being flexible and dynamic, moving between experiences and their interpretation, and between responses and theory development. In the context of this study, qualitative research within the cultural environment of

indigenous communities in Colombia provides an opportunity to immerse in the richness and uniqueness of their ways of life. This approach allows for the exploration of deep-rooted values and customs, sacred beliefs, and traditions passed down through generations. These elements are crucial for gaining a comprehensive understanding of their cultural identity and the way these traditions have shaped their history over time.

As Fernández et al. (2020) note, the data collected allow for sharing the country's educational situation with the international community and offer other researchers the opportunity to reflect on similar findings. Researchers employ a specific research design, beginning their projects with open questions. This method also emphasizes viewing the environment and people from a holistic perspective; individuals, systems, or groups are not reduced to their differences but are seen as a whole. Learning from past and present circumstances was particularly beneficial in conducting the interventions.

For the research team, every opinion was valued, and the focus was not on seeking truth or morality but on gaining a deeper understanding of others' feelings. All individuals were regarded as equals, with the understanding that morality is personal. To study people effectively, it is essential to understand them and listen to how they feel about their everyday problems in society or organizations. This approach facilitates learning about concepts such as beauty, pain, faith, suffering, sadness, and love.

The research aimed to bridge the gap between data and people's actual statements and behaviors. By observing individuals in their daily lives and listening to their thoughts, the researcher gained first-hand knowledge of the community's lives, unfiltered by theories, operational definitions, and measurement standards.

In this project, the population consisted of 55 fourth-grade elementary school students, divided into three groups: 4a (9 girls, 9 boys), 4b (10 girls, 7 boys), and 4c (10 girls, 10 boys). The students were between 9 and 10 years of age.

Regarding techniques, observation is utilized as it allows for the direct and objective collection of data. According to Arias (2020), observation is characterized by the researcher observing the phenomenon or object of study in its natural state. The researcher remains physically separated from the study population, allowing them to carry out their usual activities.

The importance of observation in this research lies in its ability to provide detailed and contextualized data on human behavior, social interactions, natural processes, and other phenomena of interest. By directly observing people in their real environment, researchers can capture aspects that might be missed by other data collection methods, such as questionnaires or interviews. Furthermore, observation offers greater realism, as participants engage naturally in their

activities without being influenced by the presence of the researcher or by questions. This approach facilitates a better understanding of the true nature of indigenous people and helps minimize reporting errors caused by prejudices.

In this project, a diagnostic test was conducted to assess the students' prior knowledge of indigenous cultures. A series of questions were posed, which the students were required to answer based on their experiences within the Colombian context.

It is considered that observation during the various interventions allowed researchers to gather qualitative data that could be analyzed, such as expressions of astonishment at new information, discontent, or empathy regarding the situation.

Field journals play a crucial role in this method, as they allow researchers to systematically and reflectively record their experiences, observations, and reflections throughout the research process. These journals are invaluable for capturing contextual details, students' reflections, and emotions that cannot be captured solely through other data collection techniques. According to Luna (2022), field journals are both a personal and consultative instrument in their preparation, valuable for individual and team work, and serve as a source of information for professionals working on the same issue, providing continuity and supervision for a project. These records can include descriptions of situations, interactions, non-verbal language, unexpected events, or any other relevant details that contribute to understanding the investigated phenomenon. Additionally, researchers can document thoughts, questions, ideas, and changes in behavior related to interculturality and indigenous people. These documents or data provide a view of the decisions made and the problems encountered, increasing the credibility and integrity of the study.

Considering that a series of interventions were carried out with the population, the researchers needed to plan prior to the meetings to guide the activities and orientations. The importance of the lesson plan lies in the fact that objectives were established beforehand, referencing sociolinguistic competences as outlined in *Guide 22: Basic Standards of Competences in Foreign Languages: English* proposed by the Ministerio de Educación Nacional (MEN) (2006) and the Common European Framework of Reference (CEFR). This preparation facilitated the effective execution of the interventions.

Formative assessment is an important pedagogical tool that allows teachers to collect real-time information on learning progress and understanding. This includes ongoing informal assessments that occur throughout the learning process and provide valuable feedback to both teachers and students. According to Irons and Elkington (2021), formative assessment and formative feedback are powerful and potentially constructive learning tools for students and staff.

Any task that generates feedback or feedforward about students' learning achievements can be considered formative assessment. Furthermore, Heritage (2021) emphasizes that effective formative assessment provides information about students' learning in relation to short-term goals. The feedback loop operates as a continuous process during learning to ensure that all students' learning progresses effectively. These insights help teachers design meaningful assessments and provide timely feedback to improve student learning. By utilizing formative assessment methods, teachers and students engage in a process focused not on finding right or wrong answers, but on understanding how students think and determining the steps needed to advance their learning from its current status (Heritage, 2021). Adopting a cross-cultural approach, this proposal builds on and enhances the contribution of Mora (2019), who advocates for an evaluation model of intercultural learning at school. This approach aims to strengthen pedagogical, evaluation, and self-assessment skills of teachers within schools, enabling them to review and refine their evaluation methods according to their specific context. It involves leveraging both the teacher's pedagogical knowledge and the students' insights.

To achieve the third objective—evaluating the degree of students' knowledge regarding Colombian and other cultures—the teacher utilized music and photography as resources. These tools provided students with meaningful opportunities to connect with their cultural heritage, strengthen their indigenous identity, and deepen their understanding of the traditions and values of their ancestral communities.

The intercultural evaluation model of learning objectives proposed by Mora (2019) was adopted for this work, as it aims to evaluate learning objectives through processes of continuous regulation developed by teachers and students in formative assessment. This model establishes a dialogue of knowledge that appreciates the diversity of cultures among participants as a means of advancing educational improvement. Consequently, this model served as a reference for the development of a tailored evaluation framework to assess the competencies required for this research.

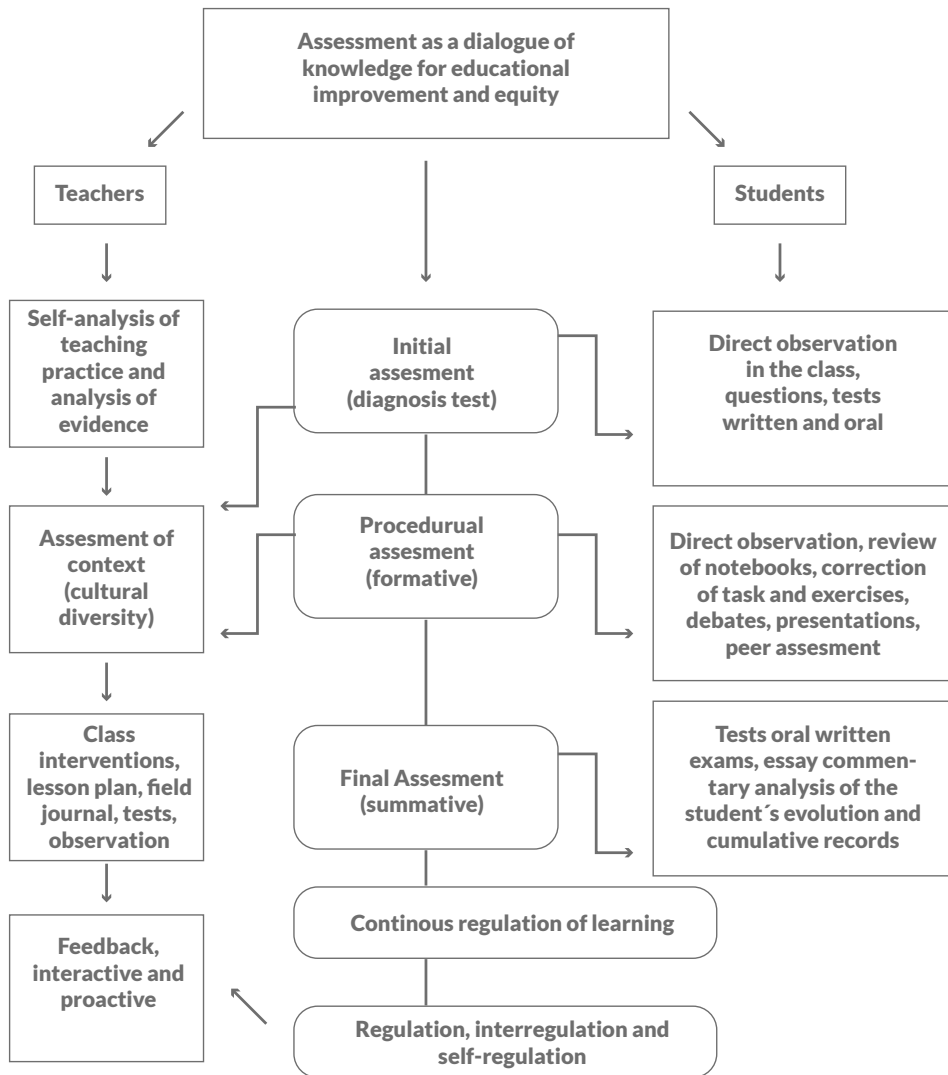


Figure 1. Intercultural Assessment Model of Learning Objectives in School.

Source: Mora (2019).

Results

For the first objective, which is to diagnose the degree of knowledge that students have about indigenous cultures, including the major Colombian indigenous groups, their native languages, and their main locations within the national territory, the information gap regarding students' cultural roots became evident. Diagnostic activities revealed that the students lacked knowledge about the existence and culture of indigenous peoples. However, there was significant enthusiasm and curiosity among the students to learn more about aspects of indigenous life. This eagerness provided valuable insights and generated meaningful questions, guiding the development of subsequent interventions.

An aura of respect was observed in the classroom for the history of indigenous culture, fostering empathy and consideration for the way these minorities live. Students related their experiences to the new information; when they were oriented to properly recognize these cultures, many realized they had already encountered them. There was a willingness and enthusiasm to discuss culture, as the fourth-grade students expressed great admiration for the history and customs of these indigenous cultures.

The discussion and its relation to the objectives revealed that through different practices, students were initially unable to recognize or identify the indigenous groups presented to them in the images. This was evident from questions and exclamations such as, "Teacher, they are poor people, people belonging to other countries", "What strange clothes!" and "Why do they wear those accessories?" This information indicated a lack of knowledge among students about the different indigenous groups that inhabit the region. Therefore, it cannot be considered that they were able to identify cultural elements such as proper names and places in the images presented to them for this purpose. Due to these findings, it can be concluded that there is a lack of intercultural competence among the students, which is defined as the ability to understand people and their attitudes from other cultures.

Being interculturally competent entails embodying attitudes of respect, curiosity, and openness, which serve as the basis for developing essential knowledge areas such as cultural self-awareness, culture-specific knowledge, and understanding other worldviews, along with skills like observation and active listening (Rawal & Deardorff, 2021). These attitudes, knowledge, and skills collectively contribute to internal outcomes in an interculturally competent individual, fostering qualities such as flexibility, adaptability, and empathy. Zapata (2023) also notes that the current scenario of interculturality in Colombia presents significant challenges but also advances and opportunities for promoting cultural diversity and intercultural dialogue. Discrimination and racism remain serious problems

in the country, and many ethnic and cultural groups face structural barriers in accessing opportunities and resources. Therefore, the goal of the investigation is to develop intercultural competence and achieve the recognition of Colombian indigenous cultures in basic education students.

Even though students were initially unaware of the indigenous groups in the region, during the activity of representing and characterizing the native people in class, it was possible to observe a curiosity to know important aspects of the life of the indigenous groups, producing even astonishment and interest among the students. They followed attentively what the teacher said and what their classmates expressed during this activity. The students who carried out the representation described the culture of the most important indigenous groups with simple and short phrases, considering their physical characteristics as well as their clothing.

Developing intercultural competence must be considered as the result of an experiential process that consists of facing what is different in the areas of language and culture (Caraballo et al., 2019). Intercultural competences are essential in the knowledge society, as they facilitate understanding of the demands and challenges of current sociocultural realities, while also providing the opportunity to explore various cultures in depth. For students to begin to understand the culture of others, they need knowledge about the target culture, awareness to identify its characteristics and differences between the target culture and one's own, and a willingness to find, analyze, synthesize, and generalize cultural characteristics and differences. Furthermore, it is important to take into account the affective objectives in teaching culture: interest, curiosity, and empathy to know, understand, and interact appropriately with other people's cultures (Ruzieva, 2021).

Ethnic groups have shown motivation to explore, recover, and interpret the traditional aspects of their local identity, which favors the understanding and establishment of a more equitable relationship between the indigenous population as hosts and their visitors. This makes it possible to demonstrate responsibility toward ourselves and others, as well as fostering understanding between cultures, empathy, and peace, as Medina et al. (2019) mention.

Regarding the second objective, the design of the activities allowed us to recognize how the policies in Colombia include cultural aspects, particularly the recognition of Colombian culture, with reference to ethnic groups, languages, and linguistic families. Additionally, the pedagogical practices required the development of students' thinking skills such as listening, reading, writing, speaking, and monologue.

Once the interventions, which introduced students to the main indigenous cultures, were completed and assessments were conducted to evaluate their degree

of knowledge, the students demonstrated respect in the classroom for indigenous minorities in relation to their previous experiences. This process allowed them to address gaps in their understanding of pre-Hispanic inhabitants of the Colombian territory. The enthusiasm displayed by the students to learn more about their ancestors facilitated their recognition of their past and enhanced their understanding of their present. Subsequently, they were able to identify cultural elements such as proper names and places. Additionally, they wrote short stories based on their imagination, describing themselves and noting differences with the newly learned cultures. When individuals are immersed in their own culture, many aspects seem evident, as they may not be aware of their own culture until they encounter and experience others. The development of visual and multimedia activities using ICT (Information and Communication Technology) and the incorporation of cultural elements were pedagogical practices that promoted behavior patterns, values, customs, and active participation among the students.

Limón and Pérez (2019) point out that without a respectful translation of the life world of the other, there is no possibility of achieving the desired understanding between life worlds, and each person interprets cultural otherness through their own criteria, symbolically and materially reproducing their own society. This statement refers to the challenge of bridging cultural gaps, specifically concerning how individuals perceive and relate to time. It highlights the difficulty in understanding and translating these differences, particularly when one person experiences time in an intersubjective manner while another does not. As Peña (2020) asserts, language must be understood as a powerful medium capable of constructing reality through the representations of the world.

Conclusions

As a result of this project, it was observed that the fourth-grade students lacked knowledge about recognizing the various indigenous groups in the region. This lack of awareness is significant from an intercultural perspective, as understanding cultural identities is crucial for working with different groups within an environment of tolerance and mutual recognition. The interrelation between cultures must be conducted with due respect and equality for each culture involved, thereby avoiding segregation and injustice. This is particularly relevant considering the historical victimization of indigenous groups, which has persisted for over five hundred years.

It was observed that the lack of knowledge among students about the indigenous cultures was not due to a lack of interest but rather because these cultures had gone unnoticed. Students lived alongside indigenous groups but did so without engaging deeply with their cultures, leading to a degree of ignorance. Once students became aware that their own country is shared with social groups of diverse languages, histories, and customs—groups that may appear different but are essentially the same human beings with different characteristics—they began to understand and appreciate this diversity.

It can be concluded that Colombian policies are indeed advantageous as they recognize the country's own culture, with history serving as a means for people to stay connected to their cultural heritage. The educational curriculum aims to foster dignity, justice, and equity. Meanwhile, pedagogical approaches that include the human element enable individuals to appreciate and enjoy diversity.

The results obtained provide insight into the current level of students' awareness regarding their cultural reality. The fact that these students were initially unaware of the existence of indigenous groups in the region highlights the need to promote knowledge acquisition that fosters tolerance and collaboration with individuals from different cultures. This is only the first step on a path that still needs to be covered. According to the Common European Framework, which emphasizes the three "Cs" of intercultural competence—cultural awareness, curiosity, and getting close with other cultures—students must be encouraged to understand and appreciate the presence of diverse cultures. This approach aims to achieve greater harmony and respect in a multicultural world.

In light of these findings, students' knowledge of the Arawak, Caribbean, and Chibcha cultures, as well as their intercultural context, has increased. They were able to appreciate their roots, geography, economy, language, and the contexts in which their ancestors lived. Teaching and learning about these cultures has underscored the importance of communication in society, the preservation of the earth, and the family as a central aspect of life.

It is sufficient for the teacher to promote connections between the students' own culture and that of indigenous peoples, encouraging interest in exploring the new horizons these cultures offer within their own country. Colombia is a diverse nation, providing students with numerous opportunities to explore. By bringing indigenous cultures closer to their own, students can better recognize and connect with other cultures while fostering a framework of equality, inclusion, tolerance, and respect.

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A Qualitative Exploration of How the Katanzama Indigenous People Experience Self-Regulated Learning and Metacognition*

[English version]

Una exploración cualitativa de cómo el pueblo indígena «Katanzama» experimenta el aprendizaje autorregulado y la metacognición

Uma exploração qualitativa de como o povo indígena «Katanzama» experimenta a aprendizagem autorregulada e a metacognição

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Colombia

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Abstract

Objective: Self-regulated learning (SRL) and metacognition are recognized as critical thinking processes essential for effective achievement, problem-solving, and critical thinking, among other aspects. While there is abundant research on these concepts for typical populations, particularly with white ethnic groups from regions such as the United States and Europe, these constructs have not been extensively investigated in other population groups or ethnic minorities. Therefore, the purpose of this study was to examine how these two phenomena are experienced by the Katanzama indigenous culture in Santa Marta, Colombia. **Methodology:** To achieve this, a structured interview protocol was developed with questions about how this indigenous group experiences SRL, metacognition, and the act of teaching. **Results:** Iterative thematic analyses revealed six themes emerging from the interview data: 1) Knowledge of context and cultural relevance in learning; 2) Regulation and adaptation in learning processes; 3) Diversification of teaching strategies; 4) Learning from mistakes; 5) Planning and organization of study; and 6) Self-criticism and pursuit of continuous improvement. **Conclusions:** The implications for research, theory, and practice are discussed.

Keywords: indigenous population; self-regulated learning; self-learning; metacognition; qualitative research (obtained from Bireme thesaurus).

Resumen

Objetivo: el aprendizaje autorregulado (AA) y la metacognición se reconocen como procesos críticos de pensamiento que son necesarios para el logro efectivo, la resolución de problemas y el pensamiento crítico, entre otros. Si bien abundan investigaciones

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sobre estos conceptos para las poblaciones típicas, que han privilegiado estudios con grupos étnicos blancos de regiones como Estados Unidos y Europa, se considera que no se han investigado estos constructos en otros grupos poblacionales o minorías étnicas. Así, el propósito del presente estudio fue examinar cómo estos dos fenómenos son experimentados por la cultura indígena «Katanzama» de Santa Marta, Colombia.

Metodología: para ello, se desarrolló un protocolo de entrevista estructurada con preguntas sobre cómo este grupo de indígenas experimenta el AA, la metacognición y el acto de enseñar. **Resultados:** los análisis temáticos iterativos revelaron seis temas que surgieron de los datos de las entrevistas: 1) Conocimiento del contexto y relevancia cultural en el aprendizaje; 2) Regulación y adaptación en los procesos de aprendizaje; 3) Diversificación de estrategias de enseñanza; 4) Aprendizaje a partir de errores; 5) Planificación y organización del estudio; y 6) Autocrítica y búsqueda de mejora continua.

Conclusiones: se discuten las implicaciones para la investigación, la teoría y la práctica.

Palabras clave: población indígena; aprendizaje autorregulado, autoaprendizaje; metacognición; investigación cualitativa (obtenidos del tesoro Bireme).

Resumo

Objetivo: a aprendizagem autorregulada (AA) e a metacognição são reconhecidas como processos críticos de pensamento necessários para o sucesso efetivo, a resolução de problemas e o pensamento crítico, entre outros. Embora existam muitas pesquisas sobre esses conceitos para populações típicas, predominantemente em grupos étnicos brancos de regiões como Estados Unidos e Europa, acredita-se que esses construtos não foram suficientemente investigados em outros grupos populacionais ou minorias étnicas. Assim, o objetivo deste estudo foi examinar como esses dois fenômenos são vivenciados pela cultura indígena «Katanzama» de Santa Marta, Colômbia. **Metodologia:** para isso, foi desenvolvido um protocolo de entrevista estruturada com perguntas sobre como esse grupo indígena experimenta a AA, a metacognição e o ato de ensinar. **Resultados:** as análises temáticas iterativas revelaram seis temas que surgiram dos dados das entrevistas: 1) Conhecimento do contexto e relevância cultural na aprendizagem; 2) Regulação e adaptação nos processos de aprendizagem; 3) Diversificação de estratégias de ensino; 4) Aprendizagem a partir de erros; 5) Planejamento e organização dos estudos; e 6) Autocrítica e busca de melhoria contínua. **Conclusões:** são discutidas as implicações para a pesquisa, a teoria e a prática.

Palavras-chave: população indígena; aprendizagem autorregulada; autoaprendizagem; metacognição; pesquisa qualitativa (obtidos do tesouro Bireme).

Introduction

Colombia is in the northwestern corner of South America, covering an area of 1,141,748 km². The country has coastlines along the Pacific and Atlantic Oceans and is traversed from south to north by the Western, Central, and Eastern Andes Mountain ranges. Colombia is characterized by its geographical, biological, ethnic, and cultural diversity, encompassing a variety of landscapes including coastal regions, the Andes, tropical forests in the Pacific and Amazon, plains, vast desert areas, and island territories. These regions are the home of more than 115 Indigenous peoples and communities of African descent (Grupo Internacional de Trabajo sobre Asuntos Indígenas -IWGIA, 2023).

The most recent census, conducted in 2018, identified an ethnically diverse population, accounting for 13.6% of Colombia's total population of 48,258,494 people. This corresponds to 1,905,617 individuals who self-identify as Indigenous peoples of diverse origins, and 4,671,160 individuals who identify as Afro descendant, *Raizal*¹, *Palenquero*², and *Rrom*³ populations. These figures are based on a national population estimate of 51,609,000 people in 2024 (Agencia Nacional de Tierras, 2022).

In 2022, it was estimated that roughly 58.3% of indigenous people in Colombia reside on legally recognized collective property reserves. These contexts provide evident access to education that respects the language, beliefs, and cultural idiosyncrasies of each indigenous group. At the same time, the remaining 41.7% of the indigenous population have moved to urban centers due to various social and economic factors, including forced displacement, disappearances, violence, and poverty, resulting in the loss of access to their culturally relevant education. In this respect, it is acknowledged that, as of 2022, there were significant incidents of violence in the ethnic territories of certain regions, particularly murdering indigenous leaders from groups such as the Awá, Nasa, and Embera in Nariño, Cauca, Chocó, and Antioquia (Organización Nacional Indígena de Colombia -ONIC, 2023).

1 The *Raizal* ethnic group is native to the islands of San Andrés, Providencia and Santa Catalina. They are descendants of the miscegenation between indigenous people, Spaniards, French, English, Dutch, and Africans (Abello & Mow, 2008).

2 *Palenques* are a form of anti-colonial resistance by Maroons (De Friedman & Patiño, 1983).

3 The *Rrom* or Gypsy people are transnational and of Nordic origin. In Colombia, they are found in the departments of Atlántico, Bolívar, Valle del Cauca, and Bogotá (Ministry of Culture of Colombia, 2024).

This displacement of Indigenous children and young people to rural and urban educational centers underscores the loss of access to culturally relevant education, compelling them to enter educational systems that often fail to recognize their diversity, worldviews, traditional laws, authorities, economic models, language, as well as ancestral knowledge. This emphasizes the need to understand how children and youth learn and self-regulate within the context of their ethnic and cultural diversity.

In this respect, several researchers have remarked that students from non-dominant cultures, when included in regular classrooms, are at a high risk of experiencing a lack of engagement and inclusion due to the culturally diverse nature of these educational settings. This challenge arises from classroom activities often disconnected from their backgrounds, interests, and lived experiences (Anyichie et al., 2023; Gay, 2018).

Given these challenges, further research is needed to gain deeper insights into how ethnic minorities, including indigenous students, learn and self-regulate in both rural and urban classrooms. It is imperative to guarantee that these students can effectively self-regulate their learning processes and fully capitalize on the educational opportunities at their disposal while honoring their ethnic diversity and preserving their traditions. To foster an environment that respects and enhances their resources, it is crucial to consider the influence of background, heritage, and cultural practices on individual learning processes (Anyichie et al., 2023; Gay, 2018; Kerfoot, 2005; Villegas & Lucas, 2002). Table 1 depicts the relevant literature review for this study.

Table 1. *Studies on the Process of Metacognition and Self-regulated Learning in Indigenous Populations.*

Researchers	Country	Objective/Method	Findings
Resing, W., Tunteler, E., de Jong, F., & Bosma, T. (2009)	Netherlands	To examine whether ethnic minority children exhibit different change patterns to Indigenous children when presented with a learning strategy, a serialization task, within a dynamic testing context based on graduated prompt techniques.	The tested children demonstrated a strategic behavior change in the more advanced strategy-use. This change was the largest for ethnic-minority children with initially weaker scores. These children also required more guidance but progressively needed fewer cognitive hints than Dutch-indigenous children during training.
		Study Design: Quasi-experimental pretest-posttest control-group design.	The graduated prompts approach offers valuable insights for detecting and describing strong and weaker points in each child's task-solving processes before, during, and after training.

Researchers	Country	Objective/Method	Findings
		Sample: one hundred and nine children, aged seven-to-nine, enrolled in five schools in the western part of the Netherlands.	With a brief intervention, it was possible to describe the number, timing, and type of prompts a child needed during training, illustrating the "learning
Ridwan, A., Rahmawati., Y., & Hadinugrahaningsih, T. (2017)	Indonesia	To explore the implementation of an ethnochemistry-based Culturally Responsive Teaching (CRT) approach in high school chemistry classrooms by incorporating cultural practices relevant to students' backgrounds alongside the formal Indonesian chemistry curriculum. Study Design: Qualitative research employing multiple methods for data collection, including observation, interview, reflective journal, and content analysis. Sample: Students from four high schools, including three public schools and one private Islamic school.	In chemistry education, Western knowledge predominates at all levels of the curriculum, resulting in a disconnect between students' learning experiences and their cultural environments. However, the challenge for teachers lies in designing a learning process that acknowledges students' cultural backgrounds and characteristics, leveraging these as metacognitive resources for both teaching and learning. The model for integrating ethnochemistry into the CRT approach developed in this study encompassed five main steps: self-identification, cultural understanding, collaboration, critical-reflective thinking, and transformative construction. This model was readily applicable in Indonesian chemistry classrooms. Students were empowered to explore their cultural identity and develop cultural awareness, allowing them to appreciate the distinctions between indigenous knowledge and formal knowledge. Additionally, while actively participating in chemistry education, the learning model provided students with opportunities to develop collaboration skills, empathetic communication, critical self-awareness of their cultural identity, and higher-order thinking skills.

Researchers	Country	Objective/Method	Findings
Mudau, A., & Tawanda, T. (2022).	Zimbabwe (Africa)	To explore the use of Indigenous knowledge in chemistry, as culturally contextualized by science education trainees and its metacognitive use in chemistry teaching.	Pre-service science teachers revealed Indigenous chemistry knowledge in diverse fields, including agriculture, health care, environmental conservation, food processing, and food preservation. In conclusion, chemistry metacognition can be effectively taught or enhanced in students by incorporating indigenous knowledge of chemistry into formal Western education.
Mudau, A., & Tawanda, T. (2024).		Study Design: Mixed methods case study utilizing interviews and focus groups. Sample: Twenty-nine pre-service science teachers	Pre-service science teachers from local schools possess vast indigenous chemistry knowledge in areas such as zoology, botany, agriculture, medicine, and craft skills. In this context, recognizing the value of this extensive and systematic indigenous chemistry knowledge (prior knowledge) can favor the accurate assessment of the demands of chemistry learning. This also helps address questions about the understanding and skills needed to integrate indigenous and formal knowledge effectively, ensuring that indigenous knowledge is applied reliably within the framework of the Western curriculum. Such integration enhanced students' learning by increasing motivation, cultural identity, engagement, and collaboration, as well as higher-order thinking skills.

Studies focusing on metacognition and ethno-education are scarce. Generally, research in this area examines the contributions of respecting the "self-education" of indigenous cultures and ethnic minorities. Although this is undoubtedly an important issue, such a perspective can be regarded as macro-level, overlooking the micro-level challenges related to personal knowledge and self-regulation in learning processes. These challenges comprise how learners experience and self-regulate their educational dynamics, and how teachers navigate their worldview and cultural identity to facilitate or enhance in-depth learning.

Further studies are needed to link the identity of indigenous populations with metacognitive and self-regulated learning perspectives. Several researchers acknowledge that both Indigenous teaching approaches and self-regulated learning theories emphasize the importance of making learning relevant and practical for students (Battiste, 2013; Brayboy & Maughan, 2009; Brayboy et al., 2012; Deloria, 2003; Perry, 2017). Similarly, students engage in in-depth learning when they are assisted in pursuing their personal goals that are consistent with their cultural values and the social priorities of their communities (Perry, 2017).

Most self-regulated and metacognitive learning models involve typical and cyclical phases, including planning, execution, and evaluation (Winne & Hadwin, 1998; Winne et al., 2013; Zimmerman & Campillo, 2003). These models describe the processes students use to guide their thoughts and actions before, during, and after engaging in a learning task or pursuing a goal. Similarly, Indigenous epistemologies often view knowledge as a holistic process that encompasses careful planning, deliberate and strategic action, as well as continuous evaluation (Brayboy & Maughan 2009). Both perspectives converge and are valuable resources to help Indigenous students understand and regulate their learning more effectively. This approach respects their idiosyncrasies and identity while navigating a school context that may be unfamiliar and disconnected from their culture and traditions.

Sociodemographic, cultural, and religious variables specific to various Indigenous populations may impact the learning opportunities and development of scientific thinking in Indigenous students who enter traditional classrooms. Their diverse worldviews are not acknowledged as valid prior knowledge that could contribute to the development of scientific concepts in learning. Various studies have extensively highlighted this perspective, emphasizing the influence of students' socio-cultural backgrounds on science teaching and learning. These studies justify incorporating these backgrounds

into the curriculum, based on how indigenous students construct their knowledge. This is grounded in observations and experiences shaped by the customs, beliefs, and religious practices of their society (Akpanglo-Nartey et al., 2012; Msimanga & Shizha, 2014; Tyler et al., 2006), which often do not seem to be integrated into formal classroom instruction. This problem underscores the need to incorporate metacognitive reflection processes, enabling students to critically evaluate which aspects of their indigenous knowledge contribute to and enhance their learning process.

This study

This study was based on this research question: How does this Colombian Indigenous population undergo self-regulated learning, metacognition, and teaching?

Position of researchers

This study aims to gain a deeper understanding of participants' awareness of their metacognition process, with a focus on their experiences with metacognition and self-regulated learning. The research team was also interested in determining whether the 'Katanzama' people of Colombia underwent metacognition like typical populations. Therefore, this study was conducted from the professional and respectful work of a team of researchers, who were aware of their understanding of metacognition, self-regulated learning, and teaching, as well as the desire to enhance the participants' metacognitive awareness. They were made partial to certain findings and blind to others.

The researchers' previous experience with metacognition and self-regulated learning favored the incorporation of the following assumptions: (1) Participants can be supported in enhancing their comprehension monitoring skills; (2) Self-regulated learning may vary across domains, topics, and content areas; and (3) Metacognition and self-regulated learning can be influenced by sociocultural factors such as race, gender, ethnicity, and level of education.

Methodology

Participants, Sampling and Research Design

This study used an intentional sampling approach to examine how metacognitive phenomena operate within Indigenous populations. Stake (1994) conducted a case study to substantiate the generality of the metacognitive phenomenon. The selection criteria were like those used in this study. Participants included individuals from a community with diverse educational roles, and the same set of questions was posed during the structured interview (Merriam, 1998; 2009). A qualitative analysis technique was applied to examine the structured interviews, facilitating a deeper understanding of how this Indigenous population undergoes self-regulated learning and metacognition.

The participants were five individuals, all members of the Katanzama community. The sample comprised a community leader, a school principal, two teachers from the local educational institution, and a university student.

Following the guidelines and authorizations provided by the leaders of the Katanzama community, who granted permission for two researchers to enter the community, conduct field data collection, and select participants for the study, the following procedure was implemented:

The Mamo⁴ (senior member) of the community delegated the task of selecting interview participants to one of the community leaders. This selection was based on specific criteria that the selected individuals needed to meet to be included in the study sample:

- Proficiency, comprehension, and fluency in both the native language, "Iku⁵," and Spanish as a second language.
- Be an active member of the community.
- Possess an adequate level of education to ensure that the interviewee could fully comprehend the questions posed by the researchers.

⁴ He is the spiritual leader of the indigenous people, and has the responsibility to maintain order through songs, meditation, and offerings.

⁵ The language of the *Katanzama* group is the *Ika* language. The 'Arhuaco' or 'Iku' language is the Amerindian language of the Chibchana family used by the *Ika* people of Colombia. This language is also known as *aruaco*, *bintuk*, *bintukua*, *bintucua*, *ica*, *ijca*, *ijka*, *ika* and *ike*. In its grammar structure it uses the linguistic form of subject, object, and verb. Many of the community's inhabitants are monolingual in their aboriginal language, others speak Spanish as an auxiliary language (Jackson, 1995; Landaburu, 2000).

- Engage in various roles within the community (such as parent, student, teacher, community leader, or principal of an educational institution) to provide diverse perspectives during the interview.

The term "Katanzama" translates as "root of knowledge" and refers to an Arawak indigenous community located in the Magdalena Alto region of the Sierra Nevada de Santa Marta, Colombia. This community regained its land roughly 12 years ago through a national land restitution program. It is considered the only indigenous population residing at sea, a location of sacred significance for the community's inhabitants. From their worldview, interactions with the sea and its stewardship have a spiritual scope. Similarly, the community venerates a second sacred site: a tree that serves as a focal point for gathering to discuss collective matters and perform daily sacred rituals, as illustrated in Figure 1: *Conversation Around the Sacred Tree*.



Figure 1. *Conversation Around the Sacred Tree.*

Source: Henao & Hurtado (2024).

Each day begins at this ritual site, where "the elders" (community leaders), "the *mamo*" (spiritual leader), and all community members convene. "The *mamo*" is the leader of this community which has one educational institution dedicated

to "self-education." At this site, the community collectively discusses all issues, decisions, and opportunities related to school matters to reach a consensus. The school employs teachers from within the community and external educators appointed by the Ministry of National Education. The community retains the autonomy to accept or request the removal of these teachers, typically preferring individuals who have had prior contact with the community. The educational institution operates two campuses: one in the upper part and one in the lower part of the territory. Teachers must stay at each campus for nearly 15 days. The institution is led by a principal, who, although an external individual, is regarded as a member of the community. Decisions regarding school matters are made within the community and communicated to the principal, who acts as a liaison to convey the community's sentiments to territorial and national entities.

Regarding the curriculum, the education provided is tailored to the community. The community determines the content that is important to learn, and the methods used for this. This approach aims to foster the development of skills and the acquisition of cultural knowledge and customs, as evidenced in the photographic record: *Gathering within the Community*.



Figure 2. *Gathering within the Community.*

Source: Henao & Hurtado (2024).

Data Collection

The process for conducting the interviews was as follows:

First, it is important to note that the interviews were conducted during a pedagogical outing organized for an ethnography class, which was attended by two of the study's researchers in the city of Santa Marta, Magdalena. Second, to conduct the interviews, the researchers obtained the necessary permissions from the teacher, who facilitated approval from the institution's principal and the community's leader, the mamo. The community leader agreed on the condition that one of their leaders would oversee the interviews, advise on the process, and appoint individuals to whom each interview question would be directed. The questions were submitted for approval in advance.

Finally, five structured interviews were conducted, each with an average duration of 35 minutes. Interviews were conducted on-site (i.e., on the Indigenous group's land) by two of the study's authors, at mutually convenient times for each participant. Participants reviewed the informed consent form and asked questions prior to the interview. Participants were informed that the interview would be digitally recorded for the purposes of data analysis. A structured interview protocol was selected due to the lack of research on how indigenous cultures globally experience metacognitive phenomena. Consequently, the questions were designed on key concepts derived from the literature review and the lead author's understanding of self-regulated learning theory. *Appendix* contains the list of questions used in this study. See figure 3: *Field interview process*.



Figure 3. *Field Interview Process.*

Source: Henao & Hurtado (2024).

Data Analysis

All five interviews were transcribed, and any identifying information about participants was removed. The analysis process commenced with an initial reading of the transcripts to familiarize the researchers with the dataset, annotate it, and identify the sections of data deemed most relevant. During the open reading process, the data were individually coded descriptively (Saldaña, 2013), and both analytical and theoretical memos were prepared. The individual codes were subsequently merged, and the next phase involved reviewing each other's codes and notes in conjunction with the overall dataset.

Although the initial plan was to analyze the data thematically, a more holistic approach was adopted emphasizing the participants' responses to the initial questions. The analytical process of the present study comprised: (a) repeated readings of the data; (b) combining similar codes into categories; (c) identifying broad patterns, which led to the development of themes; and (d) selecting representative excerpts to document the findings.

Throughout this process, the research team maintained transparency and thoughtfulness, consistently returning to the primary objective: "to gain a deeper understanding of the participant's awareness of their metacognition process". During discussion sessions, the research team reflected on how the assumptions and inferences drawn from the interview process were shaped through the interpretative process. Finally, an acceptable level of data saturation was achieved. Although interviewees expressed it in slightly different terms, there was a convergence in the fundamental meaning of their experiences with metacognition.

Results

The qualitative analysis of the interview process with the five participants reveals several thematic confluences concerning the teaching and learning processes, as well as the participants' perceptions and strategies. The following six topics provide a detailed description of how this Indigenous population learns, teaches, and self-regulates their teaching and learning processes: 1) Knowledge of context and cultural relevance in learning; 2) Regulation and adaptation in learning processes; 3) Diversification of teaching strategies; 4) Learning from mistakes; 5) Planning and organization of study; and 6)

Self-criticism and pursuit of continuous improvement. These findings include a detailed description and excerpts from the dataset.

Context Awareness and Cultural Relevance in Learning

Participants emphasized the significance of understanding the context in which learning occurs. Emphasizing the incorporation of local cultural and contextual aspects into teaching methods is crucial to ensuring that learning remains meaningful for students.

Regulation, for me, also involves that... interaction with the context. The knowledge one acquires as a professional in university must first be contrasted with the knowledge encountered in the territory. In practice, when applying this knowledge, various methods exist depending on the population you are working with. The skills developed must be adapted because they vary across different regions in Colombia. (Participant 1, Lines 10-17. Personal communication, May 5, 2023).

How do I plan them? How do you plan them? For me, it all ultimately comes down to context. First, I need to ensure that this knowledge relates to the reality experienced in the context so that it can be meaningful. To effectively reach the student. I must prepare the topics including cultural factors. If the subject involves any cultural aspect, my responsibility is to investigate and incorporate that knowledge by using the strategy of asking the elder leaders, the MAMO. For them to contribute their knowledge, and to make comparisons with Western cultural knowledge. It is of utmost importance to draw parallels between the two perspectives. What does Hema mean to us? What is its meaning? What does it mean to us? For instance, teaching about the parts of a plant differs significantly depending on the context, what is the root? They told me about "cate", it is root. And for the root of a tree, is it cate? That is an essence, it is a force, right? So, for the Arawak, cate is root and it is knowledge, it is ancestral knowledge. Comparing these differences adds another level of understanding. (Participant 4, Lines 32-47. Personal communication, May 5, 2023).

Regulation and Adaptation of the Learning Processes

The need to adapt teaching and learning strategies based on students' ages and needs is emphasized. The ability to self-regulate and adapt throughout the learning process is crucial for enhancing results.

Well, that depends on the age of the children. According to the student's age, we instilled the topics we covered. Some children progress more quickly, while others do not. So, like everyone else, we are always there to support them. (Participant 2, Lines 54-57. Personal communication, May 5, 2023).

Teaching is similar to parenting—just as when raising a child, you don't have all the knowledge yourself; you're always close to the grandparents for guidance. Grandparents always pass down customs and ancestral teachings, and just as our grandfather teaches us, the father continues learning throughout the process. This is how teaching has traditionally taken place at home. (Participant 5, Lines 65-70. Personal communication, May 5, 2023).

Diversification of Teaching Strategies

Various teaching strategies are highlighted, including playing, singing, and pedagogical outings, which are employed to make learning more interactive and effective. The significance of integrating theory and practice within the educational process is also emphasized.

It's through play, through singing, and through pedagogical outings that teaching occurs by combining both theory and practice, as people say. (Participant 3, Lines 6-9. Personal communication, May 5, 2023).

School teaching is crucial for the younger generations, but spiritual and ancestral teaching, customs, and practices are imparted within the community, specifically in the calducu, where the Mamos guide, explain, and engage in spiritual practices. Aburu, a practice involving cotton, is used to create small figures, such as worms, which can come from our body, a tree, tree seeds, or seashells, depending on the task. This is how the spiritual practice is performed, and the child learns the spiritual and ancestral knowledge, customs, and how to behave as an indigenous individual. It's something learned throughout life, always guided by

the mother, the mamos, and the parents. (Participant 4, Lines 102-112. Personal communication, May 5, 2023).

Learning from Mistakes

Mistakes are recognized as opportunities for learning and growth. Participants emphasized the significance of reflecting on mistakes and using them as a guide for future improvement.

In my case, it's when I fail to provide what I'm supposed to, meaning the topics that need to be covered when I'm not prepared. I don't realize I'm making a mistake. That's what becomes evident with children. For example, when one is given book tests and later finds that one doesn't understand the material. It means one is making a mistake. (Participant 4, Lines 91-96. Personal communication, May 5, 2023).

Sometimes, when I'm at home, I realize that my mistake is feeling reluctant to go to the university. For example, taking the bus and dealing with crowds. However, I remind myself that studying is a crucial part of my life and preparation for a better future. (Participant 5, Lines 51-56. Personal communication, May 5, 2023).

Study Planning and Organization

Planning is discussed as a crucial strategy for achieving success in one's studies. The organization and prioritization of tasks are highlighted as key aspects of effectively managing study time.

At university, a lot of work is assigned to us. I write down the activities I need to complete in my notebooks, tackling the most urgent tasks first and addressing the less urgent ones later. (Participant 1, Lines 40-44. Personal communication, May 5, 2023).

That's what you plan, one day before I plan everything, what I'm going to say the next day, that's what you have to plan, we always have to be prepared. (Participant 2, Lines 88-91. Personal communication, May 5, 2023).

Self-criticism and Search for Continuous Improvement

Participants demonstrate the will to reflect on their learning methods and consistently seek how to improve. The need to experiment with different approaches and strategies to identify what works best for everyone was underscored.

“Well, I sometimes feel that the methods I use for learning don’t work for me. I’ve tried various approaches to learn better. For instance, watching videos sometimes gives me a headache, but I’m always looking for better ways to improve my learning”. (Participant 3, Lines 30-34. Personal communication, May 5, 2023).

Well, life teaches us through different stages. As one becomes a father and then a grandfather, each stage offers more lessons from life. Being surrounded by mamos, authorities, and leaders, one realizes that learning is ongoing. A mamo, for example, isn’t fully wise unless he applies his knowledge in practice. When a mamo becomes a grandfather, its teaching and learning cycle is complete. If a mamo is not a grandfather, he is a young mamo with wisdom but lacking experience. Thus, community members learn throughout life. (Participant 1, Lines 89-98. Personal communication, May 5, 2023).

In summary, these topics reflect the complexity and diversity of teaching and learning approaches, underlining the significance of adapting to students' specific needs and contexts. The assessment of the cultural context, adaptation, reflection on mistakes, and planning were identified as key elements in the educational process, as articulated by the participants during the interviews.

Discussion

One of the most controversial issues concerning intercultural metacognition studies today is the findings derived from traditional quantitative research and factor analysis. These studies present the frameworks accepted by the scientific community comprising the two major components of metacognition: knowledge and regulation. These were proposed and demonstrated by scholars in the area (Brown, 1987; Flavell, 1979, 1987; Nelson & Narens, 1990; Schraw & Sperling, 1994; Schraw & Moshman, 1995) and their frameworks remain valid today

(Tarricone, 2011; Padmanabha, 2020; Tuononen et al., 2023). Current studies examine how context, culture, and self-education influence the development of these two major components and their associated sub-skills, particularly in individuals experiencing metacognition across diverse settings, idiosyncrasies, and cultures.

There are various perspectives on this topic, exemplified by a classic study that analyzed the relationship between metacognition and self-concept across samples of Asian, Black, Hispanic, and White students. Despite variability due to ethnic origin and gender, the study revealed a moderately positive relationship between students' self-reports of metacognitive activities and their self-concept across different ethnic groups. This suggests the presence of universal and general components of metacognition. However, Asians exhibited stronger intercorrelations (Hartman et al., 1991), and several researchers attribute this finding to the relationship between language, thought formation, and cultural variability. Chinese philosophy relies on the "Yin/Yang" concept to train students at a perceptual level of thought. At the academic level, this trend fosters cultural values such as reflection, self-criticism, and practices like perspective shifting which are believed to mediate students' metacognition, self-perceptions, and opportunities for improving academic performance (Hartman et al., 1991; Treisman, 1985).

A more recent study on the diversity of development in mental reading and metacognition demonstrates the universal nature of the construct as evidenced by phenomena such as the "tip of the tongue" (Fossa et al., 2022; Schwartz, 2006; Schwartz & Metcalfe, 2011) and the feeling of knowing, which has been documented in speakers of 45 languages (Kim et al., 2018). This process is related to the predictions people make about their memory performance after searching for items that are not currently remembered. This phenomenon is among the most studied aspects of conscious monitoring of one's performance (Koriat, 2000; Nelson et al., 1984; Spohn & Reder, 2000). The study of the "tip of the tongue" phenomenon suggests that metacognitive performance relies on the use of metamemory strategies, which are effective in aiding retrieval and extending the duration of the search. The feeling of knowing influences how individuals choose to answer a question and the duration of their search for an answer (Nhouyvanisvong & Reder, 1998).

The study also notes that despite the extreme diversity of human beliefs about nature and the origins of individual competence (Lillard, 1998), and the limited research on variations in metacognition, ethnic and gender biases persist across cultures and need further research (Kim et al., 2018).

For example, a study involving American, European, and Mayan infants unveiled significant differences in their metacognitive performance which were influenced by parenting guidelines and their cultural context, particularly in the imitation learning process. In such a study on imitative learning, children from different cultures were compared based on their modes of learning and metacognitive behaviors. European and American children were more likely to mimic the use of a toy when the experimenter engaged in ostensive communication, compared to when they only observed the experimenter using the toy (Csibra & Gergely, 2011; Kim et al., 2018).

In this respect, communicative behavior is considered ostensive when the speaker explicitly conveys their intention through a statement, and the listener interprets the statement in the manner intended by the speaker. This suggests that signals directed at the baby, such as eye contact or a directed greeting, capture attention and signal that the forthcoming information is relevant. In this experiment, the same pattern was not observed in Mayan children. Instead, findings showed that while Mayan infants imitated more during their second visit to the testing room, their imitation rate was not influenced by signaling (Csibra & Gergely, 2011).

Thus, it was concluded that sensitivity to relevance does not rely on an innate signaling device in infants of all cultures. Instead, it represents a process shaped either autonomously—where learning is driven by the child's own attentional and perceptual processes regarding task demands—or heteronomously—where learning appears to depend more on the level of trust the infant places in the external signals provided by caregivers—.

The findings of this study align more closely with the hypothesis that culture and ethnic differences contribute to shaping certain cognitive and metacognitive behaviors. This supports the idea of enhancing Western pedagogical approaches by incorporating insights from the pedagogies of various ethnic groups. In the case of individuals from the Katanzama indigenous community who shared their knowledge about learning and self-regulation, significant strategies were identified, including: 1) prioritizing knowledge of the context and cultural relevance in learning; 2) regulation and adaptation in learning processes; 3) diversification of teaching strategies; 4) learning from mistakes; 5) planning and organization of study; and 6) self-criticism and the pursuit of continuous improvement.

These types of learning strategies have been recognized as highly valuable by various researchers, who emphasize understanding context and culture in adapting the curriculum to address problems relevant to the individual and their social and historical environment. In this regard, the most successful curricula for Indigenous students share an explicit

emphasis on outdoor education, a place- and problem-based structure, and the incorporation of traditional Indigenous knowledge into formal instruction (Riggs, 2005).

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Appendix

Structured Interview Question Guide that was used in this research

- 1) How do I know or approach the topics I am going to learn?
- 2) How do I regulate myself in terms of my learning processes?
- 3) What kind of learning strategies did you use to learn better?
- 4) How do I think the error influences my learning?
- 5) How do I plan my study and learning moments?
- 6) What do I think about how I learn?

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Co-creation and Virtual Learning Communities: Bibliometric Analysis*

[English Version]

La co-creación y las comunidades virtuales
de aprendizaje: análisis bibliométrico

Co-criação e comunidades virtuais de
aprendizagem: análise bibliométrica

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Abstract

Objective: To analyze co-creation and learning communities as a teaching strategy and research field in education for exchange and knowledge generation in development of skills in innovation and learning outcomes. **Methodology:** A bibliometric analysis was carried out in Scopus between 2009 and 2023 with 91 files. The results achieved

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three specific objectives: (a) to review and analyze the current level research on co-creation; (b) to describe guidelines for virtual learning communities, of the practice and of co-creation; and (c) to identify research needs and knowledge gaps in this field.

Results: Three future lines of research were found concerning the implications of co-creation, virtual communities and learning, and co-creation in learning environments.

Conclusions: co-creation as a learning strategy promotes participation through virtual communities. Some of them are the resolution of specific problems with interactive experiences regarding future knowledge using digital narratives, gamification, and workshops, supported in learning ecosystems, working sessions with experts, and collaborative environments for solving challenges.

Key words: communities of practice; learning communities, co-creation; higher education, knowledge management (JEL code D8, D83, I22).

Resumen

Objetivo: analizar la co-creación y las comunidades de aprendizaje como estrategia de enseñanza y campo investigativo en educación, para el intercambio y la generación de conocimiento en el desarrollo de habilidades en innovación y los resultados de aprendizaje. **Metodología:** se realizó un análisis bibliométrico en Scopus con 91 documentos entre los años 2009 y 2023. Los resultados permitieron dar respuesta a los tres objetivos específicos: a) revisar y analizar el nivel actual de la investigación en co-creación; b) describir los lineamientos para las comunidades virtuales de aprendizaje y de práctica y la co-creación y c) identificar necesidades de investigación y brechas de conocimiento en este campo. **Resultados:** se encontraron tres líneas futuras de investigación concernientes con las implicaciones de la co-creación, las comunidades virtuales y el aprendizaje, y la co-creación en ambientes de aprendizaje. **Conclusiones:** se concluyó que la co-creación como estrategia de aprendizaje, a través de comunidades virtuales, poseen impulsores que garantizan la participación. Entre ellos, la resolución de problemas específicos con experiencias interactivas en relación con el conocimiento de futuro, haciendo uso de narrativas digitales, la gamificación y los talleres, soportados en ecologías de aprendizaje, sesiones de trabajo con expertos y ambientes colaborativos para la solución de retos.

Palabras clave: comunidades de práctica; comunidades de aprendizaje; co-creación; educación superior; gestión del conocimiento (Código JEL D8, D83, I22).

Resumo

Objetivo: analisar a co-criação e as comunidades de aprendizagem como estratégia de ensino e campo de investigação em educação, para a troca e geração de conhecimento no desenvolvimento de habilidades em inovação e os resultados de aprendizagem.

Metodologia: foi realizada uma análise bibliométrica no Scopus com 91 documentos entre os anos de 2009 e 2023. Os resultados permitiram responder aos três objetivos específicos: a) revisar e analisar o nível atual da pesquisa em co-criação; b) descrever as diretrizes para as comunidades virtuais de aprendizagem e de prática e a co-criação; e c) identificar necessidades de pesquisa e lacunas de conhecimento neste campo.

Resultados: foram encontradas três linhas futuras de pesquisa relacionadas às implicações da co-criação, das comunidades virtuais e da aprendizagem, e da co-criação em ambientes de aprendizagem. **Conclusões:** concluiu-se que a co-criação como estratégia de aprendizagem, por meio de comunidades virtuais, possui impulsionadores que garantem a participação. Entre eles, a resolução de problemas específicos com experiências interativas em relação ao conhecimento do futuro, utilizando narrativas digitais, gamificação e oficinas, apoiadas em ecologias de aprendizagem, sessões de trabalho com especialistas e ambientes colaborativos para a solução de desafios.

Palavras-chave: comunidades de prática; comunidades de aprendizagem; co-criação; educação superior; gestão do conhecimento (Código JEL D8, D83, I22).

Introduction

Higher education today faces challenges such as growing institutional competition (Zarandi et al., 2022, p. 1297) due to a rapidly and permanently changing market dynamic (Robinson & Celuch, 2016, p. 20), as well as the student's demands around their academic process. It must compete in labor markets that value updating, feedback (Zarandi et al., 2022) and the acquisition of skills for continuous improvement (Chan et al., 2022), personal, professional and labor development.

To face these challenges, higher education institutions (HISs) have ventured into areas that have produced benefits in terms of marketing and value generation, in the business field. Strategies such as co-creation are aimed at strengthening collaborative paths (Dollinger et al., 2018; Han et al., 2020) and enabling open innovation (Gonzalez-Cristiano & Le Grand, 2023) to empower networks (Dong et al., 2023), that involve stakeholders addressing complex problems (O'Leary et al., 2022). This experience involves changes, advances and students' perception.

Thus, strategies such as co-creation are made dynamic by using online collaborative spaces, such as learning or practice communities (Conaldi et al., 2023) to capitalize on experience through personalization, intangible management (Pedro et al., 2022; Robinson & Celuch, 2016) and knowledge transfer for the improvement of the educational system (Dollinger et al., 2018, p. 214).

The research in this field is at an early stage (Chan et al., 2022; Zarandi et al., 2022), thus, this research aims to carry out a bibliometric analysis on co-creation in a specific context such as the education. Zarandi et al. (2022, p. 1302) mention good practices transferable to universities in the analysis of specific cases (Mandolfo et al. 2020) to identify actions, strategies and guidelines to facilitate a learning environment (Emanuel et al., 2022), supported by the benefits of co-creation (Mendolfo et al., 2020) and its relationship with the knowledge management (Magni et al., 2020).

Methodology

The bibliometric analysis was based on the guidelines proposed by Vrontis and Christofi (2021) to fulfil the following objectives: (a) to review and critically analyze the current level of co-creation research; (b) to describe guidelines for virtual learning, practice and co-creation communities; and (c) to identify potential research needs and knowledge gaps to address future research.

Conceptual Limits

Co-creation has a business origin, since it was first mentioned by Prahalad and Ramaswamy (2004) as a process that allows users to contribute with new ideas or vote for ideas from other users to evolve and improve them. It uses collaboration and improves consumer and user experiences as primary benefits.

In education, there is research on the use of analysis and interpretation of indicators and data (Somerville et al., 2006), the strengthening of public-private networks (Emanuel et al., 2022), the development of affective commitment and an emotional bond (Robinson & Celuch, 2016), the progress of collective skills (Magni et al., 2020), the evaluation of teaching and learning processes (Zarandi et al., 2022), the strengthening of the business, state and society linkage model; in addition to, the generation of students social identity (Magni et al., 2020), among others.

In fact, co-creation is defined as a collaborative process of creating new value through the interaction between companies and customers (Magni et al., 2020), and by means of two subprocesses: The first one is named “value coproduction,” where the value proposition of the product or service is created with user participation in design and delivering; and the second one, “value-in-use”, a value beyond production, focused on the consumption of that value.

Co-creation is supported by other concepts such as “service dominant logic” (Dollinger et al., 2018, p. 216), the user continues to explore and learn about the value of the product and service through user experience and knowledge shared with other users (Chan et al., 2022, p. 209). This influences the improvement and transfer of service-taking experiences.

In the educational context, co-creation is the process by which students' resources are integrated with the institution to promote a variety of activities and experiences that foster exchange and interaction. They improve practice and innovation (Dollinger et al., 2018) and increase the active role in their training process (Zarandi et al., 2022).

An example of this occurs when students and institutions connect and collaborate, as co-creation improves knowledge and isolated information for students or institutions, according to Zhao and Kuh cited by Magni et al. (2020). Thus, a valuable learning experience is provided by increasing student satisfaction (Schlesinger et al. cited by Magni et al., 2020).

A “virtual learning community” can be defined as a group of cooperating people from public and private organizations with a common goal: the self-initiated, informal, and proactive learning of a situated nature. This generates a broader effect by linking stakeholders, in particular knowledge institutions

(Emanuel et al., 2022, p. 293), through virtual environments to innovate from a common and exchange language (García, 2008, p. 100).

Based on the former concept, the connection between an virtual learning community and a co-creation process is direct, as collaborative interactions in active exchange of information are both beneficial as indispensable mechanisms for co-creation (Chan et al., 2022, p. 209), with results in knowledge management in educational institutions.

Literature review reveals other mechanisms for managing knowledge, such as online communities (Hogreve & Beierlein, 2023), knowledge social networks, knowledge-based learning networks, and practice communities (García, 2008). These have in common self-initiation, problem solving, and content sharing in a creative way, with flexibility, but with the purpose toward learning and sharing knowledge.

Likewise, it allows developing critical thinking using open debate (Hogreve & Beierlein, 2023), that is not limited to informational commentary, but to learning excitement and altruistic acts to share knowledge (Wang et al., 2021).

Questioning

The bibliometric research seeks to answer the following questions:

- Q1. What is the advance of research in co-creation?
- Q2. What are the guidelines for virtual learning and practice communities and co-creation?
- Q3. What are the research needs and knowledge gaps to be addressed by future research?

Inclusion Criteria

The criterion for paper selection was the use of co-creation processes and actions within the framework of learning or practice communities, considering that both concepts for its current use allow obtaining papers related to knowledge

management for learning without limiting them to a specific area of knowledge or sector.

The search was carried out in Scopus for coverage and utility for bibliometric research (Mongeon & Paul-Hus, 2016) from 2009 to 2023. The search date was June 14, 2023.

Search Strategy

The search was carried out by *title*, *abstract*, and *keyword* in Scopus, it includes analytical categories of learning or practice communities, co-creation and knowledge management with the following search equation: ("learning communities" OR "communities of practice") AND co-creation AND "knowledge management". Ninety-one papers were retrieved, 66 of which were research papers.

Exclusion Criteria

Papers focused on resources, technological innovation, or explanation of technological devices on methodologies such as processing to support product design processes (PDP) were excluded, as well as those focused on marketing and e-commerce practices for addressing social problems and knowledge management in the enterprise, without methodological emphasis. Papers dealing with models for professional services and organizational intermediation due to their profit-generating nature, which were not transferable to the educational context, were also excluded.

Selection of Relevant Research

The papers selection was based on the following criteria:

1. Reference to a practice or learning community;
2. Use of technological mediation;
3. Orientation toward learning within knowledge management;
4. Use co-creation strategy.

Other Search Processes

The results were contrasted with the theory of co-creation for learning to explain trends in research and advances in this field.

Extraction, Analysis and Synthesis

The quantitative analysis was carried out using *VosViewer* and *Bibliometrics* (*Biblioshiny*) software (Aria & Cuccurullo, 2017), in a complementary manner. The information generated by Scopus was included in a database to review and select relevant research based on 91 abstracts.

Results and Discussion

Scientific production in this field has been generated between 2009-2023 with 78 publications, an annual growth rate of 12.18%, a total of 262 authors, 34.07% with international co-authorship, an average of 3.05 authors per paper, and an average citation of 18.24, according to the meta data analysis carried out (*Biblioshiny*) (Aria & Cuccurullo, 2017).

Publication Year and Paper Type

Exponential growth is shown in Figure 1. This reflects the interest in generating a positive attitude toward learning (Emanuel et al., 2022; Lim et al., 2019), expanding the domain and reach of education beyond the classroom toward a comprehensive educational experience (Robinson & Celuch, 2016, p. 21), fostering the conditions for active learning (Emmanuel et al., 2022), and improving the absorption capacity to strengthen institutions (Rashid et al., 2019, p. 778), and reinforce the continuous bidirectional communication (Somerville et al., 2006).

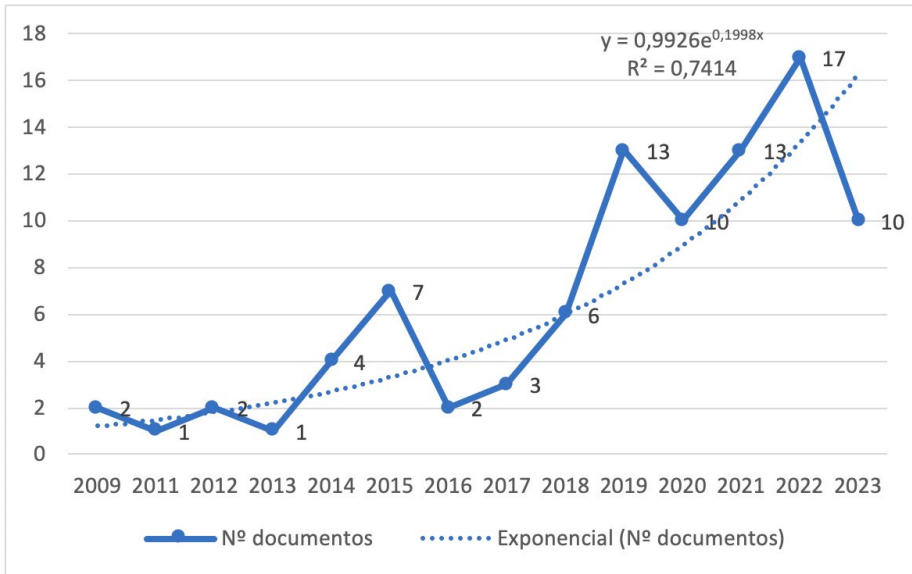


Figure 1. Evolution of Research in Relation to Knowledge Management, Intellectual Capital and Education

Source: Authors' elaboration based on Scopus data (2023).

The analysis from 2009 to 2013 shows the importance of the 2014–2015 cycle. The contribution of co-creation to business from the marketing approach (Laud et al., 2015), the improvement of communication in health education (Bretschneider et al., 2015), collaboration to the formulation and consolidation of models of knowledge management (Aradea et al., 2014), and the enhancement of customer service (Bone et al., 2015), among others, is evident.

In education, in 2019 there was a production growth that confirmed that research is flourishing (Mandolfo et al., 2020). Some aspects were highlighted such as the contribution of students in co-creation to participate, interact, and generate interpretative processes (Sahi et al., 2019). They also support new knowledge creation processes that include absorption and processing capacity (Rashid et al., 2019), mutual recognition of exchange and knowledge acquisition to improve learning outcomes (Lim et al., 2019), and the generation of higher education websites that enable a participatory role of students (Foroudi et al., 2019). Table 1 presents a summary of production by periods.

Table 1. Analysis of Scientific Production by Periods.

Year	Articles	Book	Book Chapter	Conference paper	Sources	Citation Average	Average No. of Authors
2009-2011	3	0	0	0	3	41	3
2012-2013	1	0	1	1	3	30,3	2,6
2014-2015	5	1	1	4	11	35,9	2,8
2016-2017	3	0	1	1	5	19,4	3
2018-2019	13	2	1	3	19	35,2	2,6
2020-2021	18	2	1	2	23	10,7	2,8
2022-2023	26	1	0	0	27	1,7	3,4
Total	69	6	5	11	91	174,2	20,2
%	74.1%	7.69%	4.40%	12.09%	100%		

Source: Authors self-elaboration based on Scopus data (2023).

In relation to the knowledge area, production is concentrated in business, management, and accounting 41.40%; computer science 13.38%; social sciences 12.74%; decision science 7.64%; economics, econometrics and finance 7.01%; engineering 5.73%; and less than 3% in mathematics, psychology, environmental sciences, medicine, energy, arts and humanities, earth and planetary sciences, and nursing.

Analysis of Publication Sources

The most cited journals are *Technological Forecasting and Social Change*, with 229 citations; *International Journal of Hospitality Management*, with 195 citations; *Journal of Marketing for Higher Education* with 135 citations. Figure 2 shows the impact of the sources providing information on the most important journals in the field.



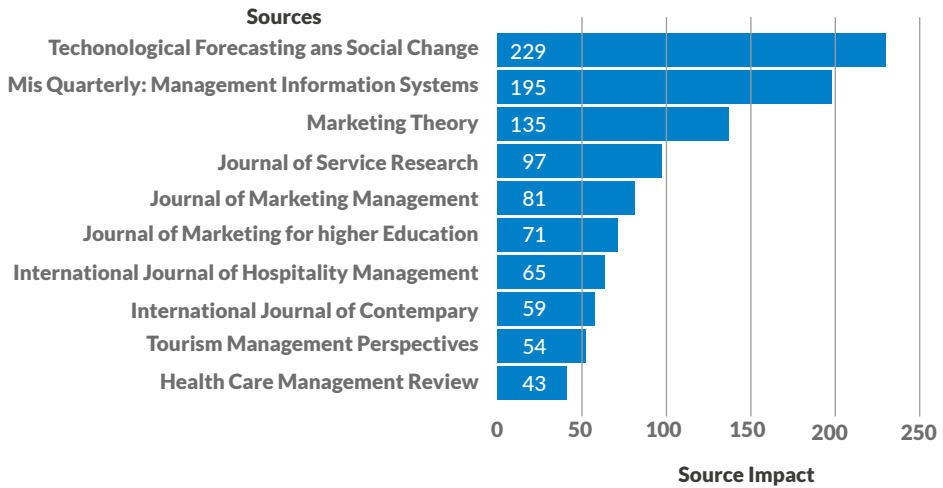


Figure 2. Measurement of Source Impact.

Source: Authors self-elaboration based on Scopus data (2023).

Authors and Impact

The most published authors in this field are Caputo et al. (2023) who establish some practices that can be used in education. The publications are based on the whole process of digital transformation to state that paying more attention to people than to technologies is necessary, emphasizing the need to combine technical competences and soft skills such as creativity, flexibility, and cognitive intelligence that demand greater workforce coverage and flexibility to achieve effective and adequate acceptance of technology for new challenges to the education of future professionals.

Zarandi et al. (2022) define students' roles in co-creation as costumer, partner, co-producer, product, and citizen. The authors highlight co-creation with goals associated with students' participation, cognitive commitment, emotional engagement, and university affiliation. Chepurna and Rialp (2018) also focus on the profile for co-creation. This profile includes aspects such as cultural context, age, gender, and educational level that moderate the effect of dissuaders and motivators on attitudes and participation in online co-creation.

Finally, Foroudi et al. (2019) identify that university websites can contribute to co-creation, as they incorporate criteria of usability, availability, and

personalization by increasing participation and involvement in their educational process. Other authors reflect on co-creation and connection with health and tourism sectors. Figure 3 shows the authors with the highest publications per period and compares that with the most cited in this field.

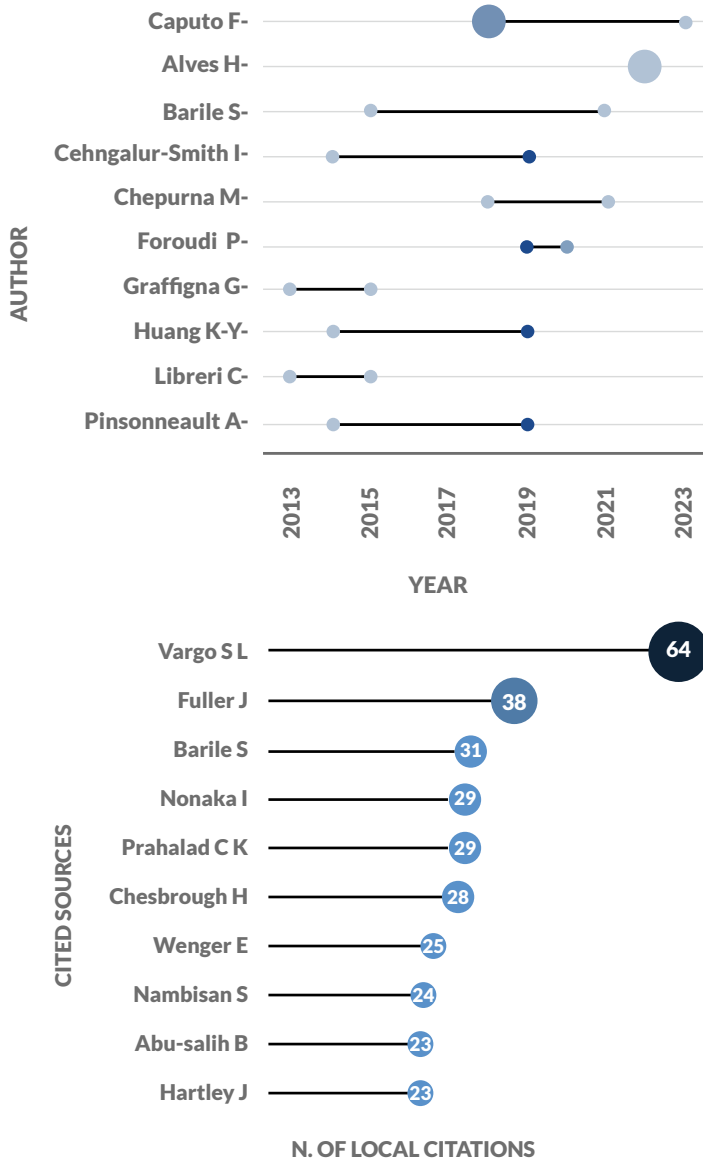


Figure 3. Comparison of Author Publications in Relation to the Most Cited Authors.

Source: Authors' elaboration using Bibliometrics (2023).

In contrast to the authors who publish on co-creation, the most cited authors such as Vargo with 64 citations, who (from a perspective of new logic in marketing focused on intangible resources and value of co-generation through relationships) states that value is defined and co-created with the customer through the use, maintenance, repair, and adaptation to the needs of that product. This contrasts with the idea that value is included in the product (Vargo & Lusch, 2004).

This is how contributions in education generate an openness to understanding that co-creation is not limited to product ideation. It also states that teaching marketing in universities must evolve toward the service logic, supported by knowledge and skills. This is the result of a co-creation process among parties, beyond the classic idea of being an exclusive supplier-client process.

Fuller and Loogma (2009), with 38 citations, contribute from the role of co-creation to learning communities that allow a future socially created, constructed, and negotiated for the creation of new knowledge from speech, language, and symbols. Prahalad and Ramaswamy (2004), with 29 citations, who are credited with the origin of the definition of co-creation in the business field. This definition has been taken by education to adapt and expand its marketing processes and incorporate it into teaching-learning process. It aims to generate a greater sense of belonging, student retention and, therefore, a higher value.

The authors who allow the connection between co-creation and knowledge management referred to Nonaka and Takeuchi (1995), because strategies and activities in virtual learning communities capture and improve tacit knowledge flow (Halonen et al., 2010; Somerville et al., 2006). In the same way, Wenger et al. (2002) contributed to the development of social learning theory (Wenger, 1998) and situated learning which allows the participation of periphery to develop knowledge associated with a field (Lave & Wenger, 1991). This author is also considered to be a founder of uses and gratifications theory that explains the needs and motivations of online communities (Nambisan & Baron, 2009).

Through the analysis of keyword concurrence over time shown in Figure 4, the relevance and contribution of co-creation to higher education with technologies and social networks is demonstrated (Candi et al., 2018; Rashid et al., 2019). These enable constructive horizontal communication (Emanuel et al., 2022, p. 298) of a bidirectional nature (Somerville et al., 2006, p. 4) with stakeholders and with a high degree of involvement and commitment to co-building value (García, 2008), in response to the challenges of low enrollment and desertion in higher education.

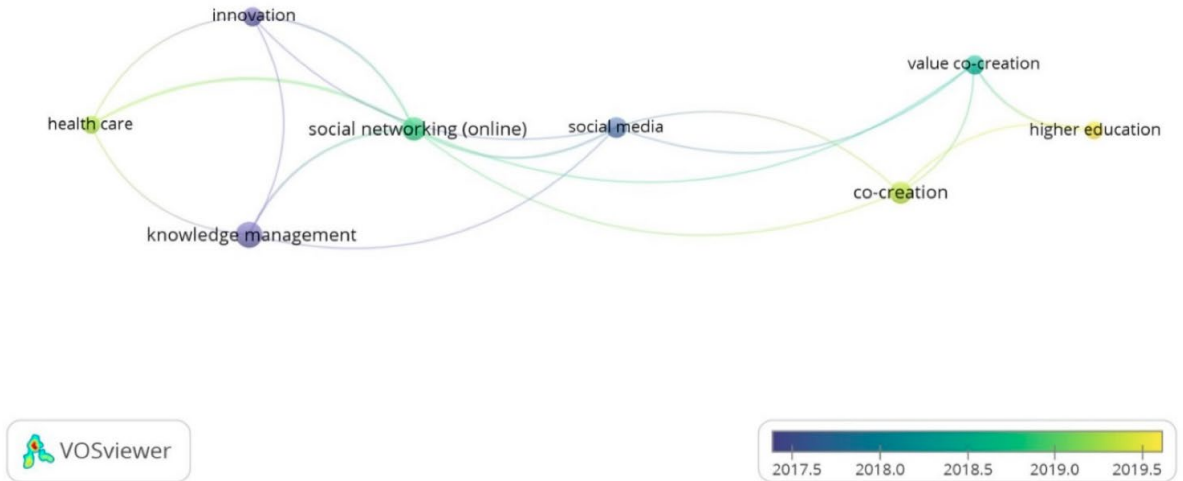


Figure 4. Keyword Concurrence and Its Evolution Over Time.

Collaboration and Cooperation Networks

Knowledge-publishing countries in the field are mainly Italy (12), the United States (11), China (11), the United Kingdom (11), and Australia (10), among others. At the same time, the countries with the highest citations in the topic are Australia (314), the United States (171), Switzerland (143), the United Kingdom (118), Italy (79), Korea (37), China (36), Pakistan (34), Iceland (30), and Spain (28).

From the researches carried out in collaborations between countries, we highlight some that contribute to the educational field, such as the one between the Philippines and the United States, developed by Pormon and Lejano (2023). This presents a pedagogy model through a relational approach to close the gap between the subject and the object in disaster care assistance. The authors highlighted that students are not only knowledge recipients, but coproducers (agents of knowledge), through the translation of scientific and technical knowledge into a common language to generate awareness about events and natural disasters.

From another perspective, O'Leary et al. (2022) conducted collaborative research between Denmark, Ireland, and Australia to explore types of distributive justice (justice of reward) and interactive justice (justice of treatment). This shows the importance of formal or informal recognition of individual contributions to motivate people to participate in online contributions (Wasko & Faraj, 2005).

Similar to O'Leary et al., Wang et al. (2021) collaborate between China and the United States to define emotional and informative influence on online customer

contribution based on social support theory. Lim et al. (2019) an Australia and Thailand contribution define the guidelines for co-creation using cell phones. They identified that mobile learning entails new practices and attitudes that involve students socially, overcoming classical transmission of knowledge and physical classroom limitations.

In other cases, such as Conaldi et al. (2023), research emerges from collaboration between the United States and the United Kingdom. These authors argue that geographical proximity is not a relevant aspect for collaborative innovation, while organizational proximity ensures complex interactions at intra- and inter-organizational levels to learn and use social and cognitive proximity, where organizational routine must be overcome to awaken the desire to learn.

Finally, Gonzalez-Cristiano and Le Grand (2023), researchers from Finland and Spain, contribute to the definition of “collaborative innovation” and support boundary objects to represent, understand and transform the knowledge. Boundary objects form common ground for abstract ideas on which greater understanding, creation and knowledge combination can be achieved. In these cases, mechanisms such as metaphors, dialogue and question formulation are used to land concepts or ideas. Figure 5 shows collaborative networks around the world.

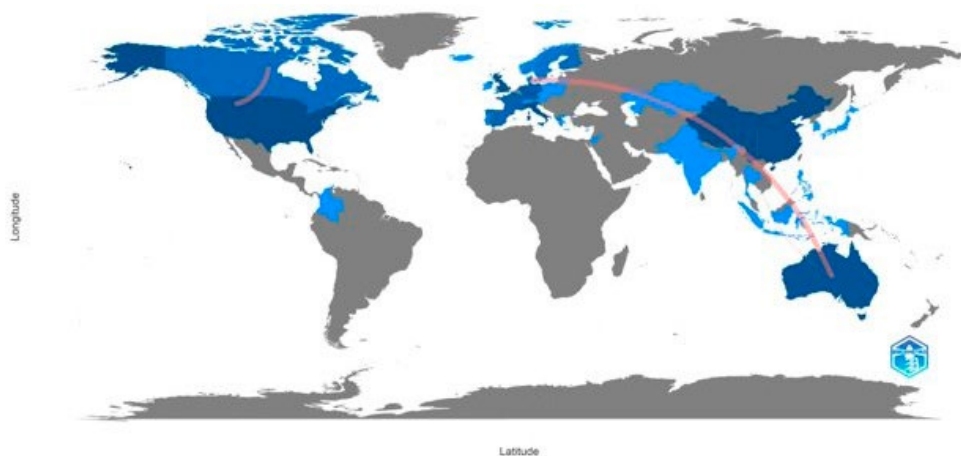


Figure 5. *Collaboration and Cooperation Networks on the Subject.*

Guidelines for Learning in Practice or Learning Communities through the Co-creation Strategy

Bibliometric review eases the detection of guidelines for the design of learning-enabling activities such as those that place students in their context and community (Pormon & Lejano, 2023, p. 3), through the arrangement of iterative stages and cycles (McEwen et al., 2022, p. 2496) to enable learning from exploration with a reflective character (Chan et al., 2022, p. 210).

Furthermore, the guidelines for the design of virtual learning communities that make possible the implementation of co-creation, can be explained from a pedagogical and technological point of view. Pedagogy establishes “learning as the result of social interactions to create a better understanding of any complex event” (Pormon & Lejano, 2023, p. 2), which has as its main driver, the questions in a directional way (Hogreve & Beierlein, 2023). These are not only limited to teacher initiatives, but, on the contrary, promote peer education (Bredl et al., 2011, p. 11) and the use of knowledge boundaries (Gonzalez-Cristiano & Le Grand, 2023, p. 12) to enable the content, routes, and format selections from personal learning interests (Dollinger et al., 2018).

Regarding technology, the goal is to develop a culture and a community environment (Jia et al., 2022) from access and transparency to the negotiation of consensus (Sugino et al., 2016); in addition, to the development of devices that improve experience and knowledge exchange (Marjanovic, 2014). This is contrary to the traditional manner of designing virtual learning objects of a unidirectional nature.

The activities are based on a consensus of content and learning outcomes (Sugino et al., 2016, p. 199), as well as proposing content with a balance between simplification and loss of conceptual depth (McEwen et al., 2022). In the same way, these activities seek decentralization, the creation of connections between networks, and allow mobility among communities that work as constellations or knowledge networks (García, 2008, p. 104).

Learning principles in learning communities through co-creation is based on a social process (Veen et al., 2009; Zahay, 2021, p. 134) to democratize knowledge (O’Leary et al., 2022, p. 4), with a relational approach (Pormon & Lejano, 2023, p. 4) for peer training (Bredl et al., 2011, p. 11). This, making use of actions such as generating questions and analyzing how others, has resolved problems.

Regarding the students’ roles in promoting learning, research reveals that they need to be encouraged to take responsibility for learning (Sahi et al., 2019, p. 545) and thus, co-produce the result, i.e. their education (Robinson & Celuch, 2016, p. 21). In addition, those who use learning communities have been shown to maintain quality relationships, enabling them to have better performance in

learning outcomes (Dollinger et al., 2018, p. 218), as such communities function as communication alternatives (Pormon & Far, 2023, p. 4) to interact (Magni et al., 2020, p. 128; Pormon & Far, 2023, p. 4) and generate solutions together (Emanuel et al., 2022, p. 297).

Figure 6 shows co-creation from learning communities that provides emotional support in teaching and learning process, as it stimulates interest in playing an active role (Dollinger et al., 2018) and demonstrates the perceived ease of information and communication technologies use (Chepurna & Rialp, 2018, p. 460). This is vital for virtual and distance learning programs that enhance confidence, as it is shared and interacted among peers. This allows the satisfaction of the one who learns, and also the one who, in an altruistic way, shares knowledge for peers' benefits, described as integrative gratification sought (Qin et al., 2023).

Figure 6 also shows the connection between co-creation and higher education. This provides emotional support for collective competencies and skills competence (Somerville et al., 2006, p. 3). The generation of ties may be too weak to share new information, but strong enough to transfer tacit knowledge (García, 2008, p. 92), with improved sense of justice and community experience (Qin et al., 2023).

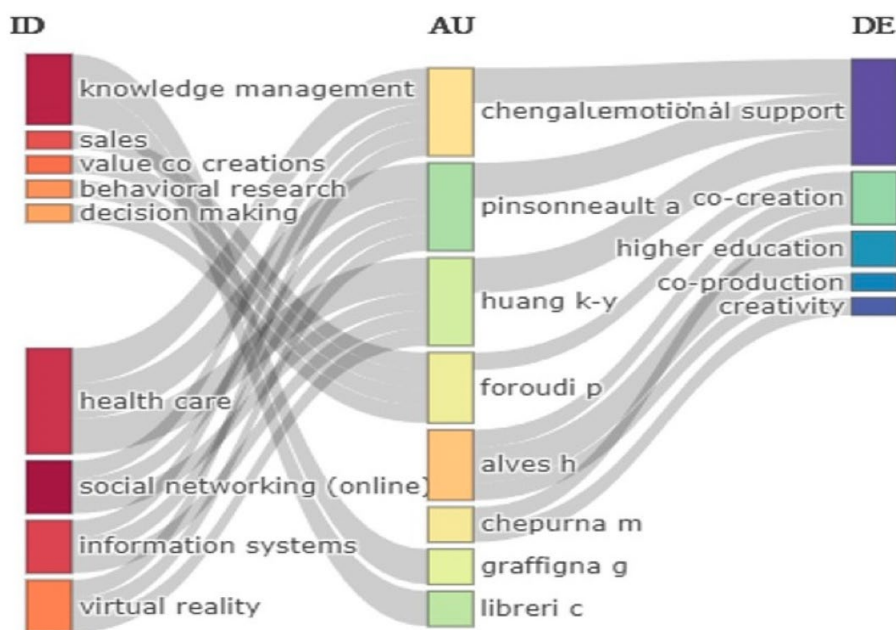


Figure 6. Three Field Diagram on Co-creation through Learning Communities in Education as a Strategy for Managing Knowledge.

Source: Authors' elaboration using Bibliometrics (2023).

Regarding innovation in HEI, Xie et al. (2023) state that its application is primarily in co-creation with students, in the construction and execution of curricula including the design of elective or optional lectures (Magni et al., 2020, p. 140; Zarandi et al., 2022) and, secondly, the availability of spaces in which to develop the student identity in relation to the institution (Zarandi et al., 2022).

Indeed, learning communities do not replace, but complement formal and usual strategies (Emanuel et al., 2022, p. 291) from a relational integration. These influence academic performance, satisfaction, loyalty and defence of the institution (Robinson & Celuch, 2016, p. 21), as these communities also generate student participation in teaching-learning process, leading to reflecting on the reasons for learning and participate in knowledge-sharing activities, thus influencing network behavior in the university (Magni et al., 2020).

Other elements that ensure co-creation are added, such as a participatory environment (Rashid et al., 2019, p. 779), through appropriate channels of communication and sufficient information and a platform for sharing information on a website (Foroudi et al., 2019). This is a social strategy that helps people improve and meet the need to use it as a source of knowledge and value for innovation (Candi et al., 2018).

With respect to teachers' competences and participants in general, creativity is required for the formulation and dynamization of co-creation strategies (Antonczak & Burger-Helmchen, 2020, p. 361), the definition of co-creative procedures for sharing experiences, and knowledge in fluid ways that introduce new approaches to problems (García, 2008, p. 104). This is supported by group dynamics (Zarandi et al., 2022, p. 1306), as it cannot be assumed that all participants have the skills to collaborate in knowledge-building.

On the one hand, co-creation in learning communities as a lifelong learning strategy is supported by methodologies and didactics such as the use of narratives, role-playing games, and workshops (Pormon & Far, 2023, p. 11); role-sharing (Heino & Hautala, 2021); competitions and simulations (Mandolfo et al., 2020, p. 9); informative dialogue (Gonzalez-Cristiano & Le Grand, 2023, p. 9); knowledge maps (Yeh, 2012, p. 1327); and problem-solving (Qin et al., 2023; Zarandi et al., 2022) using symbolic, communicative, and emotional elements (Pormon & Lejano, 2023).

On the other hand, bibliometric review helps to identify cases such as research in Portugal, which found that co-creation in education should include actions from dialogue, access, risk management, and transparency to knowledge sharing (Zarandi et al., 2022). This implies that information is shared from the positive, as well as from the emotional, such as communicating fears, lack of skills and ignorance.

The research by Emanuel et al. (2022) is also noteworthy, because they demonstrate the effectiveness of learning communities in supporting teaching-learning process. They use situated knowledge to connect resources of the institution, and boundary knowledge and the future from the relationship of several organizations, as a way to connect University, Company, State and Society.

Future of Field Research

Mainly three scenarios were identified in which further research was required, as shown in the “thematic map” in Figure 7: those related to co-creation, as literature reports research challenges associated with conceptualization and differential analysis of co-creation (Medina, 2006); the analysis of co-creation in context (Zarandi et al., 2022); the deepening of approaches and practices for executing co-creation (Mandolfo et al., 2020); the identification of co-creation process in HEI and the deepening of the relationship between co-creation and knowledge management (Magni et al., 2020), their respective benefits (Mendolfo et al., 2020), and, the maximization effect of co-creation, by supporting knowledge management (Chu, 2016).

More research is needed to broaden the scope of collaboration and joint creation in relation to communities and learning (Dong et al., 2023). Identifying individual features that contribute to a positive learning climate (Emanuel et al., 2022), with in-depth information on online communities is also necessary (Hogreve & Beierlein, 2023). This can establish the functioning, effectiveness, mechanisms that promote learning and knowledge in learning communities (Emanuel et al., 2022), as well as ascertaining how to manage communities for value generation (Rod, 2021).

Finally, as it is shown in figure 7, education is an emerging topic that identifies research needs to understand the dynamic nature of learning environments (Emanuel et al., 2022), the analysis of participants profile most willing to collaborate in a learning community (Mandolfo et al., 2020), as well as identifying actions for individual, community, and network learning (García, 2008).

Outside the classroom, the potential of co-creation with teaching training should be identified (Barrios et al., 2019), open innovation in the educational context for the generation of critical thinking (Yeh, 2012), risk identification, benefits and costs for students, to have an understanding of how to extend co-creation to higher education (Zarandi et al., 2022), all of the above, supported by empirical evidence (Antonczak & Burger-Helmchen, 2020).

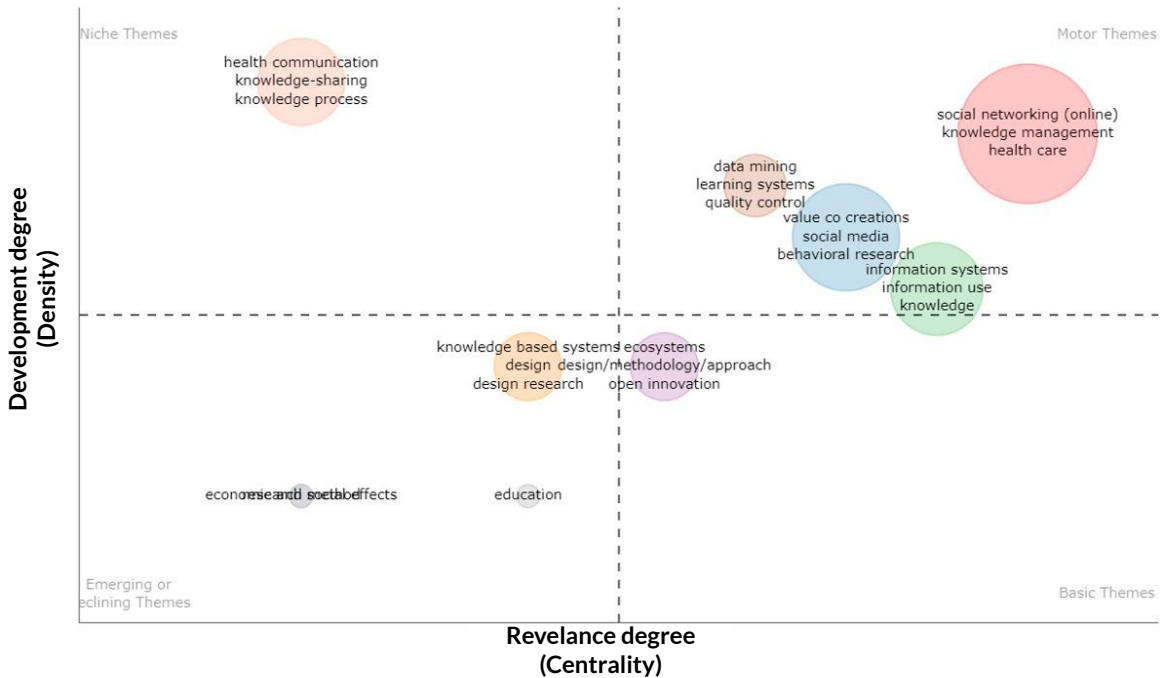


Figure 7. Thematic Map on Learning or Practice Communities, Co-creation as a Knowledge Management Strategy in Education.

Source: Authors' elaboration using Bibliometrics (2023).

Conclusions

Co-creation as a learning strategy through virtual communities is a topic that is on the rise as the scope of its application expands in different scenarios, including higher education. It has demonstrated great relevance, both in the classroom and institutionally, to improving the student experience, creating value, teaching training, as well as creating a greater customer focus that fosters the competitive advantage of institutions.

The first objective was to review and analyze the current research level. The year in which this research topic was promoted in business such as marketing and customer service improvement, as well as in health care was 2014. Since 2019,

the trend and growth of research has been toward higher education with papers as the predominant means of dissemination.

This area was also shown to have collaboration and cooperation networks between authors from different countries. This corroborates a learning community that fosters interaction, knowledge exchange, and learning independent of the physical location, within and outside organizations, with common topics and interests, social and cognitive proximity, and enhanced by use of information and communication technologies (ICT).

Regarding the second objective, virtual communities generate learning using the concrete principles of social interaction and knowledge democratization with a relational approach for peer interactions and learning. The student plays an important role in appropriating and being the protagonist in the process through the communication channels and participation in the generation of joint solutions as a result of training in values such as trust and altruism to share knowledge.

Through the bibliometric analysis of the topics in this research, aspects such as activity design were addressed in the learning community, the content, learning context, participants motivation, emotional support of the community, and in the use of methodologies and didactics, among others, building innovative learning ecologies that promote co-creation and enhance learning.

Learning in communities is characterized by being practical, and by being located and developed in a space that is seen more horizontally by peer collaboration, although not necessarily provided in a formal setting. However, due to its unique nature, progress is required in understanding how to generate an active learning climate that evolves over time and becomes an organizational strategy as a reservoir of social knowledge for knowledge management.

Regarding the third objective, three scenarios are highlighted in research needs and knowledge gaps. First, the deepening in approaches and practices to execute co-creation, as well as its conceptualization and relationship with knowledge management. Second, the expansion of research on virtual learning communities and how it is empowered and, third, further advancement in research on co-creation benefits in education. Finally, this bibliometric analysis is expected to contribute to the understanding the state of current research in the field of co-creation and its projection.

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Manizales as an *Edutropolis* from the Implementation of the Educating City Model, with an Urban Governance Approach*

[English version]

Manizales como *Edutrópolis* desde la implementación del modelo de ciudad educadora, con enfoque de gobernanza urbana

Manizales como *Edutrópolis* desde a implementação do modelo de cidade educadora, com enfoque de governança urbana

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Abstract

Objective: This article aims to explore the importance of citizen participation in urban governance, specifically for Manizales (Colombia) joining the International Association of Educating Cities (IAEC) and fulfilling the associated commitments. **Methodology:** A documentary review was conducted, followed by a mapping of stakeholders who are involved or could potentially be involved in the city model/project/initiative. Based on this mapping, 9 shared diagnostics were carried out using a methodological instrument designed with inspiration from the Methodological Guide provided by the IAEC. Finally, recommendations were generated from an urban governance perspective. **Results:** The recommendations generated will aid in the effective management of the city project from a perspective that engages potential beneficiaries. It is evident that civil society, local universities, and the public sector have established and can establish synergies around the commitments resulting from Manizales' adherence to the IAEC. **Conclusions:** Manizales' membership in the IAEC represents a significant achievement in urban governance and city diplomacy. Manizales can be configured as an *Edutropolis* through the implementation of the Educating City model.

Keywords: Educating City; Edutropolis; urban governance; citizen participation; quality of life (obtained from UNESCO and ERIC thesauri).

Resumen

Objetivo: en este artículo se pretende explorar la importancia de la participación ciudadana en la gobernanza urbana, para la adhesión de Manizales (Colombia) a la Asociación Internacional de Ciudades Educadoras (AICE), y el cumplimiento de los compromisos que se derivan. **Metodología:** se llevó a cabo una revisión documental y,

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posteriormente, se efectuó un mapeo de actores que confluyen, o pueden confluir, en torno al modelo/proyecto/apuesta de ciudad. Al tenor de este mapeo, se realizaron 9 diagnósticos compartidos, para lo cual, se implementó un instrumento metodológico, cuyo diseño se inspiró en la *Guía Metodológica* proporcionada por la AICE. Finalmente, se generaron recomendaciones desde un enfoque de gobernanza urbana. **Resultados:** las recomendaciones generadas, servirán para una correcta gestión del proyecto de ciudad, desde un enfoque que vincule a los potencialmente beneficiados. Se evidencia que la sociedad civil, las universidades locales, y el sector público, han establecido y pueden establecer sinergias en torno a los compromisos que se derivan de la adhesión de Manizales a la AICE. **Conclusiones:** la adhesión de Manizales a la AICE representa un gran logro en materia de gobernanza urbana y diplomacia de ciudad. Manizales se puede configurar como una *Edutrópolis* a partir de la implementación del modelo de Ciudad Educadora.

Palabras clave: Ciudad Educadora; Edutrópolis; gobernanza urbana; participación ciudadana; calidad de vida (obtenidos del tesoro UNESCO y ERIC).

Resumo

Objetivo: este artigo visa explorar a importância da participação cidadã na governança urbana para a adesão de Manizales (Colômbia) à Associação Internacional de Cidades Educadoras (AICE) e o cumprimento dos compromissos que dela decorrem. **Metodologia:** foi realizada uma revisão documental e, posteriormente, um mapeamento dos atores que convergem, ou podem convergir, em torno do modelo/projeto/aposta de cidade. Com base nesse mapeamento, foram elaborados 9 diagnósticos compartilhados, utilizando um instrumento metodológico cujo design se inspirou na Guia Metodológica fornecida pela AICE. Por fim, foram geradas recomendações a partir de um enfoque de governança urbana. **Resultados:** as recomendações geradas servirão para uma gestão adequada do projeto de cidade, com um enfoque que envolva os potenciais beneficiados. Evidencia-se que a sociedade civil, as universidades locais e o setor público têm estabelecido e podem estabelecer sinergias em torno dos compromissos decorrentes da adesão de Manizales à AICE. **Conclusões:** a adesão de Manizales à AICE representa uma grande conquista em termos de governança urbana e diplomacia de cidade. Manizales pode se configurar como uma Edutrópolis a partir da implementação do modelo de Cidade Educadora.

Palavras-chave: Cidade Educadora; Edutrópolis; governança urbana; participação cidadã; qualidade de vida (obtidos do tesoro UNESCO e ERIC).

Introduction

In the 1990s, the concept of “Educating Cities” (Faure, 1974) was adopted by the cities attending the 1st International Congress of Educating Cities, which was held in Barcelona (Spain). This concept was championed by the *Educating Cities* movement, consolidated in 1994 as the International Association of Educating Cities (IAEC) within the framework of the III Congress held in Bologna (Italy). This gave rise to *Charter¹ of Educating Cities*, whose purpose is to place education at the center of the public agenda of cities that embrace its principles (International Association of Educating Cities, 2020).

Since then, Educating Cities has been essentially characterized by leading strategies aimed at improving the quality of life in cities (Rodríguez, 2007) through networked governance. This implies that strategic, synergistic, collaborative, and/or cooperative relationships are established to facilitate dialogue between local government, civil society, and the cities that make up the IAEC.

The “Educating City” project places education at the center of a city's physical, economic, social, and cultural development. In line with the above, Educating Cities leads strategies addressing urbanism, environment, mobility, culture, sport, health, etc. It is a question of each Educating City addressing these, or other topics, from an endogenous vision (International Association of Educating Cities, 2023a), which allows adapting the strategies to the idiosyncrasy and cultural heritage of each city and, therefore, to the realities of the cities and those who inhabit them (Bryon and Gaona, 2005).

The IAEC makes it possible to exchange experiences, which is why it facilitates cultural exchange between different cities worldwide (Iglesias, 2019). Given that cities and their inhabitants face global challenges, Educating Cities' experiences can inspire those who make up the Association (Sassen, 2011), even those who are not part of it. However, the cities that make up the IAEC can lead strategies that reflect the realities of the territory and its inhabitants by the principles of the *Carta de Ciudades Educadoras* [Charter of Educating Cities]. This invites Educating Cities to place themselves in the principles that the Charter brings together to address the challenges that concern each city and its inhabitants, jointly or between different actors (civil society, local universities, and the public/private sector).

The transformation of cities has meant a remarkable change in how the urban environment is conceived and managed (Jacobs, 2020). The concept of

1 This roadmap for Educating Cities has been subject to changes to adapt its approaches to current and, why not, future global challenges and social realities. This is why it has been reviewed on various occasions, such as at the III International Congress (Bologna, 1994), at the VIII Congress (Genoa, 2004), and in 2020.

“urban governance” has transformed beyond simple resource administration and political management (Gehl, 2013). Now, it incorporates cultural, social, and educational elements in the configuration of contemporary cities, which reflects a more integral and holistic paradigm in the development and maintenance of urban spaces.

This perspective of urban governance converges with the emergence of an increasingly relevant term: “*Edutropolis*” (Bellet & Ganau, 2006). This concept represents a fundamental transition in the way contemporary cities approach educating. *Edutropolis* goes beyond being a conglomerate of educational institutions (Landry, 2012); it is an urban approach that merges education in all aspects of urban life. This comprehensive perspective recognizes education as a central axis that permeates the daily life of citizens, fostering continuous learning and a culture of innovation, which contributes to the city’s sustainable, cultural, and socio-economic development.

In this context, the Educating City model is developed (Rodríguez, 2007). These cities are understood as innovative projects that go beyond formal educating centers/institutions; they aspire to become ecosystems that promote intellectual curiosity, creativity (Ramos & López, 2013), and social inclusion (Cabezudo, 2015). The strategic intertwining of urban spaces such as parks, libraries, museums, and community centers forms a network (Barran, 2009) where knowledge flows freely and transforms the city into a living teaching and learning laboratory. This commitment to the Educating City represents a conscious effort to consider urban space as a place of continuous education and citizen participation (IDB, 2022).

A progressive movement towards this new paradigm is observed in the current state of the art (Collet & Humet, 2016; Rodríguez, 1999; Harvey, 2013). Cities worldwide are adopting approaches that embrace education as a vital component of their identity. Barcelona (Spain), Rosario (Argentina), and Bologna (Italy) are exponents of cities that have embraced the Educating Cities approach, promoting an environment of teaching and collaboration among all age and population groups (López & Cruz, 2003).

The intersection between urban governance, the concept of “*Edutropolis*” and the Educating City represents a significant evolution in the development of modern cities. Beyond urban conglomerates or receptacles of inhabitants, these cities are becoming environments where education and knowledge are fundamental pillars that shape collective identity and social progress (Villanueva, 2006).

From the agora of Athens (Rodríguez, 2007), urban spaces offer a meeting point where education and knowledge transcend the walls of the classrooms and become issues of interest to citizens who, through activities such as walking the city, discussing/dialoguing, and reflecting on such varied or diverse problems,

manage to impact the quality of life of urbanites in terms of urban services, democracy, economy, etc.

Today, modern cities (with their idiosyncrasies and cultural heritage) continue to be benchmarks for experiences that tend towards best practices, such as citizen participation in urban governance (International Association of Educating Cities, 2009, 2023b) and the linking of plural actors in city diplomacy (Zeraoui & Villar, 2016).

Given the factors that lead people to settle (or not) in cities (see Figure 1), different actors (civil society, universities, public sector, and private sector) are destined to converge to participate in urban governance strategies (Medina, 2013) and city diplomacy.

Source	General Information
World Bank	More than 50% of the world's population is urban (resides in cities); more than 80% of global GDP is generated in cities (cities generate significant economic revenues); cities are responsible for two-thirds of energy consumption, and more than 70% of greenhouse gas emissions (cities are an anthropic footprint/generate an anthropic footprint in the environment).
NASA, National Aeronautics and Space Administration	In recent years, there have been historical records of the increase in the temperature of our planet; 2023 was the hottest year on record. This exponential trend, caused by human activities (greenhouse gas emissions: use of fossil fuels, among others), requires total integrity and rigor and the confluence of all actors (civil society, universities, public and private sector) to face the challenges that concern us as a species.

Figure 1. *Challenges that concern us as a species.*

Source: Own elaboration, according to information from the World Bank (2023); NASA (2024).

The urban population (inhabitants of cities) and the planet's temperature (product of human activities) tend to increase. This should be a reason for reflection, discussion, and action for cities. Urban leaders can undertake timely and necessary efforts to improve urban life, act in the face of the climate crisis, marginality, access to (more and better) urban services, etc.

The COVID-19 pandemic (2020) taught us the importance and need to make informed decisions in the public sector (as well as in the everyday environment in which citizens operate or are immersed). This implies that intellectual, scientific, and/or academic thinking is considered in the public agenda (Rodríguez, 2007)

and that civil society, among other actors/stakeholders, recognizes the educational character of the methodological and research activities (on the occasion of the Educating City model).

Inside cities, decisions are made daily. Informed choices, whether made by a citizen (civil society) or a local/regional government (public sector), impact the quality of life of city people. Universities, students, and graduates not only generate economic benefits for cities; these actors/stakeholders also play a significant role in the physical, financial, social, and cultural development of cities (where their university and post-university life takes place), from intellectual, scientific, and academic activities. Issues of public interest, such as the labor market, urban mobility, or mental health (to name a few), can be addressed through teaching, research, and community service.

The articulated work between cities and universities and the knowledge products financed by these cities (to improve the quality of urban life) ratify the importance and need to make informed decisions from the public sector (see Figure 2).

"Misinformation/disinformation is the most significant short-term risk, while the environment dominates longer-term concerns (...)"

Figure 2. Disinformation is a global risk.

Source: Own elaboration, according to information from the World Economic Forum (Global Risk Perception Survey 2023 – 2024).

This is where the integration of these two concepts, "Educating City" and "*Edutropolis*," becomes more relevant. Both allude to the strategic/intentional relationship (city-educating) to improve the quality of urban life, among other things. In essence, the two concepts refer to synergies between various actors/stakeholders for such purposes (community service).

Education is often related to formal educational institutions' teaching and learning process. However, educating (championed by educating cities) goes beyond the classroom and/or schooling (without distancing, ignoring, or omitting its importance). Educating cities is characterized by leading strategies to improve the quality of urban life through formal, non-formal, and informal education.

The social and economic impacts² generated by the symbiosis between the city and educating and, particularly, from the synergistic/collaborative/cooperative relationships that are established (and/or that can be established between actors/stakeholders) correspond to the conditions that illustrate the phenomenon called "*Educiopolis*." In Manizales's specific case, the Educating City model includes basic, secondary, higher, technical, and technological education, among other things.

The implementation of the Educating City model in Manizales and, therefore, the configuration of Manizales as an *Educiopolis* allow basic, secondary, higher, technical, and technological education to be brought closer to the territory through intellectual, scientific, and/or academic activities (International Association of Educating Cities, 2019b). This is to improve the quality of life of people through teaching, research, and service to the community.

For a long time, Manizales has been considered the principal educational center of the region and one of the most weighted at the national level (Acebedo, 2011; Rodríguez, 2007, 2008). In 2019, this city joined the International Association of Educating Cities (IAEC) through Municipal Agreement No. 1040 of November 19, 2019, which was motivated by civil society, the Institute of Research in Social and Human Sciences – ICSH/University of Caldas, and the local government of the time.

Since the incorporation of Manizales into the IAEC (2019), civil society, local universities, and the public sector have exercised laudable leadership around this city project (Molina, 2007) since they have deepened in academic terms and have participated as protagonists of the decisions that are taken around it from the public agenda.

The participation of civil society and local universities (Pérez et al., 2018) in the public agenda has facilitated dialogue between plural actors to highlight the different commitments³. It needs to assist Manizales as an Educating City, such as compliance with the precepts that arise from incorporating the city into the IAEC.

This participation translates into the leadership exercised around the city model and includes both Manizales' accession to the IAEC and the fulfillment of the commitments that derive from it. These commitments obey the precepts issued, defined –or promulgated– by the municipality and the IAEC.

The IAEC promotes and disseminates the concept of "Educating City" as "[...] the backbone of democracy and citizenship" (Barcelona City Council, 2023).

2 Social and economic income/benefits.

3 Compliance with *Municipal Agreement No. 1040 of November 19, 2019*: payment of annual fees before the IAEC; implementation of the Educating City model in Manizales.

Its objective is for Educating Cities to lead strategies and/or activities that tend to improve people's quality of life.

During the second half of 2023, methodological and research activities were carried out (within the framework of implementing the Educating City model in Manizales) to contribute to the correct management of the city project.

This article addresses the importance of citizen participation in urban governance for the accession of Manizales (Colombia) to the International Association of Educating Cities and fulfilling the commitments derived from the city's incorporation into this Association.

Methodology

The research has a qualitative methodological approach, which was based on the three elements that make up the university, according to the phenomenon or factor known as "*Edutropolis*": Teaching, research, and service to the community (Dober, 2000), to guide methodological and research activities.

We initially proceeded with the review of documents derived from Manizales' accession to the IAEC in 2019. This involved the prior definition of criteria and the prioritization of documents and information relevant to the research.

The above allowed for identifying the precepts issued by the IAEC and the municipality, as well as the academic and/or scientific documents that derive from Manizales' membership in the Association (between 2019 and 2023). In the same way, scientific literature was reviewed in databases on *Edutropolis* and urban governance as documents of particular interest for analysis.

Subsequently, a mapping and/or identification of actors/stakeholders that converge, or may converge, around Manizales as an Educating City was initiated (see Figure 3). For this, the academic documents generated and/or produced in Manizales (since 2021) were taken into account on the occasion of the Educating City model.

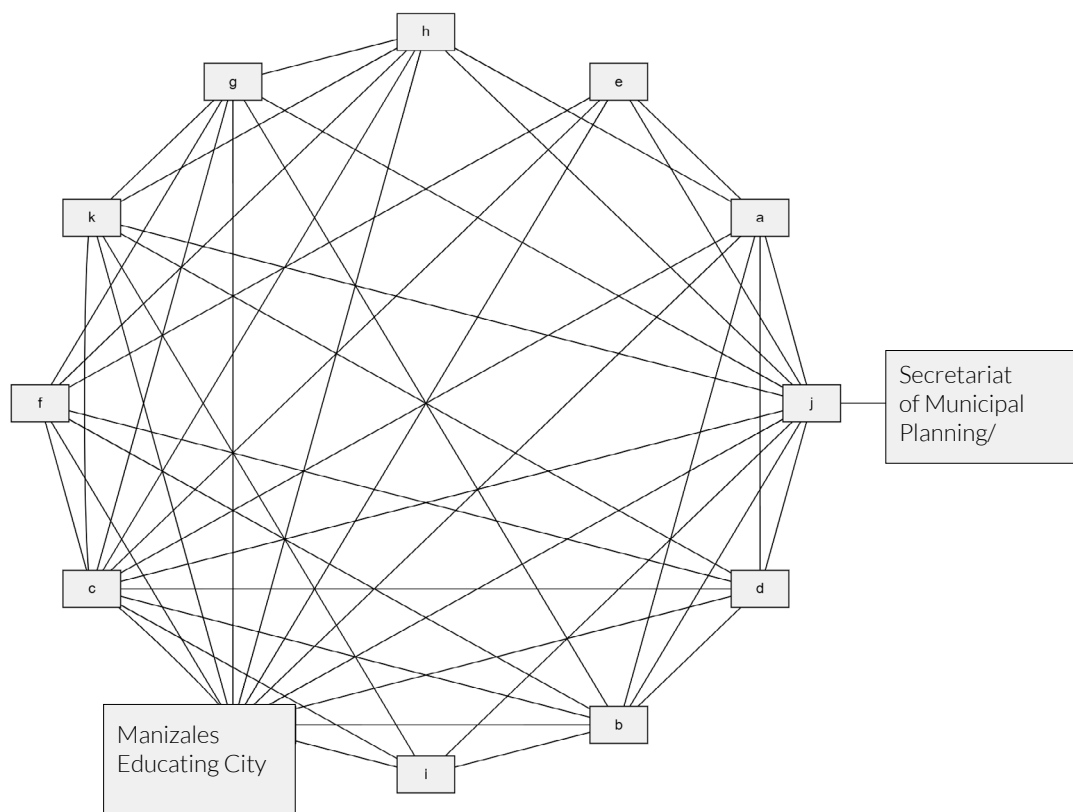


Figure 3. Stakeholder mapping.

Source: own work, based on the mapping/identification of stakeholders.

Actors/stakeholders

- a. Civil society
- b. Institute for Research in Social and Human Sciences (ICSH)
- c. Local Universities
- d. University students
- e. Schools
- f. Teachers

- g. Alumni
- h. SENA
- i. Cultural events
- j. Public sector
- k. Private Sector

Likewise, a methodological instrument was adapted and implemented to allow shared diagnoses to jointly define the challenges and priorities for intervention in Manizales as an Educating City (with and from the previously identified actors/stakeholders).

This methodological instrument was inspired, fundamentally, by the Methodological Guide provided by the IAEC (International Association of Educating Cities, 2019a), but also by multiple triangulation and *Design Thinking* as methodological bets that allow linking those potentially benefited by this city project, as actors/stakeholders that converge or can converge around it (Ramírez, 2010).

Structure of the Methodological Instrument to Carry Out the Diagnoses

- What are the top 3 city challenges?
- How can we contribute to responding to them through lifelong learning and values educating?
- What municipal or civil society programs would you highlight to realize these challenges?
- Which entities could contribute to the achievement of these challenges?
- List/make a list of places you associate with an Educating City:
- Authorization to process personal data
- Stakeholder database;

All the information presented in this article conformed to the ethical and legally established parameters for the collection, storage, use, circulation, deletion, and, in general, processing of the personal data of the actors questioned during the investigation.

The Mayor's Office of Manizales is provided with all the information and documentation related to the participation of actors/stakeholders, which may be consulted within the framework of the methodological and research activities carried out during the second half of 2023, in connection with the implementation of the Educating City model in Manizales.

Nine shared diagnoses were made with the actors/stakeholders questioned during the research. These diagnoses were conducted in two phases: the first involved engaging the stakeholders to carry out a shared diagnosis with each of them; the second phase consisted of a virtual meeting, through which the actors/stakeholders could voluntarily participate to discuss the shared assessments, jointly define intervention priorities for building the Educating City in Manizales, and review the principles of the *Charter of Educating Cities*, among others. In this sense, the contributions derived from the interpellation of actors/stakeholders during the mapping and/or identification of the same were considered.

About Multiple Triangulation

Multiple triangulation (Betrián et al., 2013) allows one to adjust two or more methodological bets, both in the search and collection process and in the data/information analysis process. Triangulation is a diversification (previously defined) of sources, data/information, and methodological strategies (Forni & Grande, 2020).

The divergences or convergences that derive from the implementation of various methods (Aguilar & Barroso, 2015) allow us to take into account relevant information that could be ignored (or go unnoticed) if a methodological strategy does not have the possibility of being adjusted by the researchers, according to the particularities of each case. This methodological strategy offers a generous alternative. Thanks to the design and implementation of various methodological instruments, it can, among other things, highlight the perceptions of different actors/stakeholders.

About Design Thinking

Whether it is a citizen, a university, a local government, or the private sector, Design Thinking (IDB, 2022) is a methodological commitment that, due to its interest in the human being and its creative and innovative nature, allows:

- Manage an intergenerational and multidisciplinary dialogue within the framework of implementing the Educating City model in Manizales.
- Explore and adapt methodological instruments.
- Generate feedback/relevant information, which is input to make decisions about the city model.
- Put citizens at the center of reflection and actions.
- Identify challenges and commitments in the short, medium, and long term within the implementation framework, as well as validity and projection in the future of the city model.
- Ensure iteration and improvement of methodological activities.
- Promote the relationships that are established, or that can be established between actors/ *stakeholders* and, therefore, strengthen urban governance within the framework of implementing the city model.

Likewise, a contrast and/or validation of a successful experience as an Educating City in Colombia was carried out (Correa, 2014), for which Medellín was chosen to occupy this place (International Association of Educating Cities, 2019b). The validation is relevant to the recommendations that were defined in favor of the implementation, validity, and projection in the future of Manizales as an Educating City from an urban governance approach to manage the city project correctly. This validation was carried out directly with stakeholders involved in fulfilling the commitments arising from Medellín's accession to the IAEC.

Finally, recommendations were generated from the documentary review, the mapping of actors/*stakeholders*, and the contrast and validation of a successful experience as an Educating City (in Colombia). These recommendations constitute significant inputs for correctly managing the city project (strategic and financial planning).

In this sense, the research seeks to raise the importance of citizen participation in urban governance for configuring Manizales as an *Edutropolis* within the implementation framework of the Educating City model.

This methodology adopted an approach that allowed linking those potentially benefiting from the city model/project/commitment while searching, collecting, and analyzing information (Molina, 2007). The focus consisted of a study on the Educating City, with and from some of the actors/stakeholders that, in the particular case of Manizales, converge, or may converge, around the city model, not as spectators of an Educating City that stands before them as one more imposition, but as protagonists and/or architects of it (Izquierdo, 2007).

Results

The recommendations generated by this research are obtained from the activities led in Manizales (Colombia) within the framework of implementing the Educating City model (2023). These recommendations will serve as input for correctly managing the city project (in the short, medium, and long term), using an approach that links potential beneficiaries (Molina, 2007).

It can be established that the methodological and research activities carried out on the occasion of the Educating City model in Manizales contribute to the exercise of the three elements that make up the university, according to the phenomenon or factor is known as "*Edutropolis*": Teaching, research, and service to the community (Dober, 2000).

In this sense, for Manizales to be configured as an *Edutropolis* and, therefore, as a city that meets the conditions that illustrate this phenomenon, it is essential that the methodological and research activities that are led, based on the implementation of the Educating City model, are oriented in the light of teaching, research, and service to the community.

The knowledge ecosystem in Manizales is presented as a fertile field for its production. Among others, the city has research institutes and groups recognized by Minciencias. These contribute to the production, dissemination, transfer, and social appropriation of knowledge:

Table 1. Research groups endorsed by Minciencias in Manizales (2021).

Due to the large area of knowledge of the OECD	
Social science	52
Engineering and technology	32
Natural sciences	20
Humanities	20
Medical and Life Sciences	18
Agronomy	14
By University	
Universidad de Caldas	70
Universidad Nacional de Colombia based in Manizales	44
Universidad de Manizales	16
Universidad Autónoma de Manizales	15
Universidad Católica de Manizales	11
Total	156

Source: Minciencias.

Deepening in academic terms around implementing the Educating City model in Manizales means moving from rhetoric to scholarly debate (International Association of Educating Cities, 2019b). This allows us to understand the potential of the city model/project/commitment.

Implementing the Educating City model in Manizales can strengthen the confluence between actors/stakeholders at the local, national, and international levels (see Figure 4), according to the fulfillment of the commitments that derive from the cities' adherence to the IAEC.

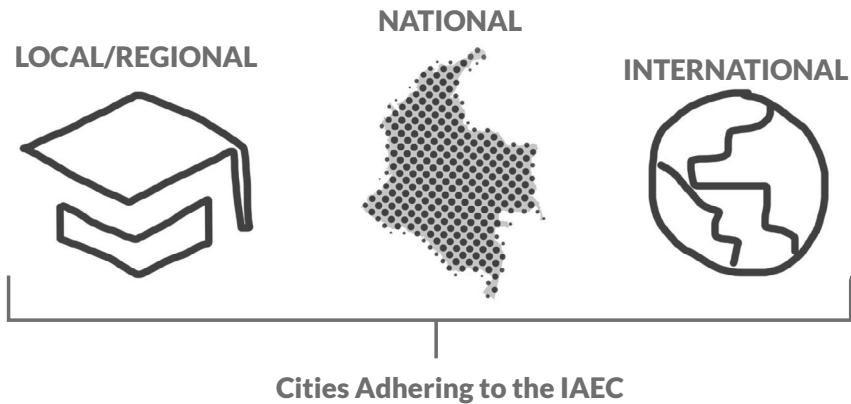


Figure 4. Confluence between actors/stakeholders (civil society, universities, public/private sector).

Source: own elaboration, according to the adhesion of Manizales to the IAEC and the implementation of the Educating City model.

Correctly managing the city project depends on fulfilling commitments (Centelles, 2009). These derive from Manizales's adhesion to the IAEC within the framework of the precepts issued by the Association and the municipality.

A Municipal Agreement and the Manizales Land Management Plan support the Educating City model:

- Municipal Agreement No. 1040 of November 19, 2019.
- Manizales Land Management Plan (2017–2031); numeral 1.1.2.1.2 of the General Component of the Technical Support Document, section "Manizales Campus"; Educating City Model.

The Manizales Land Management Plan (Alcaldía de Manizales, 2017) is a planning instrument that conceives educating as a central axis⁴ for the physical, economic, social, and cultural development of the city:

"Manizales is widely recognized as a city with a high level of education, culture and university vocation, which needs to be consolidated under a spatial approach, and articulated with territorial planning" (p. 19).

⁴ Educating is a central element for the long-term vision and the territory's occupation model.

"Hence the principles of the Educating City Model [...]" (p. 19).

"[...] structuring, articulating and driving axis of sustainable human development" (p. 20).

[...] that, together with culture, innovation, entrepreneurship, and technology, will contribute to the knowledge and higher education economy, the well-being of its inhabitants, and the development and competitiveness of Manizales and the region (p. 20).

The Manizales Land Management Plan emphasizes the synergies that must be established between the city and the (local) Higher Educating Institutions to supply and guarantee the interests and needs of university students and graduates:

The city must work with universities and educational centers to meet students' needs and ensure Manizales is positioned as a city of knowledge and one of the primary destinations for higher education students nationally and internationally (p. 20).

As Table 2 shows, a detailed framework is necessary for the strategic and financial planning of Manizales as an Educating City, highlighting the integration of different municipal plans and budgets. Instruments such as the Land Management Plan (POT, for its Spanish acronym), the Municipal Development Plan, and the Annual Operational Investment Plan, among others, are essential to prioritize and allocate resources efficiently, ensuring proper management of the Educating City project. Including a medium-term fiscal framework and an annual program highlights the importance of rigorous and sustainable financial planning. These elements facilitate a cohesive strategy that links territorial, socio-economic, and financial planning and promotes comprehensive urban governance, which supports the Educating City model in Manizales.

Table 2. Elements for Strategic and Financial Planning.

Territory planning	Socio-economic planning	Financial Planning
Land Management Plan	Municipal development plan	Annual Investment Operating Plan
	Action plans	General budget of the municipality
	Indicative plan	Medium-Term Budgetary Fiscal Framework
	Sector plans	Annual, monthly cash program

Likewise, the research results underline the need for strategic and financial planning that involves all potentially benefited actors (see Figure 5). To ensure the project's success, citizen participation and collaboration between civil society, universities, and the public sector is emphasized. The recommendations also emphasize creating meeting spaces and consultation mechanisms to identify challenges and define intervention priorities, ensuring management based on synergies and cooperation between the various actors involved.

Recommendation 1

Promote and strengthen dialogue and social and political leadership in favor of the city model.

Recommendation 2

Recognize the leadership exercised by civil society and local universities/the Social and Human Sciences Research Institute (ICSH), among others, to establish bilateral communication between the parties.

Recommendation 3

Strengthen the dialogue/communication between the IAEC and Manizales, linking the potential beneficiaries of the projec.

Recommendation 4

To ensure bilateral communication between the IAEC and the Coordinating Board of Manizales as an educating city, recognizing the present knowledge product and, therefore, the actors/stakeholders and the previous work.

Recommendation 5

Ensure integrity and rigorousness from civil society, local universities, and the public/private sector regarding compliance with the precepts promulgated by the IAEC and by the municipality.

Recommendation 6

Follow-up and control from the public sector (commitments arising from Manizales' membership in the IAEC: annual dues; implementation of the city model).



Figure 5. *Recommendations*

Source: Own elaboration, based on the recommendations for implementing the Educating City model in Manizales.

Finally, as can be seen in Figure 6, Manizales' accession to the International Association of Educating Cities (IAEC) and the implementation of the City model have involved a myriad of authors. This timeline highlights significant milestones from the incorporation of Manizales into the IAEC in 2019, to the

methodological and research activities carried out during the second half of 2023. It emphasizes, in particular, the active participation of various relevant actors, including civil society, local universities and the public sector.

2019

Adherence of Manizales to the International Association of Educating Cities (IAEC); commitments that derive (precepts issued from the IAEC and the municipality); outstanding achievement in urban governance and city diplomacy.

2020

Updating of contact data between the municipality and the IAEC, for this purpose, the support/accompaniment of the *Personería de Manizales* (as Administrative and Disciplinary Control Body, and part of the Coordinating Board of Manizales as Educating City) was counted on; celebration of the International Day of the Educating City; the IAEC carried out the updating of the Charter; an Inter-administrative Agreement was envisaged between the Secretariat of Municipal Planning/ Mayor's Office of Manizales and the Institute of Research in Social and Human Sciences (ICSH)/University of Caldas.

2021

The Universidad de Caldas made a diagnosis regarding Manizales's status as an Educating City (member of the IAEC).

2022

The diagnosis (year 2021) is recognized as an outstanding work (from the Faculty of Legal and Social Sciences of the University of Caldas); the (initial) formation of the Coordinating Board of Manizales as an Educating City is carried out in the facilities of the Rogelio Salmona University Cultural Center; a document is filed in the Council of Manizales, within the framework of the city model/project/commitment; the allocation/approval of resources to irrigate methodological and research activities is achieved during the 2023 term.

2023

The Secretariat of Municipal Planning/ Mayor's Office of Manizales requested a proposal to sign an Inter-administrative Agreement (envisaged since 2020) between the office/State Entity and the Institute of Research in Social and Human Sciences (ICSH) of the Universidad de Caldas to implement the city model/project/commitment. This Inter-administrative Agreement is not signed, despite having everything for such purposes (there is a proposal and everything signed/ok from the different instances of the University of Caldas/Planning Office/ICSH to resume the matter at any time); from the office/the State Entity two contracts are signed for the provision of services, to carry out methodological and research activities, within the framework of the implementation process of the Educating City model in Manizales (knowledge products financed by the municipality, to make informed decisions from the public agenda, in favor of the strategic and financial planning that is necessary for the correct management of the city project).

Figure 6. *Timeline.*

Source: Own elaboration, according to the adhesion of Manizales to the IAEC and the implementation of the Educating City model.

Collaboration between these actors has been essential for the planning and executing strategies to improve urban governance and the quality of life in the city. The involvement of civil society has ensured that decisions and policies

reflect the needs and aspirations of citizens. Local universities have contributed their knowledge and research capacity, providing a solid academic foundation for Educating City model initiatives. The public sector, for its part, has provided the resources and institutional framework necessary to implement and sustain these strategies.

Discussion

Knowledge and educating make up the imprint of Manizales (Puig, 2008), a city that concentrates its will and efforts so that development and the economy are based on knowledge (Calvo-Sotelo, 2017). The different university campuses built in the city and the relevance of educating in municipal agreements and planning instruments account for this. Educating (formal, non-formal, and informal) is the central axis of this city's physical, economic, social, and cultural development. According to the vision and/or projection in time of Manizales:

Manizales, by 2032, will be positioned as the city with the best quality of life in Colombia [...] (Alcaldía de Manizales, 2017, p. 10).

The country's University Capital of Knowledge, Entrepreneurship and Innovation [...] (Alcaldía de Manizales, 2017, p. 10).

Although there is a wide range of higher educating options, Manizales is one of the longest-lived cities in Colombia. This means that the city must define programs, projects, activities, and/or strategies aimed at improving the quality of life of older adults and young people (Sosa, 2015), assuming the latter as an economically active population that carries out undergraduate and postgraduate studies, among other activities, given the need to be inserted into the labor market, access the cultural offer, urban services, etc. (Cardona, 2019). This leads to generating better conditions that, based on this purpose, make the city a quality university center.

The Charter of Educating Cities (International Association of Educating Cities, 2020) highlights the importance of facilitating the integration of people into the labor market, according to principle 16 (*Guidance and inclusive labor insertion*):

In the connection between education and employment, there should be a close relationship between educational planning, the labor market's needs, and the community's needs [...] (p. 16).

The development of the city (based on knowledge) requires the intervention of the conditions of its production (Montero, 2009), and these allude to having a higher quality of life (see Figures 7 and 8). As far as a knowledge-based (and economic) city model (knowledge economy) is concerned, it does not only require the presence of universities or the production of knowledge *per se*. This ambitious and promising commitment involves intervening in the conditions in which knowledge is produced within the framework of the knowledge ecosystem as a reliable field for its production.

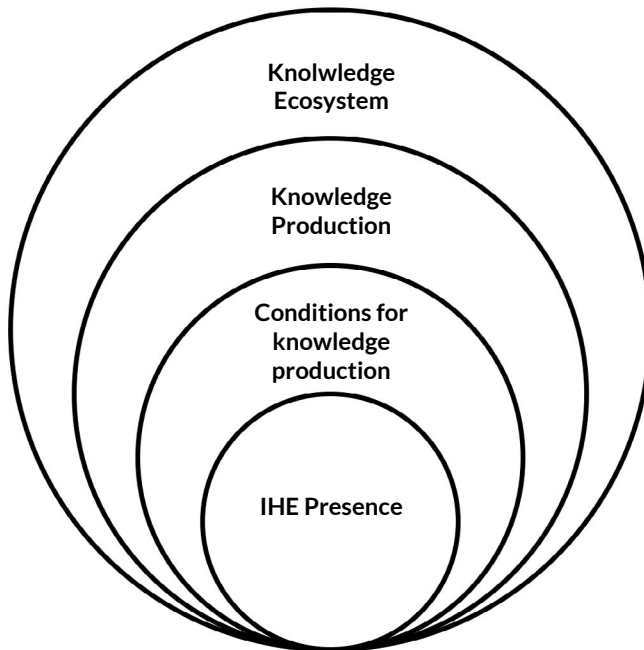


Figure 7. Knowledge ecosystem.

Source: own elaboration from the knowledge ecosystem in Manizales.

Category	Description
IHE Presence	Academic Offer.
Conditions for knowledge production	Quality of university and post-university life (work experience/labor market, mobility, access to information, cultural offer, sport, mental health, entrepreneurship, etc.).
Knowledge production	Activities of an intellectual, scientific, and/or academic nature; knowledge products.
Knowledge ecosystem	Disclosure/dissemination of knowledge/scientific journals; areas of knowledge according to the research groups recognized by Minciencias; research centers/institutes; seedbeds, among others.

Figure 8. *Categories.*

Source: Own elaboration from the knowledge ecosystem in Manizales.

Improving the conditions in which knowledge is generated in Manizales and, in this sense, contributing to improving the quality of university and post-university life (see Figure 9) could allow those potentially benefited to settle in the city in the best possible scenarios. Manizales needs students and graduates to carry out their life projects in the city (Cardona, 2019).

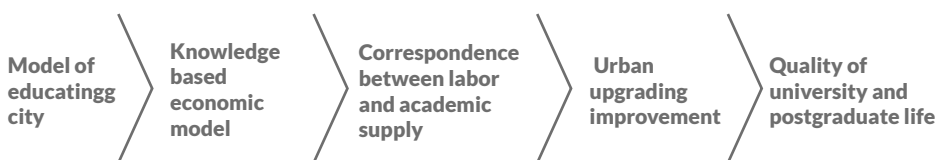


Figure 9. *Manizales' Transition to a Knowledge-based Economic Model.*

Source: Prepared by the authors, based on Manizales' membership in the IAEC and the implementation of the Educating City model.

Deepening in academic terms around Manizales as an Educating City has made understanding the city model's scope and sphere of influence possible. Once the potential of the Educating City model in Manizales is known, it is evident that, according to the city's characteristics and needs (physical, economic, social,

and cultural) (IDB, 2022), Manizales could meet the conditions that illustrate the factor or phenomenon called «*Edutropolis*» to develop the city based on knowledge (Aristizábal, 2012) and, in effect, favor a knowledge economy. According to Dober (2000):

Edutropolis is a metropolitan network of post-secondary education centers that serves and supports many educational, social, economic, and cultural functions. Such roles include the traditional triad of teaching, research, community service, and, increasingly, community enhancement and enlargement, i.e., community development (p. 17).

This author argues that higher education institutions in the United States represent a central axis for the country's economic and cultural development. Over the past century, universities and other establishments of advanced education have become the primary engines of scientific and technological progress. This includes pure research and its practical application in industry, agriculture, transport, communications, and medicine sectors. Most Nobel laureates have ties to US universities or higher education institutions. Since the 1950s, these institutions have been cradles for prominent writers, musicians, artists, architects, and designers. In addition, university campuses have trained amateur and professional athletes who have achieved success in competitions worldwide (Dober, 2000).

The phenomenon known as “*Edutropolis*” is intentional, not fortuitous; therefore, it depends on the actors that make it possible. Among these actors are mainly universities, which play a remarkable leadership role in the cities' development (physical, economic, social/cultural), where this factor/phenomenon can be observed and analyzed.

An “Educating City” is conceived as a city project that is also not fortuitous or capricious. On the contrary, as in the case of Manizales, it is understood as a city model/project/commitment that represents a remarkable achievement in urban governance and city diplomacy. This, currently, is in force, has a basis in a municipal agreement and a planning instrument, and has the potential to establish synergies between actors/stakeholders (civil society, universities, public and private sector) in the glocal sphere, as well as to improve -gradually, and among other things- the quality of university and post-university life, from strengthening and generating the necessary conditions for there to be correspondence between the labor supply and the academic offer.

The Educating Cities are mainly governed by the precepts issued by the IAEC (*Charter of Educating Cities*, statutes, internal regulations, among others). In the case of Manizales, the municipality issues precepts, a municipal agreement, and a planning instrument.

Both the phenomenon or factor called "*Edutropolis*" and the Manizales Land Management Plan emphasizes the synergies that must be established between universities to contribute to the physical, economic, social, and cultural development of the city and, therefore, around the social, cultural and economic dynamics in which citizens are inserted. However, it is necessary to make explicit that, within the framework of the conditions that illustrate an *Edutropolis*, synergistic/cooperative relationships are not established only or hermetic between universities.

Various actors (civil society, universities, and public/private sector) are immersed in the dynamics related to the educational, social, economic, and cultural functions that are promoted, supported, and led from the potential exercised by universities and, therefore, from the potential exercised by students, teachers, and graduates; as living forces that make up universities, and acquire capacities to produce knowledge and lead projects to improve the quality of life in the city (Gaete, 2015).

The development or progress of a city, from the leadership exercised by the universities, present in it (Bellet & Ganau, 2006), refers to a city model where teaching, research, and service to the community guide the confluence between actors/stakeholders, the definition of purposes or challenges, and the relationships that are established or that can be established around them (see figure 10).

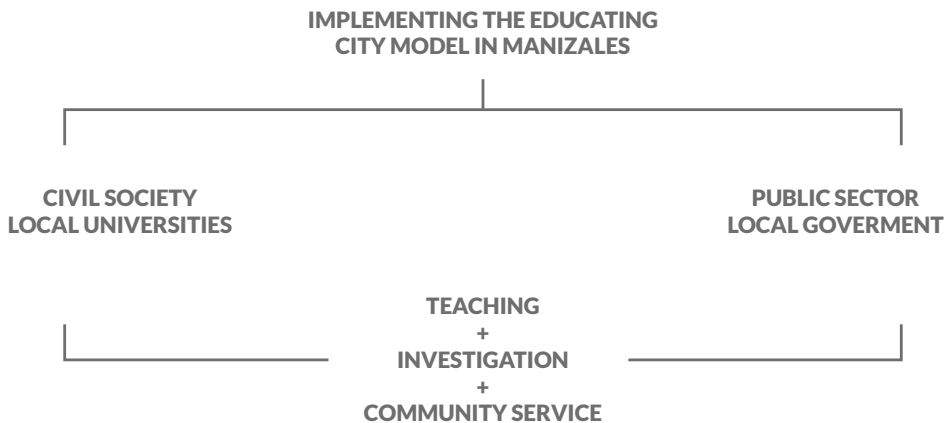


Figure 10. *Implementing the City Model/Project/Commitment.*

Source: own elaboration, according to the adherence of Manizales to the IAEC and the implementation of the Educating City model.

The configuration of Manizales as an *Edutropolis*, within the framework of implementing the Educating City model, is not possible if only synergistic relationships between universities are subscribed to. The leadership universities can exercise regarding the realities of the territory and its inhabitants depends on the relationships established with the actors linked to it. These actors converge or may converge around the Educating City model, potentially benefiting.

The construction of the Educating City means strengthening the conjunction of actors around the purposes pursued. This governance includes civil society, higher educating institutions, and the public/private sector, and it is based on networked governance and cooperation/synergies between actors. Networking facilitates the joint definition of strengths, challenges, and actions, creating alliances and increasing co-responsibility.

The assortment of actors and their diversity makes it necessary to enable scenarios where the values of the Educating City are reflected. This suggests managing meeting spaces and consultation mechanisms (physical and virtual) that allow the identification of the challenges/needs of the municipality, as well as the definition of intervention priorities. "In this work, it is advisable to have the collaboration of universities and experts, since this helps to systematize the analysis of realities and to guide short, medium and long-term goals [...]" (International Association of Educating Cities, 2019a, p. 18).

Conclusions

The accession of Manizales to the IAEC represents an outstanding achievement in urban governance and city diplomacy. It connotes Manizales as an *Edutropolis* based on implementing the Educating City model. This implementation refers to the aspects derived from this distinction, such as compliance with the precepts and commitments that arise from the city's incorporation into the IAEC through intellectual, scientific, and academic activities.

Citizen participation in urban governance allows the strategies and/or activities led, within the framework of implementing the Educating City model in Manizales, to respond to the realities of the territory and its inhabitants. The actors collaborating in implementing the city model contribute significantly to fulfilling the commitments from the city's accession to the IAEC. They also manage meeting spaces and consultation mechanisms to promote and strengthen the confluence between them.

Proper city project management (strategic and financial planning) depends on compliance with the commitments derived from Manizales' incorporation into the IAEC. This requires greater public and local government responsibility to ensure compliance with administrative acts, municipal agreements, and planning instruments. The methodological and research activities make it possible to comply with these commitments and carry out the planning necessary for the correct management of the city project in the short, medium, and long term.

The Educating City model can improve the quality of university and post-university life by putting the knowledge generated and/or produced at the city's and its inhabitants' service. Teaching, research, and community service motivate the confluence between actors and the definition of standard purposes, establishing strategic and collaborative relationships at the global level and projecting Manizales as an Educating City in the future.

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Inequality Aversion and Social Norms in Resource Distribution by Costa Rican Adolescents*

[English version]

Aversión a la desigualdad y normas sociales en la distribución de recursos por adolescentes costarricenses

Aversão à desigualdade e normas sociais na distribuição de recursos por adolescentes da Costa Rica

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Abstract

Objective: This study analyzes the relationship between inequality aversion and conformist and non-conformist social norms in exploring their influence on resource distribution decisions among Costa Rican adolescents. **Methodology:** This quasi-experimental cross-sectional study was conducted with a Costa Rican sample

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(N = 285, mean age = 13.4 years, SD = .64, 51.4% female). The study focused on the influence of conformist and non-conformist social norms on decision-making in the face of inequality, through an economic interdependence game (Ultimatum Game - UG) in a work-for-pay version. Additionally, the study explored the relationship between these norms and horizontal and vertical individualist-collectivist cultural orientations, sociodemographic variables, and inequality aversion. **Results:** The induction of norms did not significantly affect participants' decisions in the UG. There was a negative relationship between household size and inequality aversion. **Conclusions:** These results suggest that inequality aversion and preference for equality are stronger than the situational influence of conformist and non-conformist social norms on decision-making in the face of inequality.

Keywords: social norms; inequality aversion; cultural orientation; conformism; priming; Ultimatum Game (obtained from the APA thesaurus).

Resumen

Objetivo: se analiza la relación entre la aversión a la desigualdad y normas sociales de carácter conformista e inconformista, para explorar su influencia en las decisiones ante la distribución de recursos entre adolescentes costarricenses. **Metodología:** este estudio cuasiexperimental transversal, realizado con una muestra costarricense (N = 285, M edad = 13.4 años, DT edad = .64, 51.4% mujeres), se enfocó en la influencia de normas sociales conformista e inconformista en la toma de decisiones frente a la desigualdad, en un juego de interdependencia económica (juego del ultimátum - JdU-) en versión de pago por trabajo. Además, se exploró la relación entre estas normas y las orientaciones culturales individualista-colectivista horizontal y vertical, las variables sociodemográficas y la aversión a la desigualdad. **Resultados:** se encontró que la inducción de normas no tuvo un efecto significativo en las decisiones de los participantes en el JdU, así como una relación negativa entre la cantidad de habitantes del hogar y la aversión a la desigualdad. **Conclusiones:** estos resultados sugieren que la aversión a la desigualdad y la preferencia por la igualdad son más fuertes que la influencia situacional de normas sociales de carácter conformista e inconformista en la toma de decisiones frente a la desigualdad.

Palabras clave: normas sociales; aversión a la desigualdad; orientación cultural; conformismo; *priming*; juego del ultimátum (obtenidos del tesoro APA).

Resumo

Objetivo: analisa-se a relação entre a aversão à desigualdade e normas sociais de caráter conformista e inconformista, para explorar sua influência nas decisões sobre a distribuição de recursos entre adolescentes costarriquenhos. **Metodologia:** ste estudo quase-experimental transversal, realizado com uma amostra costarriquenha (N = 285, M idade = 13,4 anos, DP idade = 0,64, 51,4% mulheres), focou na influência de normas sociais conformistas e inconformistas na tomada de decisões frente à desigualdade, em um jogo de interdependência econômica (jogo do ultimato -JdU-) na versão de pagamento por trabalho. Além disso, explorou-se a relação entre essas normas e as orientações culturais individualista-coletivista horizontal e vertical, as variáveis sociodemográficas e a aversão à desigualdade. **Resultados:** encontrou-se que a indução de normas não teve um efeito significativo nas decisões dos participantes no JdU, assim como uma relação negativa entre a quantidade de habitantes do lar e a aversão à desigualdade. **Conclusões:** esses resultados sugerem que a aversão à desigualdade e a preferência pela igualdade são mais fortes que a influência situacional de normas sociais de caráter conformista e inconformista na tomada de decisões frente à desigualdade.

Palavras chaves: normas sociais; aversão à desigualdade; orientação cultural; conformismo; priming; jogo do ultimato (obtidas do tesouro APA).

Introduction

Social norms are considered a significant point of convergence between cognitive sciences and culture (Barrett, 2020; Ensminger & Henrich, 2014; Fehr & Fischbacher, 2004; Hawkins et al., 2019; Henrich, 2016; House et al., 2020; Kanngiesser et al., 2022). While these norms are inherently collective, they could not exist without human cognitive complexity; without the latter, human cultural complexity would lack a foundation and thus be impossible (Boyer, 2018; Harari, 2015; Sun, 2012; Tomasello, 2021).

Recent scientific evidence suggests that social norms significantly influence how people perceive and make decisions regarding resource distribution (Ensminger & Henrich, 2014; House et al., 2020; House & Tomasello, 2018; Li et al., 2021; McAuliffe et al., 2017; Ruggeri et al., 2018). However, there is also evidence indicating that people have an intrinsic and generalized preference for equality (Tomasello & Vaish, 2013), along with an automatic aversion to inequality (Fehr et al., 2006; Henrich, 2016), which manifests early in development, even within the first year of life (Hamlin & Wynn, 2011). Given these findings, the question arises as to how situational social norms interact with intrinsic preferences in shaping human behavior.

Although inequality in resource distribution has traditionally been analyzed by economic sciences (Stiglitz, 2013; Piketty & Goldhammer, 2014), it has also been increasingly and fruitfully studied from a psychosocial perspective (García-Sánchez et al., 2018; Sainz et al., 2021; Jetten & Peters, 2019). From this viewpoint, alongside the dominant vision of materialistic determinism, where culture is defined by the economic system (Wang et al., 2022; Sánchez-Rodríguez et al., 2019; Sánchez-Rodríguez et al., 2020), evidence has also been found of the opposite process; that is, culture significantly influences the economy and its degrees of inequality (Binder, 2019; Gorodnichenko & Roland, 2012; Nikolaev et al., 2017).

Culture can significantly influence economic behavior, as reflected in the construction of social norms. These can condition various aspects such as the degree of generosity (McAuliffe et al., 2017), tolerance for inequality (Jiao & Zhao, 2023), respect for hierarchies (Osei et al., 2022), obedience to instructions from elders (Hoffmann & Tee, 2006), the understanding of justice (Schäfer et al., 2015), the level of competitiveness (Hofstede, 2016), or expectations regarding the behavior of others in resource distribution (Meristo & Zeidler, 2022). Nevertheless, despite the significant influence of historically predominant cultural values in a society, social norms can also be affected by situational influences over shorter time frames (Bianchi, 2016; Oyserman, 2016).

One way social norms interact with the more inherent and universal dispositions of humans is through a phenomenon known as "inequality aversion." This can be defined as the human tendency to reject unequal deals (Fehr, 1998), although inequality aversion can also be considered a generalized human tendency (Fehr & Schmidt, 1999). The way it is expressed varies significantly between societies (Schäfer et al., 2015). What explains this variation? Studies suggest that differences between societies can be partially explained by differences in their social norms, which have a significant influence on people's behavior (House et al., 2020; Kanngiesser et al., 2022).

Social norms vary in several aspects, including the degree of individual autonomy they permit and the level of conformity they expect (Gelfand et al., 2011). Consequently, societies differ in the extent to which they expect strict ("tight") or flexible ("loose") adherence to their social norms. In other words, societies differ in their norms as such and also in the degree of adherence and compliance they expect from their members regarding these norms.

An individual is averse to inequality if they dislike outcomes perceived as inequitable. This raises the problem of how individuals measure and value equality in the outcomes they obtain. A relevant factor in addressing this problem is the processes of social comparison (McIntyre & Eisenstadt, 2011). People assess the equality of outcomes through mental comparison processes, involving both cognitive quantification mechanisms and emotional evaluation mechanisms. These processes are present from early childhood but become more consolidated during middle childhood and adolescence (Sobel & Blankenship, 2021). In adulthood, comparisons of relative income have a broad and significant impact on job satisfaction and personal life (Fehr & Schmidt, 1999).

An effective way to operationalize inequality aversion in research is through the Ultimatum Game (UG) (Cochard et al., 2021; Güth et al., 1982; Ensminger & Henrich, 2014; van Dijk & De Dreu, 2021). This is a task of interdependent economic exchange where two people (one proposer, and one responder) decide how to distribute several resources, with the condition that if the responder rejects the offer, both parties get nothing; that is, the responder has veto power in this game, which conditions the proposer.

This game can serve to observe disadvantageous inequality aversion, particularly in the role of the responder because if they decide to reject any offer equal to or greater than one unit (no matter how unequal it is), they are opting for a loss, as their starting point is zero units.

Research based on the UG has found that people tend to propose offers close to equality (5:5), which are generally accepted, and tend to reject unequal offers (e.g., 9:1, 8:2, 7:3, 6:4) (Henrich et al., 2001; Henrich, 2016; Henrich & Muthukrishna, 2021).

This tendency to reject unequal distribution proposals is known as "costly punishment" (Ensminger & Henrich, 2014), as it implies that the rejecter is willing to lose resources to equalize the situation with their counterpart; that is, they prefer to get nothing but be in equal conditions, rather than get something but be in inequality compared to their counterpart in this game. Therefore, people do not only consider the resources obtained by themselves but also the relative outcome linked to what others receive, with whom they establish comparisons. Given this, that people possess an internalized automatic norm of equality has been suggested, in addition to inequality aversion. This norm guides them to prefer receiving egalitarian exchanges and offering such distributions more frequently (Henrich & Muthukrishna, 2021).

A possible explanation for this inherently favorable tendency toward equality and unfavorable tendency toward inequality is that humans are motivated to maintain long-term cooperative relationships, leading them to seek relationships of reciprocity, shared benefit, and mutual satisfaction, which act as a stimulus for such maintenance. In contrast, relationships of inequality, exploitation, and injustice would be a disincentive for maintaining cooperation, as they would tend to truncate it (Tomasello, 2009; Tomasello & Vaish, 2013; Henrich & Muthukrishna, 2021).

This research is additionally relevant as it was conducted in the Latin American and Central American context, regions where inequality in wealth distribution is among the highest in the world (Programa Estado de la Nación, 2021). Therefore, understanding how norms and social preferences interact in the socialization of adolescents is important, given the high sensitivity of this stage in defining values and behaviors in people's and societies' lives (Inglehart, 2018).

Type of Study

As previously mentioned, evidence suggests that social norms play a significant role in behavior toward inequality. However, the relationship between intrinsic norms, like inequality aversion, and situational norms (such as levels of conformity) remains unclear. Therefore, this quasi-experimental cross-sectional between-subjects study investigates how conformist and non-conformist social norms influence the decision-making of Costa Rican adolescents (a collectivist society) when faced with inequality, through an economic interdependence game (the Ultimatum Game - UG) in a work-for-pay version. It is expected that if inequality aversion is stronger than the influence of conformist or non-conformist

norms, participants will reject unequal offers similarly, regardless of whether they are under a conformist or non-conformist normative priming strategy, or in its absence.

Hypothesis

The induction of conformist and non-conformist social norms will have a significant effect on participants' decision-making in the UG, indicating that situational norms—induced through priming—play an important role in behavior toward inequality. In this case, participants exposed to the conformist condition are expected to accept more unequal offers, while those exposed to the non-conformist condition will reject more unequal offers compared to the control condition. This hypothesis suggests that social norms can influence participants' decision-making, even if they have an intrinsic aversion to inequality.

Methodology

Participants

A total of 285 Costa Rican adolescents were recruited, with a mean age of 13.4 years ($SD = 0.64$), 51.4% female, from four Costa Rican secondary schools. To estimate the minimum acceptable sample size, power analyses were conducted using G-Power (Faul et al., 2009). These analyses indicated that a sample size of at least 170 individuals would be sufficient to achieve a medium effect size of $f = 0.25$, an $\alpha = 0.05$, and $(1-\beta) = 0.95$ to measure the effects of priming in the ultimatum. Therefore, a target sample size of 200 was proposed; nevertheless, thanks to the cooperation of educational centers, a total sample of 285 individuals was obtained. This sample was sufficient to detect the expected effects if they existed. Parental informed consent and assent from each participant were obtained for participation. This study was approved by the Research Ethics Committee of the National Distance Education University (UNED), certified under reference code: 1-PSI-2022.

Instruments

The independent variable was normative priming in three conditions: conformist, non-conformist, and neutral (see Appendix 1). The priming strategy involved inducing participants to think about two types of norms: a conformist norm (central idea: "You should be humble and accept what others want to give you for your work") and a non-conformist norm (central idea: "You should be proud and not accept that others give you little for your work"), along with a neutral control condition. Before inducing the first two conditions, participants were asked to identify the person they thought about as a normative source. This strategy was previously validated through cognitive interviews with four adolescents, two males and two females, who demonstrated an understanding of it as expected. Previous studies confirm that this type of modeling is effective in inducing social norms (Jiao & Zhao, 2023; Oyserman & Lee, 2008; Oyserman et al., 2014; Oyserman, 2015; Oyserman, 2016; House & Tomasello, 2018; Tomasello, 2021).

The dependent variable was the Ultimatum Game (UG), as it is effective in measuring behavior toward inequality (Güth & Kocher, 2014). In this case, a work-for-pay version was applied (Fernández et al., 2023). The UG strategy used here involves a work situation, where the participant is led to think they are distributing the product of their labor with a partner, which has been shown to better measure inequality aversion than when the situation is framed as the distribution of a donation (Ensminger & Henrich, 2014; Houser & McCabe, 2014; van Dijk & De Dreu, 2021). Each participant was presented with an equal distribution option (5:5) and four unequal options (9:1, 8:2, 7:3, and 6:4).

After completing the UG, participants were asked, "How do you feel after making this distribution of the payment for your work?" This was answered on a four-point Likert scale, ranging from "very bad" to "very good."

The following are the covariates included: the Horizontal and Vertical Individualism and Collectivism scale by Triandis and Gelfand (1998), previously validated in Latin America (Díaz et al., 2020); the Perception of Inequality in Everyday Life scale (PEIEL), previously validated with Spanish-speaking youth (García-Castro et al., 2019); the level of religiosity according to Etchezahar and Simkin (2013) (consisting of a single question); and concern and self-sufficiency with money (Mani et al., 2013) (consisting of a single question). Additionally, sociodemographic variables were used, such as the number of household members, parental education, and household ownership status.

The Horizontal and Vertical Individualism and Collectivism scale, developed by Triandis and Gelfand in 1998 and refined over time (Triandis & Gelfand, 2012), is a measurement instrument used to assess the cultural dimensions of individualism and collectivism in a society. The scale was previously validated in

Latin America by Díaz and colleagues in 2020, and it has been observed that the distinction between horizontalism and verticalism is important for understanding social inequality phenomena (Chaverri & Fernández, 2022).

This scale consists of 16 items presented as statements, and participants are asked to indicate their agreement or disagreement level with each statement. The scale validity was psychometrically evaluated in the present study, revealing good internal consistency and an adequate factor structure. General collectivism obtained a Cronbach's alpha of 0.73, horizontal collectivism showed an alpha of 0.70, and vertical individualism of 0.69, thus these were accepted as reliable measures. General individualism, vertical collectivism, and horizontal individualism were rejected due to reliability indices below 0.60.

The Perception of Economic Inequality in Everyday Life scale (PEIEL) consists of 11 items referring to different aspects of daily life, such as knowing people with very different income levels, differentiated access to health services, knowing people who can and cannot go on vacation, among other aspects (García-Castro et al., 2019). Participants were asked to indicate their level of agreement with each statement on a four-point scale. The reliability and validity of this scale were evaluated through psychometric analyses, revealing good internal consistency, with a Cronbach's alpha of 0.86 and an adequate factor structure, generating a single factor that explains 42% of the variance. Furthermore, the PEIEL has been shown to discriminate between people with different levels of perceived inequality.

Procedures

A paper-and-pencil questionnaire was administered to seventh-year students at four public secondary schools in Costa Rica. The instrument was previously validated through cognitive interviews with four 13-year-old adolescents (two females and two males), which reflected an adequate understanding of the questionnaire. The three priming conditions were randomized.

Participants were approached during their regular classes. Completing the instrument with all the measures took approximately thirty minutes. The principal author of this article was present during all questionnaire administrations to supervise the process. Most adolescents had no issues filling out the questionnaire, and any doubts were promptly addressed. After each session, the questionnaires were reviewed to ensure they were fully completed. If any questions were omitted, participants were asked to provide those responses.

Analysis Plan

Initially, descriptive analyses of the variables were conducted separately to observe their frequency distributions. Following this, reliability analyses of the scales (using Cronbach's alphas) were performed, followed by factor analyses to select and estimate those scales that showed acceptable psychometric properties. Next, Pearson's bivariate correlations were carried out to examine the linear associations between variables. Subsequently, ANOVAs were conducted with the type of priming as the factor and the acceptance or rejection decisions in the different UG distributions as the dependent variables. Finally, post hoc analyses were performed to estimate the significance of the mean differences.

Results

The applied normative priming strategy showed several significant correlations, as presented in Table 1. Under nonconformist priming, religiosity was found to be lower ($r = -0.11$, $p < 0.1$), the reported feeling after the UG tended to be less pleasant ($r = -0.11$, $p < 0.1$), and concern about money tended to be higher with this priming ($r = 0.11$, $p < 0.1$). Under conformist priming, participants were more likely to think of their mother as the normative source compared to other people ($r = 0.16$, $p < 0.05$). In the nonconformist priming condition, the perception of having enough money to buy what one wants tended to be lower ($r = -0.14$, $p < 0.05$). Collectively, these results suggest that the normative induction (conformist-nonconformist) was effective, as it showed expected interactions with other relevant variables, such as the degree of religiosity, the level of emotional rejection following an unequal treatment, concern about money, and the person who represents the normative source.

The other covariates of the study, although they did not show significant interactions with the experimental conditions (type of priming), did show relevant associations among themselves, as shown in Table 2. Notably, the Perception of Inequality in Everyday Life (PEIEL) showed significant positive correlations with horizontal collectivism ($r = 0.21$), general collectivism ($r = 0.26$), and vertical collectivism ($r = 0.13$). Horizontal collectivism was associated with general collectivism ($r = 0.82$) and negatively with vertical individualism ($r = -0.28$).

General collectivism also showed a negative relationship with vertical individualism ($r = -0.25$) and with the set of unequal exchanges in the ultimatum ($r = -0.12$), as well as positive correlations with the positive feeling after the UG (r

= 0.12) and the number of household members ($r = 0.13$). As expected, the feeling after the UG showed a negative correlation with the set of unequal offers in this game ($r = -0.18$), indicating that the feeling after such offers tend to be negative. Finally, the number of household members showed a negative correlation with the set of unequal exchanges in the UG ($r = -0.27$). Additionally, it was found that the more household members there were, the greater the tendency to accept unequal offers (6:4, $r = -0.13$; 7:3, $r = -0.22$; 8:2, $r = -0.25$; 9:1, $r = -0.26$), with statistically significant associations in all cases.

Table 1. *Bivariate Correlations between Independent Variable and Covariates.*

	Religiosity	Feeling	Sufficient Money	Concern about Money	Normative Source person
Non-conformist Priming	-.11*	-.11*	-.14**	.11*	-.16**
Religiosity	-	-.07	-.05	-.10*	.03
Feeling after UG		-	-.02	.11*	.16**
Sufficient Money			-	-.13**	.04
Concern about Money				-	.10

Table 2. *Bivariate Correlations Among Covariates.*

	Horizontal Collectivism	General Collectivism	Vertical Individualism	Ultimatum Feeling	Household Number Members	Unequal Ultimatum
PEIEL	.21**	.26**	.13*	.03	-.02	.04
Horizontal Collectivism	-	.82**	-.28**	.10	.10	-.05
General Collectivism		-	-.25**	.12*	.13*	-.12*
Vertical Individualism			-	.01	.05	-.05

	Horizontal Collectivism	General Collectivism	Vertical Individualism	Ultimatum Feeling	Household Number Members	Unequal Ultimatum
Ultimatum Feeling				-	.04	-.18**
Household number members					-	-.27**

* $p < .05$, ** $p < .01$

The UG results generally demonstrate a trend of rejection toward inequality and acceptance of equality. Unequal offers were predominantly rejected, with a 90% rejection rate for the 9:1 distribution (see Figure 1). This rejection decreases as the level of inequality in the offer decreases: 86% for the 8:2 distribution, 80% for the 7:3 distribution, and 59% for the 6:4 offer (see Figure 2). Meanwhile, rejection falls to only 3.5% for the equal 5:5 distribution, confirming that acceptance of equal offers tends to be widespread (see Figure 3).

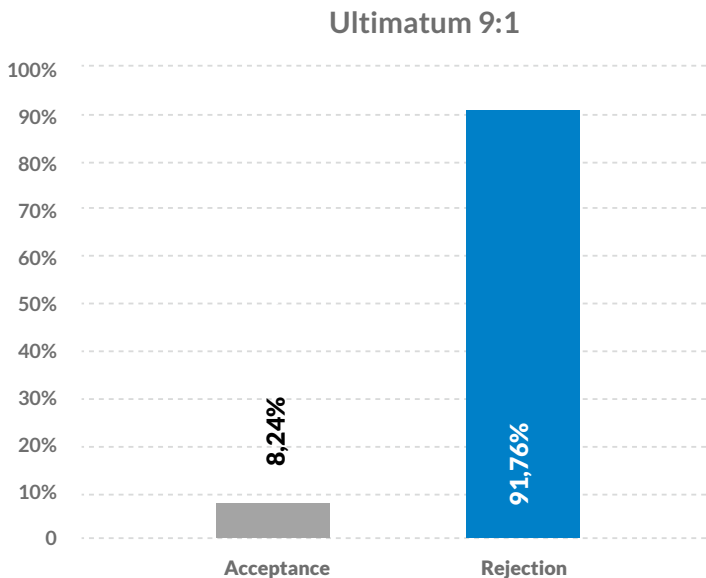


Figure 1. *Ultimatum 9:1.*

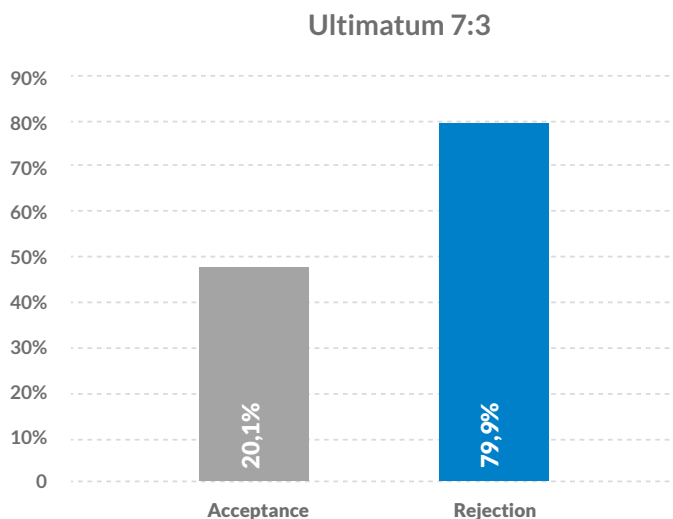


Figure 2. *Ultimatum 7:3.*

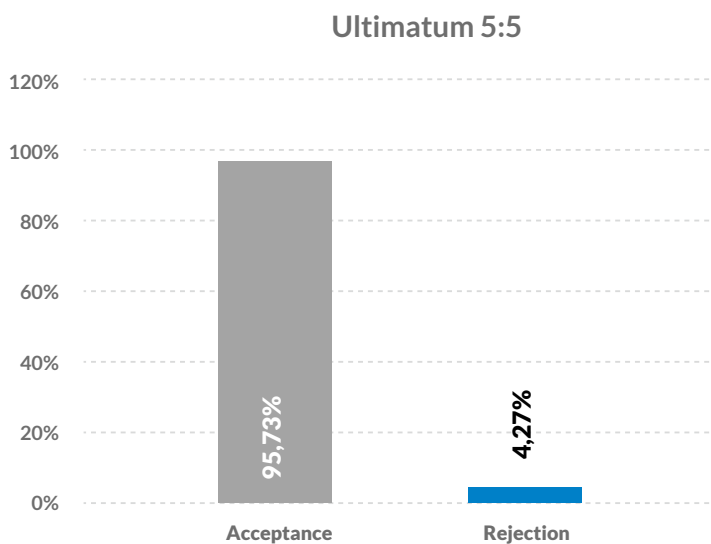


Figure 3. *Ultimatum 5:5.*

After reviewing the previous general results, the relationship between normative priming and the UG was analyzed. Responses to the different offers were found to not be affected by the type of conformist or non-conformist normative priming. This suggests that the inequality aversion measured by this

game was not influenced by the induction of these situationally induced social norms.

Means, standard deviations, standard errors, and confidence intervals in the UG are shown in Table 3. The higher the mean, the greater the rejection of the offer, since acceptance was coded as 1 and rejection as 2. Table 4 presents the post hoc variance analyses comparing the means in the UG under the two types of normative priming and the neutral condition. The differences between the means, the standard error, the level of statistical significance, and the confidence interval are reported.

Table 3. Mean Scores in the Ultimatum Game According to the Type of Priming Applied.

Priming		N	Mean	Standard Deviation	Standard Error
Ultimatum 9:1	Non-conformist	94	1.90	0.296	0.031
	Conformist	90	1.92	0.269	0.028
	Neutral	95	1.93	0.263	0.027
	Total	279	1.92	0.276	0.016
Ultimatum 8:2	Non-conformist	93	1.84	0.370	0.038
	Conformist	92	1.87	0.339	0.035
	Neutral	95	1.83	0.376	0.039
	Total	280	1.85	0.361	0.022
Ultimatum 7:3	Non-conformist	93	1.76	0.427	0.044
	Conformist	91	1.85	0.363	0.038
	Neutral	94	1.79	0.411	0.042
	Total	278	1.80	0.402	0.024
Ultimatum 6:4	Non-conformist	94	1.63	0.486	0.050
	Conformist	91	1.59	0.494	0.052
	Neutral	95	1.57	0.498	0.051
	Total	280	1.60	0.491	0.029
Ultimatum 5:5	Non-conformist	93	1.04	0.204	0.021
	Conformist	93	1.04	0.204	0.021
	Neutral	95	1.04	0.202	0.021
	Total	281	1.04	0.203	0.012

Table 4. Mean Comparisons in the Ultimatum Game According to the Type of Normative Priming and Neutral Condition Applied.

Relationship Between Types of Priming			Mean Differences with Priming	Standard Error	p-value
Ultimatum 9:1	Non-conformist	Conformist	-0.018	0.041	0.660
		Neutral	-0.022	0.040	0.584
	Conformist	Non-conformist	0.018	0.041	0.660
		Neutral	-0.004	0.041	0.920
	Neutral	Non-conformist	0.022	0.040	0.584
		Conformist	0.004	0.041	0.920
Ultimatum 8:2	Non-conformist	Conformist	-0.031	0.053	0.563
		Neutral	0.007	0.053	0.893
	Conformist	Non-conformist	0.031	0.053	0.563
		Neutral	0.038	0.053	0.474
	Neutral	Non-conformist	-0.007	0.053	0.893
		Conformist	-0.038	0.053	0.474
Ultimatum 7:3	Non-conformist	Conformist	-0.083	0.059	0.164
		Neutral	-0.024	0.059	0.686
	Conformist	Non-conformist	0.083	0.059	0.164
		Neutral	0.059	0.059	0.320
	Neutral	Non-conformist	0.024	0.059	0.686
		Conformist	-0.059	0.059	0.320
Ultimatum 6:4	Non-conformist	Conformist	0.034	0.072	0.637
		Neutral	0.059	0.072	0.409
	Conformist	Non-conformist	-0.034	0.072	0.637
		Neutral	0.025	0.072	0.730
	Neutral	Non-conformist	-0.059	0.072	0.409
		Conformist	-0.025	0.072	0.730
Ultimatum 5:5	Non-conformist	Conformist	0.000	0.030	1.000
		Neutral	0.001	0.030	0.976
	Conformist	Non-conformist	0.000	0.030	1.000
		Neutral	0.001	0.030	0.976
	Neutral	Non-conformist	-0.001	0.030	0.976
		Conformist	-0.001	0.030	0.976

Note: No mean differences were significant below 0.05, nor were they marginally significant below 0.1.

Figure 4 depicts the mean acceptance and rejection for the 9:1 distribution under the three experimental conditions in the UG. Figure 5 shows the case of the 5:5 distribution. In both cases, the response behavior in this game can be observed to not differ with the type of priming or condition applied, while it does vary with respect to the equality or inequality of the offer.

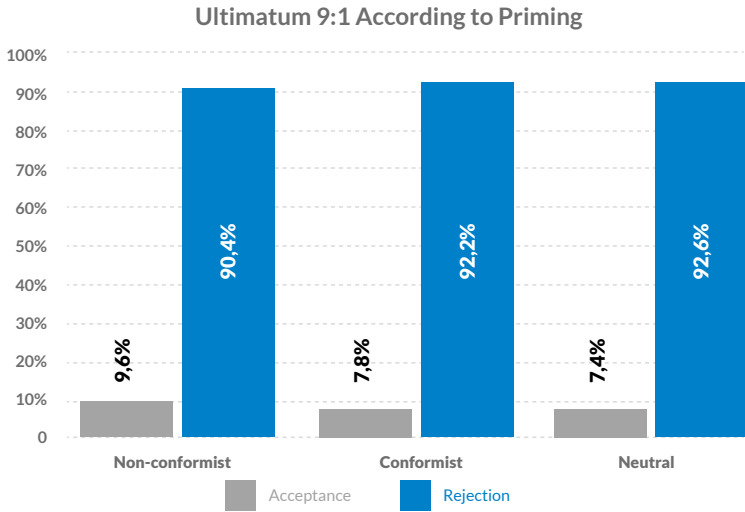


Figure 4. Ultimatum 9:1 According to Priming.

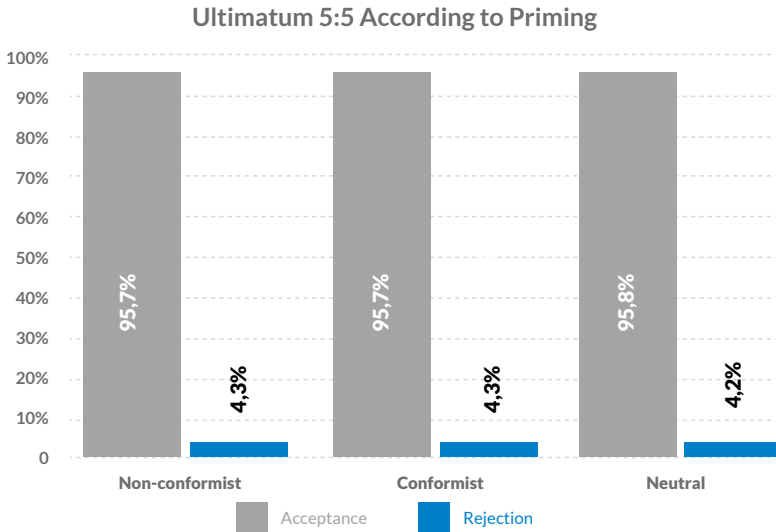


Figure 5. Ultimatum 5:5 According to Priming.

Conclusions

The previous results confirm a robust human tendency toward equality preference and inequality aversion (Engelmann & Tomasello, 2019). This tendency is notably present in early adolescence (12-13 years old), where individuals demonstrate the capacity to uphold these preferences even in the face of social norms from authority figures that explicitly advocate for humility and acceptance of any payment offered for work done. Additionally, there is evidence of the effectiveness of the applied conformist and non-conformist priming, as it significantly correlated with relevant variables indicating a more conservative attitude toward inequality, such as a more positive reported feeling and higher religiosity. This suggests that while the conformist and non-conformist priming influenced participants' perceptions, it did not change their behavior of rejecting inequality and accepting equality.

In other words, the results show that the priming strategy obtained a significant interaction with other relevant study variables (religiosity, emotional acceptance, perception of having insufficient money, greater concern for money, and the maternal figure as a normative source), which are consistent with having a more conformist attitude and greater submission to social norms. However, neither of the two induced norms made a significant difference in decision-making in the UG version of payment for shared effort, suggesting that inequality aversion has a greater influence than situationally induced norms on adolescent behavior toward economic inequality.

The fact that the UG involves a loss of resources when rejecting any exchange equal to or greater than one unit demonstrates a willingness to exert costly punishment (Henrich et al., 2006) as an action to, presumably, assert reciprocity (Bowles & Gintis, 2004). This could be taken as an indication of what Fehr and Gächter (2002) called strong reciprocity, which increases the prospects of norm application, in this case, an implicit norm of inequality aversion that uses the receiver's veto power in the UG and suspends cooperation in the face of a perceived unfair deal, overriding an explicit instruction not to apply it; since, under conformist priming, participants are induced to be humble and accept whatever they are offered for their work.

Humans exhibit an early and inherent tendency toward cooperation and pro-sociality (Hamlin & Wynn, 2011), where equality, justice, and mutual respect help sustain such cooperation over the long term (Tomasello & Vaish, 2013). This tendency is a key trait in explaining the cultural evolution of humans. How strong is this inequality aversion in 13-year-old Costa Rican adolescents? Does it persist even in the face of social norms inducing conformism? The previous

results suggest that this aversion is already present at this age and does indeed persist despite norms that seek to subvert it.

Although recent evidence in cultural psychology indicates that social norms strongly influence behavior toward inequality (House & Tomasello, 2018), the interaction between chronic norms and situational norms in shaping behavior toward inequality remains unclear. This study verified a preference for equality and a costly aversion to inequality, as these tendencies persisted even when participants were mandated to accept inequality. This suggests that an inherent norm of inequality aversion manages to overcome a situational norm toward social conformity in the face of unequal treatment, even when the former implies a loss.

This inequality aversion effect was influenced by the number of household members, as a greater number of people in the household correlated with a lower tendency to reject unequal exchanges. This association might be because, with more people in the household, existing resources must be divided among more parties, making those in larger families more accustomed to settling for smaller portions when distributing resources or benefits. Conversely, those living in families with fewer members would be more accustomed to receiving a larger proportion and, therefore, would have less tolerance for receiving what they perceive as a smaller amount of resources or benefits.

These results contribute to the construction of knowledge regarding understanding cultural normative dynamics, as they serve to decipher and assess the relationships and differences between different normative levels (intrinsic and situational in this case), whose interactions have not been clarified. In turn, such advances can be useful in refining predictive models of human behavior in various circumstances, given the complexity and impact of norms inherent to the cultural world they construct and inhabit.

That these results were obtained in a society with a collectivist tendency and high levels of socioeconomic inequality, in a sample in the early adolescence stage is striking. This could imply a certain perspective of generational social change. Because the extent that people are willing from early ages to reject unequal treatment (even disobeying a norm that asks otherwise) is a trend more likely to be consolidated in future adult generations (Inglehart, 2018).

Limitations and Recommendations

One limitation of this study is that the UG was presented to participants as a hypothetical or imaginary situation. While this method is valid for studying decision-making processes (Ensminger & Henrich, 2014; van Dijk & De Dreu,

2021), future studies should consider conducting this game in a more realistic context to enhance its ecological validity. However, this approach often leads to a significant reduction in sample size.

In future research, the findings of this study could be replicated in other Latin American contexts, as well as in other cultural regions, to verify this inequality aversion effect in the face of norms that request its disregard.

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Appendices

Appendix 1: Conformist, Nonconformist, and Neutral Normative Priming

Conformist Normative Priming

Please start by answering the following question:

Think about the person with the most authority in your family and imagine a situation where that person reminds you that you must always be humble and accept whatever others want to give you for your work, and that you should not complain or get angry when you are given very little for your work, because the most important thing is to always be humble and quiet.

Then answer the following questions:

1. Who is the person you thought of?
2. What was the situation in which they asked you to be humble and quiet? Please describe it below:

Nonconformist Normative Priming

Please start by answering the following question:

Think about the person with the most authority in your family and imagine a situation where that person reminds you that you must always be proud and not accept others giving you little for your work, and that you should complain and get angry when you are given very little for your work, because the most important thing is to have self-respect and not allow any injustice.

Then answer the following questions:

1. Who is the person you thought of?
2. What was the situation in which they asked you to have self-respect and not allow any injustice? Please describe it below:

Neutral Condition

Reading comprehension exercise. Please read the following text and then answer the question about it:

A coincidence without comparison in the solar system: the diameter of the Sun is 400 times greater than that of the Moon, and the Moon is 400 times closer to the Earth than the Sun, which allows the Moon to cover the Sun when it passes between the Earth and the Sun. If the diameter of the Moon were 225 kilometers smaller, the total coverage would not occur, and a total solar eclipse would never be seen. Eclipses have long been dated through their records; it is believed that a Chinese scribe was the first to document one about four thousand years ago. Total solar eclipses will eventually disappear because the Moon is moving away from the Earth at a rate of about four centimeters per year, so in the distant future, thousands of years from now, it will be too far away to cover the entire Sun.

Mark with an X: What is the main idea of the above text?

- a. The relationship between the Sun's diameter and the Moon's proximity to the Earth makes it possible for us to witness total solar eclipses. ()
- b. A Chinese scribe was the first to establish an accurate record of one of the solar eclipses that occurred 4,000 years ago. ()

- c. The Moon is closer to the Earth than the Sun, but it is moving away at a rate of four centimeters per year, which endangers eclipses. ()
- d. The diameter of the Sun is 400 times greater than that of the Moon, and this property allows solar eclipses to be visualized. ()

Appendix 2: Ultimatum Game - Work Payment Version

Please read the following instruction carefully before answering and let us know if you have any questions:

Imagine that you and a colleague have just finished a job in which you both put in the same effort, but your boss says they don't know who worked more and who worked less, so you will have to split the money between you in the following way. Your colleague will make you several different proposals for dividing up the money, and in each case, you can only accept or reject the offer. If you accept it, both of you will keep your colleague's proposal in that case. If you reject it, both of you will get nothing in that case. The money will be distributed over several rounds.

Offer 1: Mark with an X the option of your choice in each case. From an initial amount of one thousand colones (C1000), your colleague proposes to keep nine hundred (C900) and give you one hundred (C100).

I accept the offer / __/ (the money is distributed according to the offer made)

I reject the offer / __/ (both get nothing in this case)

Offer 2: From a second amount of one thousand colones (C1000), your colleague proposes to keep five hundred (C500) and give you five hundred (C500).

I accept / __/

I reject / __/

Offer 3: From a third amount of one thousand colones (C1000), your colleague proposes to keep eight hundred (C800) and give you two hundred (C200).

I accept / __/

I reject / __/

Offer 4: From a fourth amount of one thousand colones (C1000), your colleague proposes to keep six hundred (C600) and give you four hundred (C400).

I accept / __/

I reject / __/

Offer 5: From a fifth amount of one thousand colones (C1000), your colleague proposes to keep seven hundred (C700) and give you three hundred (C300).

I accept / __/

I reject / __/

Corporate Social Responsibility and Legal Mandate: A Systematic Literature Review *

[English version]

La responsabilidad social empresarial y el mandato
legal: un análisis sistemático de la literatura

Responsabilidade social corporativa e mandatos
legais: uma revisão sistemática da literatura

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Abstract

Objective: The growing demand for ethical behavior in businesses by stakeholders has been addressed through Corporate Social Responsibility (CSR). Normatively, CSR is practiced under hard law or soft law, which incentivizes social responsibility without requiring legislation. Recently, several countries have enacted laws on CSR, traditionally voluntary, although the literature shows academic skepticism about the effectiveness of mandatory laws due to contextual and axiological differences in CSR practice. **Methodology:** A systematic literature review of 148 scientific documents was conducted to discuss whether CSR should be understood as a legal mandate or voluntary action. **Results:** A relationship is evident between mandatory non-financial reporting and legitimacy, control, corporate performance, and innovation. Additionally, arguments are made in favor of maintaining CSR as a moral obligation rather than a legal requirement. **Conclusions:** The main findings indicate that companies should reconcile their interests with those of their stakeholders based on axiological principles that transcend legal mandates. This document has academic, business, and legal implications, providing insights for reconciling axiological and legal considerations.

Keywords: corporate social responsibility; voluntary; law; mandatory; reporting (obtained from UNESCO thesaurus).

Resumen

Objetivo: la creciente demanda de comportamiento ético en las empresas por parte de los stakeholders ha sido respondida mediante la responsabilidad social empresarial (RSE). Normativamente, la RSE se ejerce bajo leyes duras (hard law) o leyes blandas (soft law), que incentivan la responsabilidad social sin necesidad de legislación. Recientemente, varios países han legislado sobre la RSE, tradicionalmente voluntaria, aunque la literatura muestra escepticismo académico sobre la efectividad de las leyes obligatorias, debido a diferencias contextuales y axiológicas en el ejercicio de la RSE. **Metodología:** se ha desarrollado un análisis sistemático de la literatura a 148 documentos científicos sobre la discusión si la RSE debe ser entendida como mandato legal o actuación voluntaria. **Resultados:** se evidencia una relación entre el reporte no financiero obligatorio y la legitimidad, control, desempeño corporativo e innovación. Asimismo, se argumenta a favor de mantener el carácter voluntario de la RSE como obligación moral. **Conclusiones:** los principales resultados muestran que las empresas deben conciliar sus intereses con los de sus stakeholders con una base axiológica que trascienda el mandato legal. Este documento tiene implicaciones

académicas, empresariales y legales, que proporcionan elementos de juicio para conciliar lo axiológico con lo jurídico.

Palabras clave: responsabilidad social empresarial; voluntario; ley; obligatorio; informe (obtenidos del tesoro Unesco).

Resumo

Objetivo: a crescente demanda por comportamento ético nas empresas por parte dos stakeholders tem sido atendida por meio da responsabilidade social empresarial (RSE). Normativamente, a RSE é exercida sob leis rígidas (hard law) ou leis flexíveis (soft law), que incentivam a responsabilidade social sem necessidade de legislação. Recentemente, vários países legislaram sobre a RSE, tradicionalmente voluntária, embora a literatura mostre ceticismo acadêmico sobre a eficácia das leis obrigatórias, devido a diferenças contextuais e axiológicas na prática da RSE. **Metodologia:** foi desenvolvido um análise sistemática da literatura de 148 documentos científicos sobre a discussão se a RSE deve ser entendida como mandato legal ou ação voluntária. **Resultados:** evidenciou-se uma relação entre o relatório não financeiro obrigatório e a legitimidade, controle, desempenho corporativo e inovação. Além disso, argumenta-se a favor da manutenção do caráter voluntário da RSE como uma obrigação moral. **Conclusões:** os principais resultados mostram que as empresas devem conciliar seus interesses com os de seus stakeholders com uma base axiológica que transcenda o mandato legal. Este documento tem implicações acadêmicas, empresariais e legais, fornecendo elementos de julgamento para conciliar o axiológico com o jurídico.

Palavras-chave: responsabilidade social empresarial; voluntário; lei; obrigatório; relatório (obtidos do tesoro Unesco).

Introduction

Business ethics become crucial when profit pursuit negatively impacts society, the environment, and the company (Cheruvath, 2017). Stakeholders demand companies to integrate socially responsible activities into their value propositions (Muniz et al., 2019) and avoid diverting funds towards activities without social benefit (Koya & Roper, 2020). Thus, companies have adopted corporate social responsibility (CSR) as a voluntary strategy that supports sustainable development (Krichewsky, 2017), and is based on corporate values like democracy, equality, solidarity, and community concern (Brzeska & Jędrzejewski, 2021), that goes beyond legal compliance (Lin, 2020).

In recent years, CSR has shifted in two major approaches. Firstly, it has expanded its reach from local to an international field, as corporations from industrialized countries have suppliers in emerging economies, facing several demands from stakeholders. Secondly, the government has become more involved in CSR through mandatory regulation with hard laws (Knudsen, 2018; Berger-Walliser & Scott, 2018) or promoting soft laws that encourage social responsibility without depending on legislation (Knudsen, 2018).

Social and environmental responsibilities have shifted from being optional to mandatory for many organizations (Baah et al., 2021). Progressive legislators and academics are increasingly demanding a legal mandate for corporate social responsibility (CSR) from companies (Kim, 2021), as they understand 'mandate', according to the jurist Francesco Carnelutti, as an indicator of a behavior that must be followed: "[...] do this, do not do that" (Mejía & Turizo, 2020).

Literature suggests that legality plays an important role in the impact on CSR processes and outcomes (Cosma et al., 2021), as well as in environmental issues (Baah et al., 2021). Regulatory initiatives correspond to relatively recent legal developments compared to CSR traditional voluntary approach. For example, mandatory sustainability reporting began in the 2000s (Fitriasari & Kawahara, 2018; Jain et al., 2017).

For several authors, the advantages of legal mandate for CSR practices are evident, like brand positioning (Sarkar et al., 2021), financial performance (Garg et al., 2021; Bag & Omrane, 2020; Mukherjee et al., 2018), corporate reputation, and customer satisfaction and loyalty (Islam et al., 2021; Barauskaite & Streimikiene, 2021). Although the transparency of mandatory non-financial reporting may be competitive for some companies, especially small ones, it is a burdensome practice (Kinderman, 2020; Yan, 2019).

Thus, the discussion turns around whether the legal regulation of corporate behavior effectively governs and moderates that behavior (Chiu, 2019). In fact,

a controversial topic relates to the change in CSR legal status, that is, voluntary versus mandatory nature of the concept (Gatti et al., 2019; Corrigan, 2019).

For the well-known jurist Francesco Carnelutti, law is not the same as justice: there is a relationship of means to an end between them; law is the means, justice is the end. People find peace (beyond treaties) when there is order within themselves and around them. Justice is conformity with the order of the universe (Mejía & Turizo, 2020).

As Vieira (2010) explained, while the law is hard because it is law (*Dura Lex - Sed Lex*: the first main principle of Roman Law), it is also true that applying objective law literally does not always necessarily lead to justice, as warned by its second fundamental principle: much law, much injustice (*Summum ius, summa iniuria*). This grants effectiveness and recognition to subjective and natural rights.

Similarly, Vieira (2010), the voluntary nature of CSR places the discipline within the subjective or natural realm, in the same intrinsic dynamic of businesses to maximize profits in a fair, equitable, moral, and sustainable environment. When the law comes into play, while it destroys the "naturalness" of its environment features, it is also true that it can "guarantee" them. There lies the dichotomy.

The well-known Francesco Carnelutti (Mejía & Turizo, 2020) claimed that although the law is fair for a wide majority of cases grouped in one category, legal academics have observed that the law ultimately produces unfair results in both situations. For Jackson et al. (2020) if the regulation related to disclosure of non-financial reporting leads to more policies and implementation efforts, it does not necessarily mean that outcomes improved.

There is still skepticism and caution among academics regarding the effectiveness of this regulation (Caputo et al., 2019; Lin, 2020; Tang & Demeritt, 2018). Literature states inconclusive positions on whether companies should be required to report, take actions, and or invest in CSR (41% of papers), maintain such behaviors voluntarily (45%), or adopt a neutral position (15%).

According to Knudsen (2018), legal context varies between countries, as socially responsible behavior may be voluntary in one place but not in another. Some opinions hold that proposals to legislate CSR should depend on existing legal rules in values and corporate law (Huang & Yue, 2017).

Literature lacks detailed empirical data to identify relationships between institutional issues (mandatory, normative, and specific) and non-financial reporting in developing countries (Dagilienė & Nedzinskienė, 2018). CSR mandatory disclosure in these countries is poorly studied (Ramananda & Atahau, 2019).

It becomes evident that there is a need to review the relevant and updated literature on the main perspectives about the debate on CSR as a legal mandate, and to analyze the main arguments for considering CSR to be legally mandatory or voluntary for companies.

Methodology

This paper is based on a systematic literature review, useful for processing large volumes of papers on a specific topic and guiding future research (Al-Tabbaa et al., 2019). There are four steps in the review process: Identification of the review question, definition of the first sample, selection of the final sample, extraction and synthesis of data. These steps are combined with the PRISMA approach by Moher et al. (2015), for clarify and transparency in systematic reviews in four phases: identification, screening, eligibility, and inclusion. The methodological phases are described as follow:

(i) The Initial Review Question

Recent literature has highlighted some challenges and gaps about the relationship between CSR and its compliance mandatory or voluntary. What are the main perspectives in recent literature about the debate on CSR as a legal or voluntary mandate? What are the main arguments for or against, the main advantages and disadvantages, of considering CSR (Corporate Social Responsibility) as legally mandatory or voluntary for companies?

(ii) Definition of Initial Sample

The authors followed the PRISMA approach proposed by Moher et al. (2015) in four stages: Identification, screening, eligibility, and inclusion. The last two take place in the "selection of the final sample."

Identification: The literature has recently focused on the relationship between CSR and law, with a notable increase in academic production since 2017 based on search results. Therefore, papers from that year were selected from Scopus and Web of Science (WoS) databases which are considered relevant for systematic reviews in social fields (Pérez-Escoda, 2017).

Additionally, supplementary files were included in the sample to reinforce and clarify the theoretical background and discussion surrounding the topic, as none of the papers from the search explicitly addressed topics like legal hermeneutics and own definitions of the theoretical framework (17 papers).

Screening: the combinations of keyword search were established in WoS and Scopus databases: "corporate social responsibility," "mandatory," "obligatory," "law," and "voluntary." 273 articles were selected, and duplicate papers were excluded for a total of 262.

(iii) Selection of the Final Sample

For the selection of the final sample, the authors carried out the stages of "Eligibility" and "Inclusion," according to Moher et al. (2015). After iterative discussions among the authors, four questions were defined as criteria for inclusion/exclusion:

- Does the paper explore whether or not CSR should be required by law?
- Does the paper analyze advantages or disadvantages, pros and cons of CSR as legally mandatory and/or voluntary?
- Does the paper expose empirical evidence and/or theoretical approaches to address the discussion on whether CSR should be legally mandatory and/or voluntary?

The authors independently analyzed titles, abstracts, and, in special cases, the full text of several papers, and applied inclusion and exclusion criteria. Out of 262 papers, 114 were excluded for not meeting inclusion and exclusion criteria. 66 did not respond to inclusion questions, as they addressed CSR in different contexts (*e.g.*, USR, circular economy, CSR committees, CSR reporting, successful cases, industry 4.0, donations, teaching ethics, global warming, relationship with reputation, loyalty, financial and environmental performance, strategic planning, and innovation), without considering whether CSR should be mandatory or voluntary.

47 papers that analyzed disciplines other than CSR and/or their legal/mandatory nature (*e.g.*, staff training, biomaterials, construction, occupational health, communications, retirement, blood supply, agency theory, animal cruelty, gambling, pandemic, IFRS, legal ontology, biofuels, theological voluntarism) were excluded. Finally, 148 papers were selected, along with 17 additional ones to provide context and theoretical accuracy. PRISMA flow (figure 1), serves as a graphic of identification, screening, eligibility, and inclusion process for this paper.

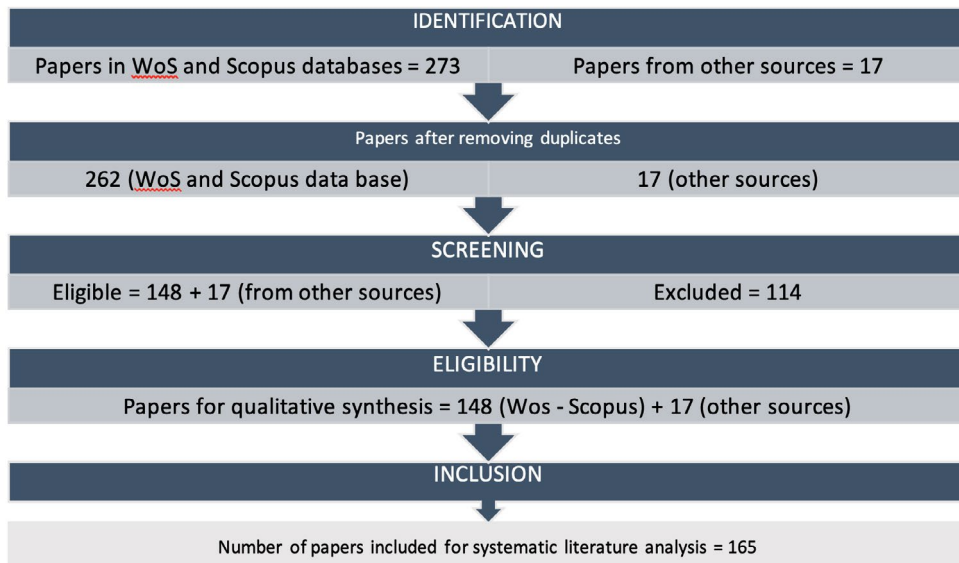


Figure 1. PRISMA Flow.

Source: Authors based on Moher et al. (2015).

(iv) Extraction and Synthesis of Information

For the extraction and synthesis of information, an analytical reading was conducted to identify relevant arguments, ideas, and/or citations to answer the established questions. This analysis aimed to answer these questions: What is the research about? What is the main goal? What are the main results? What are the main arguments for or against establishing a CSR legally mandatory and/or voluntary?

Then, the theoretical background was established. Each paper was classified into approaches from their respective content analyses. Work perspectives and their sub-perspectives were presented as follows:

The first is called "Mandatory/Voluntary Disclosure of CSR" (90 papers), with two sub-perspectives related to recommending, supporting, or agreeing that companies should prepare a mandatory CSR report (40 papers); or, on the contrary, with voluntary reporting through an argumentative analysis of advantages or disadvantages that support that position (41 papers); or, alternatively, a clearly neutral stance (9 papers).

The second is called "Mandatory or Voluntary CSR Actions and Investments" (58 papers), with two sub-perspectives related to recommending, supporting, or agreeing that companies should undertake mandatory CSR actions and/or investments (20 papers); or that such actions and/or investments should be voluntary, through an argumentative analysis of advantages or disadvantages that support this position (25 papers); or a clearly neutral stance (13 papers).

Results. Perspectives on Mandatory/Voluntary Nature of CSR

Conceptual and Legal Reference. CSR and Law

Globalization and business growth have led to a greater call for corporations to take responsibility for their environmental and social impacts and increase transparency about non-financial risks (Berger-Walliser & Scott, 2018). CSR is a way to incorporate ethical behaviors into business and can be used to increase profits and ensure corporate growth as long as it fulfills responsibilities towards employees, community, and ecological system (Cherualath, 2017). Several authors state that CSR and its mandatory reporting positively influence financial performance (Baah et al., 2021).

Although its meaning is unclear (Gatti et al., 2019), "CSR" is an evolving concept with roots in human civilization. Based on charity and human drive to share and care, CSR is currently known as 'corporate citizenship,' 'triple bottom line,' 'corporate consciousness,' and 'business sustainability' (Padhi et al., 2018). It is also related concepts like "accountability" (La Torre et al., 2020), "deontology," "charity," "philanthropy" (Padhi et al., 2018), "circular economy" (Fortunati et al., 2020), "customer loyalty" (Islam et al., 2021), "business strategy" (Jha & Aggrawal, 2019), and "university social responsibility" (Ali et al., 2021).

"CSR" concept as well as its pragmatism, has traditionally been approached with a voluntary character (Gatti et al., 2019; Yan, 2019). However, the idea has been advocated that it should be legally mandatory, whether through hard laws (Knudsen, 2018; Berger-Walliser & Scott, 2018; Kim, 2021) or soft laws (Knudsen, 2018), this approach is relatively recent (Fitriasari & Kawahara, 2018; Jain et al., 2017).

Several countries have adopted laws to promote CSR through the disclosure of non-financial reporting and encouragement of responsible behaviors.

In India, Section 135 of The Companies Act 2013 requires organizations that meet certain criteria to spend at least 2% of their average net profits from the last 3 years on CSR and report their activities annually (Bag & Omrane, 2020).

The European Union Directive 2014/95/EU aims to promote CSR by requiring the disclosure of non-financial reporting on environmental sustainability, social issues, human rights, and diversity policies (Hombach & Sellhorn, 2019).

Indonesia implemented a mandatory CSR approach in 2007, with legal regulations on environmental conservation and waste management (Fitriasari & Kawahara, 2018).

In Japan, Law No. 77 of 2004 demands companies to prepare and publish annual environmental reporting (Fitriasari & Kawahara, 2018).

In China, Review 2014 by China Securities Regulatory Commission establishes rules for information dissemination by listed companies (Huang & Yue, 2017).

In South Africa, the King III Code of 1993, promoted by the Institute of Directors, demands listed companies on Johannesburg Stock Exchange to prepare integrated reporting on finance and sustainability (Barth et al., 2017; du Toit et al., 2017).

Yan (2019) identifies three main forms of hard law approach in CSR: mandatory laws to promote responsible behavior, minimum standards for business behavior, and mandatory disclosure of CSR issues.

The stated approach in this paper aligns with the previous author regarding two main groups of approaches: CSR mandatory/voluntary disclosure, and socially responsible behaviors (actions and investments) of a mandatory/voluntary nature.

Mandatory / Voluntary Disclosure of CSR

With the modern coverage of information and communication technologies, a company that receives higher levels of media coverage finds itself in the spotlight and, therefore, experiences an incentive and need to publish reporting to highlight its strengths (Shabana et al., 2017).

CSR has become an interesting excuse for organizations to disclose their non-financial information. It helps to reduce information asymmetry (Lu et al., 2018) of greater transparency and accountability (Yan, 2019). Indeed, the legal obligation, in some cases, is associated with a greater quantity and quality of CSR reporting (Mio et al., 2020).

However, there is a price for these transparency initiatives. For example, companies that wide disclose their emissions (*e.g.*, greenhouse gases) in response to financial incentives, social pressure, and/or regulatory compulsion (Tang & Demeritt, 2018), may find that their stock value is similarly diminished (Oware

& Mallikarjunappa, 2020), despite evidence that regulation drives the reduction of such emissions (Saha et al., 2021), and that the cost of social capital increases (Gerged et al., 2021). It can be considered as a disincentive for disclosing non-financial reporting (Huang & Yue, 2017), that is why, lawmakers have relied on lack of voluntary disclosure to justify regulatory intervention (Hombach & Sellhorn, 2019).

Advantages Associated with Mandatory CSR Reporting.

Based on literature review, various advantages associated with mandatory reporting of CSR can be observed. In general, the inclusion of information about CSR in financial reporting can have effects on organizational performance (Christensen et al., 2017). The findings show an association between CSR reporting and improvements in legitimacy, control, corporate performance, and innovation.

From the perspective of social legitimacy, voluntary reporting does not include penalties for false statements or undeclared data, it can undermine the reliability of reported information (Fitriasari & Kawahara, 2018). It is known in Roman law as *lex imperfecta*, a law that does not carry a penalty in case of violation (Gatti et al., 2019).

Voluntary corporate responsibility may not be able to keep up with the intensity and level of social demands, not to mention that the incentives driving corporations often differ from social expectations (Chiu, 2017). The desire for legitimacy from stakeholders, associated with mandatory regulation, influences environmental and social responsibility and financial performance (Baah et al., 2021).

A main problem in corporate law regarding CSR reporting is whether executives should be accountable only to shareholders or also to other stakeholders. Even more, while it is expected that senior executives, in their role as agents of a corporation, should work almost exclusively for the "principals" (Huang & Yue, 2017), it is true that boards of directors are not necessarily forced to maximize shareholder value (Yan, 2019).

According to Lipton (2020), reporting only to shareholders can be beneficial for large companies with a high social impact, but operating out of public eye can have significant negative effects on employees, customers, and competitors. The lack of transparency makes it difficult to understand social and industrial overview and, therefore, to improve services for communities. A minimum regulatory intervention is necessary (Jain et al., 2017) along with an ethical commitment from companies (Berger-Walliser & Scott, 2018) and top management (Koya & Roper, 2020) to balance their interests with those of society.

Large companies face more pressure to meet social expectations than smaller ones (Shabana et al., 2017). The mandatory nature of CSR not only increases reports volume (Carini et al., 2018), it also provides stakeholders with accessible and useful information for their decisions (Hombach & Sellhorn, 2019; du Toit et al., 2017).

Even organizations that had not experienced negative events have seen the usefulness of publishing CSR reports as a defense against negative public perceptions (Shabana et al., 2017). For some authors, the mandatory reporting of CSR enhances transparency (Nair et al., 2019; Aureli et al., 2020; Hombach & Sellhorn, 2019; Caputo et al., 2021).

Business executives are noticing that failing to report their CSR has regulatory sanction implications (Shabana et al., 2017), this is why CSR reports have increased and improved in content and quality (Arraiano & Hategan, 2019). The requirement for reports allows companies to determine the structure and content of information to be disclosed (Fitriasari & Kawahara, 2018). These improvements are associated with a higher company value, increased liquidity, better investment efficiency (Barth et al., 2017), greater social capital (De Luca et al., 2020), a reduction in information asymmetries (Wang et al., 2018), and, in general, better social performance (Kinderman, 2020).

Mandatory regulation can also be seen as an effective mechanism of control. Mandatory disclosure of CSR improves the monitoring of companies in China, especially when they have had serious agency problems (Liu & Tian, 2021) and contributes to enhancing internal control. Jackson et al. (2020) conducted an analysis of OECD member nations and found a relation of non-financial reporting associated with strict minimum criteria. Likewise, it is related to better quality in sustainability (Dilling & Harris, 2018) and financial reporting (Wang et al., 2018; Ahenkan et al., 2018).

Regulation can also be seen as a driver of better corporate performance and innovation. This is expressed by several authors like Nair and Bhattacharyya (2019), who argue that mandatory reporting constitutes a factor of competitive advantage (in the case of Indian companies), and, in some cases, it leads to better organizational performance (Kundu, 2017).

Some papers included in this review argue that mandatory disclosure of CSR reporting is associated with improvements in economic, financial, business sustainability, and market indicators, a better risk rating (Garg et al., 2021); greater social capital (De Luca et al., 2020); improved return and investment efficiency (Liu & Tian, 2021); a realignment of capital markets with sustainability principles (Esty & Karpilow, 2019); enhancement of stock liquidity and price efficiency (Ji et al., 2019); increased organizational value in the market (Xu et al., 2020); lower corporate bond costs (Gong et al., 2018); improvement of corporate sustainability

(Brzeska & Jędrzejewski, 2021); greater environmental responsibility (Liu et al., 2021); enhancement of institutional image (Shabana et al., 2017); increased transparency and promotion of stakeholder participation (Aureli et al., 2020); and a greater trust (Mio et al., 2020) and value for shareholders (Juniarti, 2021).

Disadvantages associated with mandatory CSR reporting.

Several papers included in this review describe some factors that have negatively influenced in CSR reporting practice in public and private companies. Some of them are the lack of collaboration or even counterproductive nature of non-financial information and financial performance —stakeholder or market— (Phan et al., 2020), and the lack of awareness regarding accountability and absence of regulatory disciplinary frameworks (Andrades et al., 2019); or simply the lack of corporate maturity to take on the responsibility of comprehensively reporting their CSR (du Toit et al., 2017).

For some authors, the disadvantages of mandatory reporting include a decrease in investment efficiency and organizational performance. Contrary to what was mentioned before mandatory CSR disclosure may be associated with negative outcomes in organizational performance like poorer financial performance (Oware et al., 2021). Chen et al. (2018), Fahad & Busru (2021) and Lu et al. (2021) argue that companies with mandatory CSR reporting often experience a decline in profitability for disclosure of low environmental and social scores that create negative externalities for shareholders. The agreement of interests of shareholders with both parties is complicated (Huang & Yue, 2017).

It is also argued that mandatory reporting significantly reduces payments (Ni & Zhang, 2019) and, in certain cases, it is associated with an increased risk of stock price loss (Huang & Yue, 2017; Manchiraju & Rajgopal, 2017). Harper (2018) states that the current disclosure of corporate sustainability is inadequate for investment analysis. There is a trend towards greenwashing (Tang & Demeritt, 2018), a decrease in information about environmental performance (Sharma & Verma, 2021), and an inefficiency in reducing human rights abuses (Chilton & Sarfaty, 2016).

In contrast, voluntariness can stimulate CSR reporting and is associated with better organizational performance. Several researches show that voluntariness is related to positive perceptions of stakeholders in organizational legitimacy (Fallan & Fallan, 2019), corporate citizenship (Corrigan, 2019), credibility of sustainability documents (Loza, 2020), reduction of information asymmetries (Cortesi & Vena, 2019), brand loyalty (Muniz et al., 2019), value for shareholders

(Manchiraju & Rajgopal, 2017), better environmental indices (Barbosa et al., 2021), and quality of non-financial reporting (Zhang & Chen, 2019).

Mandatory/Voluntary Shares and Investments in CSR

Some governments have started to implement laws to ensure the mandatory disclosure of CSR to adopt responsible practices on their own or under pressure of their stakeholders (Chilton & Sarfaty, 2016), and to improve the efficiency of their CSR investments. According to Makosa et al. (2020) legal pressure acts more as a stimulating inertia than as a strictly positive or negative effect.

Companies in countries with mandatory CSR disclosure engage in more CSR activities (Jackson et al., 2020) and demonstrate a greater commitment to Sustainable Development Goals (Mishra, 2021). They also promote commitment of senior management and boards of directors (Subramaniam et al., 2017). CSR mandatory report not only encourages organizations to engage in socially responsible behaviors, but it also strengthens the arguments for world leaders to take on environmental responsibilities (Mishra, 2021). Some laws, such as in India, explicitly regulate investment and CSR shares. For example, Smriti and Das (2021) find that the mandatory presence of women in corporate governance positions is positively associated with company profitability.

Several authors demonstrate positive impacts of mandatory spending on CSR on financial performance (Oware & Mallikarjunappa, 2020; Bag & Omrane, 2020), asset performance and cash flow (Bhattacharyya & Rahman, 2019), company value (Sharma & Verma, 2021), cash levels (Jadiyappa et al., 2021), and R&D intensity through environmentally sustainable practices (Banerjee & Gupta, 2019).

However, while for approximately half of reviewed authors both legal disclosure and socially responsible activities offer economic, social, and environmental benefits, the other half believes that these advantages are primarily due to the voluntary nature of CSR.

This could respond to a lower managerial commitment when forced to implement CSR practices (Guo & Shen, 2019), especially if top management has a significant equity stake (Ahenkan et al., 2018). Cosma et al. (2021) state that stakeholder participation in CSR depends more on the characteristics of board directors than on mandatory CSR.

Mandatory regulation does not prevent socially irresponsible behaviors (Jackson et al., 2020) nor does it guarantee a positive change in organizational culture (Koya & Roper, 2020). For example, mandatory transparency can lead executives to act according to preferences of their key stakeholders (Hombach

& Sellhorn, 2019). Changing laws and policies does not necessarily eliminate harmful behaviors for society or businesses (Koya & Roper, 2020).

An ethical manager makes decisions based on moral rules to do what is right even if it is not the most profitable, such as refusing to lie to a customer, even if it means losing a sale (Mapletoft, 2021).

Government regulation often imposes stricter minimum standards, but it can be rigid due to its "one-size-fits-all" approach (Jackson et al., 2020). This approach can cause problems by treating all companies the same way, it ignores their specific characteristics (Jain et al., 2017). For example, an environment of mandatory CSR in bureaucratic public companies can threaten outsourced CSR projects (Subramaniam et al., 2019).

At a global level, EU legislation has shown a complex and fragmented evolution with adverse effects like low efficiency in CSR (MacGregor & MacGregor, 2020), limited corporate governance (Chiu, 2019), and a decrease in investment in CSR (Makosa et al., 2020). Furthermore, the identification of long-term effects and evaluation of effectiveness of social investments is complicated (Zaytsev, 2019).

Critical literature highlights the inefficiency of investment in CSR under legal mandate. In India, CSR mandatory investment under Section 135 of the Indian Companies Act 2013 has shown negative results. The legislation has disappointed some authors (Mukherjee et al., 2018), it showed a negative impact on profitability (Bhattacharyya & Rahman, 2020) and limited environmental performance (Prasad et al., 2019). Furthermore, spending on CSR has not been linked to financial inclusion (Bhattacharyya et al., 2021), and a reduction in overall CSR spending has been observed (Mukherjee et al., 2018), and funding for low-impact actions (Jain et al., 2021).

It can be stated that CSR mandatory is not "the" determinant of social investment. For some authors, investment depends more on specific characteristics of the company like size, economic sector, balance level, and cash flow from operations (Bhattacharyya & Rahman, 2019) or the maturity of its life cycle (Trihermanto & Nainggolan, 2018).

Discussion

The results show differences in literature regarding advantages and disadvantages of mandatory reporting. Some authors advocate for business profitability associated with mandatory reporting while others claim the opposite. Furthermore,

although several papers link mandatory CSR reporting with the increase in value for shareholders, some authors like Cordazzo et al. (2020) argue that non-financial reporting do not contribute to this increase. Therefore, it is crucial to research into these differences to better understand the reasons and information that support different positions in specific contexts.

Research has methodological limitations. First, research was based on two databases, WoS and Scopus, although they are relevant, they do not cover all scientific journals or legal hermeneutics. Secondly, conference papers, reviews, or working papers that could have provided additional information were excluded. Finally, although systematic analysis aims to be objective, the interpretation of results can have subjective biases. To mitigate these biases, the research included discussions among three authors with prior information about the papers.

To promote complementary research, it is crucial to evaluate the concrete impacts of public CSR policies on state regulatory power that demands more empirical research, including transnational comparative studies (Krichewsky, 2017).

In several legal systems, CSR is already implicitly regulated by environmental, economic, and social laws, often without being called a "CSR law." The evaluation of social, economic, and environmental effects of these laws is still an ongoing progress, as legislation on social responsibility is relatively recent.

There is few detailed empirical research on relationships between institutional factors and non-financial reporting in developing countries (Dagilienė & Nedzinskienė, 2018). The disclosure of CSR in these countries is poorly studied (Ramananda & Atahau, 2019). Future research should expand and deepen empirical evidence on transparency in corporate disclosure regulation (Hombach & Sellhorn, 2019).

Finally, the relationship between CSR and legal mandate often focuses only on corporate effects, not on possible effects on the legislator. Studies are needed to explore whether public policies on CSR reinforce state regulatory power or weaken state intervention by institutionalizing private forms of governance (Krichewsky, 2017).

Conclusions

CSR focuses on ensuring that companies are responsible for their activities, they combine their interests with those of their stakeholders and their environmental impact. Companies with CSR initiatives can gain a competitive advantage by

improving their public image and generating higher profits and return on investment (Barauskaite & Streimikiene, 2021).

The stakeholder theory holds that CSR improves the perception of stakeholders (Masoud & Vij, 2021). Mandatory CSR reporting reduces bridge gaps in stakeholder expectations, increases recognition and respect for the organization (Shabana et al., 2017), which has positive effects on corporate performance (Christensen et al., 2017). These include improvements in legitimacy, control, corporate performance, and innovation.

However, the literature also points out disadvantages of legal obligation and advocates for keeping CSR as a voluntary practice. Despite the trend to legislate on CSR and view it as a tax (Koya & Roper, 2020), academic skepticism about the effectiveness of this regulation persists (Caputo et al., 2019; Lin, 2020; Tang & Demeritt, 2018).

Before legislating, it is essential to understand the needs and expectations of the main stakeholders (Subramaniam et al., 2017). Lipton (2020) suggests that, instead of laws on mandatory CSR reporting, a transparency system should be developed according to stakeholders needs and ensuring information usefulness for investors and the public and promoting dialogue.

Fahad and Busru (2021) recommend that business executives seriously consider and invest in CSR after researching needs, rather than doing so merely to meet minimum requirements. Companies must fulfill their legal responsibilities and integrate social and environmental practices into their operations (Yan, 2019).

An ethics code, managerial commitment, and supply chain principles are negatively associated with unethical behaviors (Yun et al., 2019). Committed companies to do the right thing will comply with the law and engage in voluntary activities without additional regulation, thereby, it reduces the law's impact on their behavior (Yan, 2019).

Literature suggests that a combination of hard and soft laws may be more effective in CSR, it enhances stakeholder trust (Subramaniam et al., 2019). Japan is an example how a country can be strict in sustainability disclosure to the government while maintaining voluntary public reporting (Fitriasari & Kawahara, 2018).

It is crucial to consider corporate particularities like location and type of production when introducing CSR mandates. Koya and Roper (2020) argue that aligning mandatory campaigns with corporate values makes them more meaningful.

The main discussion is that good performance in CSR does not always arise from regulation (Kinderman, 2020). Without values and moral responsibility, the law, whether hard or soft is unnecessary. CSR should be a moral obligation, not

a legal imposition (Cherualath, 2017). Moral considerations should motivate prosocial corporate actions (Kim, 2021).

In conclusion, legislating CSR is complicated and may diminish corporate "pride" in their responsible activities (Huang & Yue, 2017; Koya & Roper, 2020). Recent legislation is challenging and undermining the understanding and concept of CSR- Corporate Social Responsibility (Lin, 2020; Berger-Wallisler & Scott, 2018).

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Methodology for the Sector Diagnosis Applied to Metal-mechanical Enterprises of Risaralda*

[English version]

Metodología para el diagnóstico sectorial aplicada a las empresas metalmecánicas de Risaralda

Metodologia para o diagnóstico setorial aplicada às empresas metalmecânicas de Risaralda

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Abstract

Objective: To formulate and apply a sector analysis methodology to generate regional and local growth and development strategies in different economic sectors.

Methodology: A review of methodologies of sector diagnosis and identification of select opacities in obtaining and validating findings in reports. A seven-stage methodology articulates activities from the construction of data collection instruments, their administration and analysis to the treatment of findings from sector analysis and their diagnosis.

Results: The methodology was validated through a case study at metal-mechanical SMEs in Risaralda, Colombia. Their conditions of the economic and market context were analyzed to characterize business conglomerates.

Conclusions: Elements for business competitive advantages and established peculiarities that weaken their competitive and productivity strategies were identified. A sector diagnosis that considers specific peculiarities for clustering was conducted that allows the recognition of leadership traits from business competitiveness and can be replicated within or outside a single economic sector. Finally, the need for regional spaces such as observatories, laboratories, and discussion tables for sector study and proposals for government entities to establish and strengthen university-business-state-society partnerships is highlighted.

Key words: sector analysis; sector diagnosis; diagnostic methodology; productive sectors; economic sectors (obtained from the ISOC thesaurus of Economics).

Resumen

Objetivo: plantear y aplicar una metodología de análisis sectorial para generar estrategias regionales/locales de crecimiento y desarrollo en distintos sectores económicos. **Metodología:** se realiza una revisión de metodologías sobre

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diagnósticos sectoriales e identificación de algunas opacidades en obtención y validación de hallazgos en informes. A partir ello se propone una metodología de siete etapas que articula actividades desde la construcción de instrumentos de acopio de datos, su administración y análisis, hasta tratamiento de hallazgos que derivan del análisis sectorial y su diagnóstico. **Resultados:** se validó la metodología propuesta a través de estudio de caso en PYMES metalmecánicas de Risaralda, Colombia, con la cual se analizaron las condiciones del contexto económico y de mercado en el que se desenvuelven para, así, caracterizar conglomerados empresariales. **Conclusiones:** Se identificaron elementos que constituyen ventajas competitivas empresariales y se establecieron particularidades que debilitan sus estrategias de competencia y productividad. Gracias a ello, se hace un diagnóstico sectorial que considera particularidades específicas para la clusterización, que permite el reconocimiento de rasgos de liderazgo que elevan la competitividad empresarial y puede ser replicado dentro o fuera de un mismo sector económico. Finalmente, se evidencia la necesidad de espacios regionales como observatorios, laboratorios y mesas de discusión para estudio sectorial y elaboración de propuestas para entes gubernamentales que establezcan y fortalezcan alianzas Universidad-Empresa-Estado-Sociedad.

Palabras clave: análisis sectorial; diagnóstico sectorial; metodología diagnóstica; sectores productivos; sectores económicos (obtenidos del tesoro ISOC de Economía).

Resumo

Objective: propor e aplicar uma metodologia de análise setorial para gerar estratégias regionais/locais de crescimento e desenvolvimento em diferentes setores econômicos. **Metodologia:** realiza-se uma revisão de metodologias sobre diagnósticos setoriais e identificação de algumas lacunas na obtenção e validação de achados em relatórios. A partir disso, propõe-se uma metodologia de sete etapas que articula atividades desde a construção de instrumentos de coleta de dados, sua administração e análise, até o tratamento dos achados derivados da análise setorial e seu diagnóstico. **Resultados:** a metodologia proposta foi validada por meio de um estudo de caso em PMEs metalmecánicas de Risaralda, Colômbia, com o qual se analisaram as condições do contexto econômico e de mercado em que atuam, a fim de caracterizar conglomerados empresariais. **Conclusões:** foram

identificados elementos que constituem vantagens competitivas empresariais e estabelecidas particularidades que enfraquecem suas estratégias de concorrência e produtividade. Graças a isso, realiza-se um diagnóstico setorial que considera particularidades específicas para a clusterização, permitindo o reconhecimento de traços de liderança que elevam a competitividade empresarial e que pode ser replicado dentro ou fora de um mesmo setor econômico. Finalmente, evidencia-se a necessidade de espaços regionais como observatórios, laboratórios e mesas de discussão para estudo setorial e elaboração de propostas para entidades governamentais que estabeleçam e fortaleçam alianças Universidade-Empresa-Estado-Sociedade.

Palavras-chave: análise setorial; diagnóstico setorial; metodologia de diagnóstico; setores produtivos; setores econômicos (obtidas do tesouro ISOC de Economia).

Introduction

The exploitation and enhancement of advantages of economic activities, as well as the recognition and intervention of their disadvantages, enable the formulation of strategies for regional and national development. This requires a grouping and analysis of productive activities to a categorization of sectors, based on an understanding of the economic phenomenon that characterizes them and the intrinsic potentialities in the region or country of interest to be studied. In this regard, establishing methodologies for the diagnosis of economic sectors is necessary.

While there is research that demands sector analysis, the literature aimed at documenting and systematizing the methodology or proposing a scientific-based design is insufficient. Most of the reports focus on diagnosis results, with a raw description of the methodology to obtain such findings. It creates difficulties for validating results of sector research or bias in them. This is reflected in the specificity of several existing sector diagnostics which without a standardized methodology, hinder progress in the generation of regional and local growth and development strategies to favor a large number of sectors and activities.

The importance of documenting and systematizing the methodologies to make diagnoses is clear. It becomes interesting to academics, sector leaders, and national communities. This paper arises as part of the experience from the doctoral thesis “Quality as Strategic Conduct in the metal-mechanical SMEs of Risaralda, Colombia.”

A sector analysis methodology is proposed based on knowledge management. It is a seven-stage work path that allows a diagnosis based on strengths and weaknesses of a sector within the economic and market context. It was validated through a case study of metal-mechanical SMEs in Risaralda, Colombia.

This article argues the usefulness of sector diagnosis for development plans, programs, and business organizations within an environment of complexity and current turbulence. It also describes the expansion waves of this research in recent decades, reviews methodological approaches for sector analysis from literature review, and concludes with an analytical structure on the conceptual theoretical foundation of metal-mechanics in Risaralda.

The methodological proposal includes both the type and method that encompasses the sector analysis, as well as a path to be followed presented in detail below. The case study that diagnosed the state of metal-mechanical SMEs in Risaralda, Colombia, conclusions and recommendations for future sector analyses are also presented.

Sector Analysis in Planning

The analysis of economic phenomena demands grouping economic activities according to their common characteristics. This has led economic science to resort to sector categorization, as a tool to collection, analysis and monitoring of productive activity of a country or region. An “economic sector” is a grouping of productive activities that share common characteristics and differ from other groups. According to classical economics, there are three economic sectors: primary, secondary, and tertiary. However, new technologies and new forms of economic activity have led to new productive sectors, such as quaternary and quinary. Although there is no full consensus, the latter are seen as extensions of tertiary sector “technologies” (Aced-Toledano & Miquel, 2020).

The complexity of the economic phenomenon has required deepening this classification. Differentiating even more for economic activities is common, depending on their specialization. The International Standard Industrial Classification (ISIC) of all economic activities is accepted as international reference for grouping productive activities. Other United Nations agencies established classifications for occupation, employment, expenditure, education, tourism, and environmental statistics, using ISIC conceptual and methodological components, including the Classification of the Functions of Government (COFOG), International Standard Classification of Education (ISCED), International Standard Classification of Occupations (ISCO), and Tourism Satellite Account (TSA) (National Administrative Department of Statistics [DANE], 2020).

Each country or region chooses a sector of activity based on its economy, potential in science and technology, and understanding of development as a social phenomenon. This involves defining and implementing plans and programs for their growth and development which creates conditions to harness and enhance competitive advantages to compete in markets with high demands and constant changes.

The importance of sector diagnostics for managers of developing plans and programs is highlighted, as they provide data and analysis for designing policies and strategies at macroeconomic and sector levels, and considering both intra and intersectoral aspects is important (Lopez et al., 2021).

Understanding the sector in which it operates is essential for a business organization. Although until the first half of the 20th century, enterprises were conceived as closed systems, as of the General Theory of Systems¹ they

¹ Proposed by the Austrian physiologist Karl Ludwin von Bertalanffy in 1969, it argues that systems in their diversity (family, animal, social, business) are integrated by elements in constant interaction and within a framework of rules, myths, and history.

are open systems. The enterprise and its various components interact with macroeconomic areas, competitors, distributors, suppliers, and customers. There are two levels of classification of the environment. The general classification refers to the socio-economic area in which the enterprise carries out its activity. Another specific classification frames the set of factors outside the organization that directly influences part of the economic sector. Therefore, a detailed understanding of the specific sector is crucial to competitive strategy development and business goals achievement.

The sector analysis allows enterprises to gather data related to the competitive environment, competitors' status and leadership, customers purchasing power, and suppliers market power, rules and laws of interest of their specific economic environment, among other main issues for decision-making in business management. This analysis makes determining the dynamics and degree of competition in the sector possible, visualizing trends, opportunities and constraints in a framework of competitiveness and growth, and preventing threats. In this way, the analysis is an instrument that guides the development of more proactive strategies in the exploitation and enhancement of opportunities and addressing threats (Berg, 2006).

The understanding of productive sectors in an environment of complexity and turbulence serves in understanding where they want to go, and where they need to evolve and transform (Garza & Solares, 2018). From this identification, sector research increased interest in strategic management and economic development disciplines, so that economics and management, marketing, and other related areas include research lines of sector analysis. Three waves of expansion have been observed in recent decades: one from 1960 to 1980, another between 1985 and 2000, and the last started in 2001 (Alarcón, 2020).

The first wave was driven by theoretical and conceptual foundations of "Structure-Conduct-Performance" model Theory of Industrial Organization. In this approach, the enterprise's competitive advantage has spatially linked its position within the industry, as well as in analytical tools such as the Boston Consulting Group's matrix published in 1973 (UNIR Revista, 2021), which remains a widely used tool in corporate planning.

In the second wave, Porter's competitive strategy emerged. It dominated sector studies and focused on the idea that industry governs individual enterprises' competitive strategies (Porter, 2015). The economic perspective of sector studies began to be replaced by the administrative perspective.

The third wave of sector studies emerges in the new millennium and is characterized by the definition of new technology- or knowledge-based sectors, the importance of sector studies for strategic management, postgraduate research in case studies, and the growth of statistical data sources with big data and

statistical and multivariate analysis techniques. These factors have driven sector research of a computational type and with dynamic models like the dominant ones today (Alarcón, 2020).

However, in parallel with this traditional economic-rational approach, the perspective of cognitive school as an alternative of sector analysis has been developed (Sáez & González, 1999). This part of the concept of “cognitive groups,” is understood as mental groups of enterprises guided by managers when analyzing competition in their activity sector and facing strategic problems. The question lay in that the environmental perceptions, rather than their characteristics identified objectively and as the product of a rational economic analysis, are aspects that must be considered in the process of formulating a strategic plan (Weick, cited by Sáez & González, 1999).

Understanding the mental processes of managers and decision-makers is essential. It is a task undertaken by the cognitive school with Herbert Simon as its precursor. It focuses on four aspects of strategy: perception, how they gather data; conceptualization, how the strategy is formulated; reconception, how it changes or why it does not; and strategic style, how strategists differ in their cognoscitive orientations (Simon, 1982).

Clearly, there are several theoretical tools to be incorporated in the design of sector analysis methodology. For this research, considering the tools that are applied in sector studies aimed at improving decision-making and business success is important. Those tools are: knowledge management and organizational learning, Porter's Five Forces model, strategic planning, and the mental processes analysis of business managers to identify the strategic groups in the economic sectors (Beltrán et al., 2015; López et al. 2021).

According to the above discussion, business success depends on the ability of organizations to adapt to changes in a competitive environment which includes technology, globalization, economic uncertainty, cultural, and social changes. Therefore, sector analysis is useful in identifying and understanding these transformations and adapting to them proactively. Betancourt (2014) argues that companies must recognize that they compete in a variable and dynamic environment and that they must consider the sector characteristics to structure an effective competitive strategy. Hence, the importance of identifying theoretical tools that need to be incorporated in the design of a sector analysis methodology.

Methodologies for Sector Analysis

Once the importance of research on economic phenomena is understood, some approaches to sectoral analysis methodologies can be outlined. Beltrán and Casasbuenas (2015) propose the design of a new sector diagnosis methodology in Colombia. It starts by recognizing the economic sectors in the country: primary, secondary, tertiary, quaternary, and quinary. After that, 10 variables are taken into account for the design development. General aspects, value chain, competition, macroeconomic factors, human capital, business, research, development, innovation, environment, normativity and problems, opportunities and prospects. Each one derives from other levels.

López et al. (2023) review literature to compile different sectoral diagnosis methodology. The conclusion is that the methodology proposed by ARCOSES² (López et al., 2021) has certain advantages over shortcomings identified in the literature and shows insufficient information to apply this methodology in Colombia.

As a complementary and aligned approach to this research, other methodological approaches for sector analysis that include quality as a new reference should be considered. The quality-centered sector diagnosis in Colombia is a matter of great importance for the country's economic and social development. While there is progress in the implementation of standards and in continuous improvement of enterprise quality, there are still challenges and opportunities for improvement in all sectors. Technology, sustainability, and corporate social responsibility are key trends in this sector diagnosis.

There are various quality-centered sector diagnosis methodologies in which quality standards focus on identifying the most important standards for the sector and analyzing how to implement and comply with them. This includes assessments and audits to verify if interest standards are being met.

Other methodologies such as process evaluation focuses on analyzing productive transformations of the sector and improving quality, identifying their critical points, implementing quality protocols, performing tests and quality controls, among others. Some of these are: Customer analysis to ascertain in detail the needs and requirements of sector customers to improve quality of products or services by doing surveys, interviews and other market research methods. Also included is continuous improvement based on the Plan, Do, Verify, Act (PDVA) cycle. Opportunities for processes and products improvement are

2 Research group of Universidad Distrital Francisco José de Caldas, Bogotá, Colombia.

identified, actions are implemented, results are measured and standardized, in a continuous cycle process.

The quality-based diagnostic methodologies can be applied together or separately, depending on the sector specific needs and the scope of the diagnosis. Any of them must be focused on satisfying the customer and meeting their expectations to improve the competitiveness and offer better services or products to consumers.

Analytical Structure for the Case Study

Productivity and competitiveness gaps of SMEs in the department of Risaralda, Colombia, compared to other large global companies, have prevented their positioning within the interest markets, mainly, in those whose quality standards exceed their current strategic capabilities.

To close these gaps, this research achieved the establishment of an analytical structure based on the Deming Chain Reaction (DCR) model, Strategic Conduct (SC) of Structure-Conduct-Performance (SCP) paradigm of the Theory of Industrial Organization (TIO) and the understanding of Quality as Strategic Conduct, as the theoretical-conceptual support for the relationship between quality and competitiveness.

From this perspective, Deming (1989) argues that there is a relationship in which quality favors increasing enterprise's productivity levels and, thereby, its competitiveness. It was understood as a chain reaction that begins with the follow-up philosophical procedures of quality discipline, as good practices to control the variability of processes and standards achievement that markets demand. Castaño and Gutiérrez (2011), Chase and Aquilano (1994), De Meyer and Wittenberg-Cox (1994), Evans and Lindsay (2008), Gutierrez (2010), Gutiérrez (2014), Heizer and Render (2009) and Medina (2007), Gutiérrez (2009), Rincón (2001) and Tamayo et al., (2015) point out a relationship between both customer requirements, their satisfaction, and financial performance with DCR.

Therefore, studying both the markets and companies' interaction makes sense, as well as government intervention forming on their structure and functioning that, according to Coloma (2005), Raible (2013) and Tirole (1988), has historically been addressed by TIO, which uses the ECD paradigm for the particular behavior analysis of these markets (Coloma, 2005). SC are conceived as ways of acting that allow companies to improve their competitive position or restrict competition decisions (Ramírez & Unger, 1997; Taddei & Robles, 2002).

In addition, different studies endorse the relationship between quality and SC (Brah et al., 2002; Camisón & Boronat, 2004; Contreras et al., 2018; Elhuni & Ahmad, 2014; Hernández et al., 2018; Hoyos, 2019; Huerta et al., 2016; Khan, 2010; Lee & Phuyal, 2013; Noronha, 1999; O'Neill & Al, 2016; Santos & Álvarez, 2006; Talib & Al, 2010; Urmann, 2013, Wayhan et al, 2010; York & Miree, 2004). Those and the rest of the analytical structure that underpinned this research, allowed establishing an understanding of the concept of “quality” as Strategic Conduct, seen as “the management based on quality, which the enterprise directs as a mechanism to improving its position in the markets and/or limit competition” (López, 2022, p. 45).

Thus, and according to these authors, quality as one of the factors evaluated by the customer at purchase time can be considered an intangible resource of the enterprise’s worth in improving its competitiveness. It affects both its costs (market structure) and efficient use of its resources and capabilities (performance), TIO proposes.

Methodology

A sector analysis begins with scientific knowledge that is achieved only to the extent that a rigorous process is maintained. Therefore, the type and method are of particular relevance, because the tools, instruments, and protocols to be used are established, and the analytical perspective under which it will proceed and the depth to be reached in gathering data, conducting an analysis and reaching a conclusion.

The type of study refers to the depth of scientific knowledge intended in the sector analysis, as exploratory, descriptive, relational, explanatory, predictive, or applied (Méndez, 2009). It will indicate the data to be gathered and the analysis level to be carried out. The method refers to the procedure to be followed during the sector study. Méndez (2009) proposes as “observation, inductive, deductive, analysis, and synthesis” (pp. 238-242).

Once the type and method are determined for the sector analysis, this methodological proposal establishes the steps to be followed through techniques and instruments to the treatment of findings. Each one proposes activities, sub-activities and their breakdown, as shown in Table 1.

Table 1. Methodology for Sector Analysis.

Stage	Activity	Sub-activity	Breakdown
1. Techniques and Instruments	Data Gathering Technique	Semi-structured Interview	
		Research Constructs	1) Construct 1 2) Construct 2 3) Construct n.
	Data Gathering Instrument	Variables	1) Variable 1 2) Variable 2 3) Variable n.
		Guiding Questions	
2. Population and Sample / Unit of Analysis and Observation	Population Universe	Population Universe Definition	
	Population Framework	Population Framework Definition	Subdivisions within the Population Framework
	Samples	Sample Type	Sample Technique
3. Sources	Secondary Sources	References of Theoretical - Conceptual Framework	Theoretical Framework-Specific References
	Primary Sources	Actors/Sample Expert	Filters to Clean Actors Database/Sample Experts Filter 1 - Criterion Definition 1 Filter 2 - Criterion Definition 2 Filter 3 - Criterion Definition 3 Filter n - Definition Criterion.

Stage	Activity	Sub-activity	Breakdown
4. Fieldwork	Conduct Interviews	Recording in Audio and Video	
		Transcription of Interviews	
5. Data Treatment	Operationalization of Variables	Definition of Indicators by Variable	
		Grouping of Indicators by Hierarchical Levels	
	Coding	Code Assignment and Memo Descriptor by Indicator	
	Tabulation	Response Frequency Setting	
6. Data Analysis		Code Response Association	
		Obtaining Non-numerical Data	
	Qualitative Evaluation	Qualitative Analytical Model	Relationships between Research Variable and Response Frequencies
	Numerical Data Extraction		
	Quantitative Evaluation	Quantitative Analytical Model	Data Visualization Grouping of Data
7. Finding Treatment	Results Interpretation		
	Presentation of Results		

In stage one, techniques and instruments to gather information are determined; after processing, the information will become data for the subsequent sector analysis. This methodology proposes semi-structured interviews because they respond to the requirements of obtaining primary information from the managers of the enterprise to be studied, foster that the subject freely express the quantity and depth of information provided, and allows relative flexibility in its format and question order (Bernal, 2010). Vela (2008) ensures that the interviewer guides the discussion on the items to obtain data that will feed the

collection instrument designed for this purpose. The question formulations will guide fieldwork based both on theoretical-conceptual constructs that underpin the research with a view toward solving sector problems, and focused on research variables that represent the sector characteristics or dynamics that are intended to be observed.

The second stage sets out the elements from data required for the sector analysis. If possible, the population and sample are determined for probabilistic studies, in which, the population universe contains the total of possible elements of research interest; such as people, objects, and measurements, among others. The population frame is established from a list, enumeration, or inventory that contains all the elements of population interest, and the sample is taken from the population for the required measurements performance (Anderson et al., 2008; Gutiérrez & De la Vara, 2008; Pérez, 2005; Scheaffer et al., 1987). Otherwise, a unit of analysis and observation should be determined for non-probability studies, the minimum division of population, or interest population (Pérez, 2005).

The third stage consists of documents and facts with the information of the sector starting from secondary sources such as books, periodicals, and/or texts prepared by third parties out of the study sector, and primary resources, such as those collected, directly, orally, or written. Reviewing relevant bibliographic references and direct consultation with enterprise managers as the actors and/or experts within the sector becomes important.

In stage four, semi-structured interview is conducted. The methodology establishes the need to record via audio and/or audiovisual tools and transcribe and then analyze the discourse.

In stage five, the data collected in the fieldwork is processed and then converted into data that enables analysis according to the objective. This demands the coding, categorization, and tabulation of data through appropriate statistical techniques and presentation of information from the data using tools such as tables, diagrams, graphs, etc. The methodology warns of the importance of ensuring that the system used responds to an analysis of both qualitative and quantitative content to control inferences throughout the sector study and be reproducible and valid within the context of the sector.

This implies operationalizing the variables to determine how the construction of the study will be observed and measured according to the objectives. This may require indicators by variable, hierarchical groupings, and codes and their descriptions to data tabulation to facilitate the interpretation and analysis of results.

In stage six, data is interpreted through a deductive-inductive exercise that argues its usefulness within the interested framework of sector study. This may involve comparison, association, correlation and/or validation of the results against the constructs and objectives to obtain knowledge of the sector dynamics studied. This methodology proposes that to be conducted it be associated with the response frequencies obtained during the interview with the codes established in the operationalization of variables; the next step is a first evaluation of the non-numerical data found through a quantitative analysis model, and subsequently that the numerical data from the quantitative analysis be evaluated which permits the visualization and clustering of the data.

Stage seven presents the development of activities in response to the objectives that enable the interpretation and presentation of results.

Results

Diagnosis of Enterprises in the Metal-mechanical Sector in Risaralda

For the case study of the metal-mechanical sector of Risaralda, Colombia, the seven stages for sector analysis methodology were executed, one by one. The semi-structured interview for data collection for stage 1 was chosen; SMEs registered with Chambers of Commerce under ICO codes 24, 25, 28, 29 and 30 for stage 2; managers and/or managers of enterprises as primary sources for stage 3. In stage 4, the interview was conducted and recorded in audio and video. As part of stage 5, a system was created to encode and categorize information from interviews according to established research variables. In stage 6, qualitative and quantitative analysis models were applied to highlight data clusters. Finally, in stage 7, conclusions were drawn and recommendations given.

Characterizing them in relation to their quality stages and as business conglomerates and analyzing the relationship between quality and SC as shown below was possible.

Characterization of Enterprises in Relation to Their Quality Stages

In the quality stage enterprises implement elements to increase product, service and/or process quality. In the case study, Inspection, Control, Assurance and Quality Management stages were established.

It was concluded that most of the enterprises implement elements from the Inspection stage, followed by the Control and Assurance stages, while there was no evidence of implementing elements in *Quality Management* stage.

Characterization of Enterprises as Business Conglomerates

Table 2 shows the results of enterprises based on both qualitative and quantitative analytical models and research variables.

Table 2. *Characterization of Enterprises as Business Conglomerates.*

Variable	Results
Interview Strategic Capacity	The highest formal academic level is a professional undergraduate degree. Most of the positions correspond to a hierarchical management level. A large number have little experience to allow understanding the enterprise they manage. There is high and low strategic decision-making experience. Most professionals held a middle-level position in another enterprise before the current one. A self-teaching form of achieving informal knowledge for decision-making prevails.

Variable	Results
Characterization	<p>Operational positions are predominant, the percentage of administrative and managerial staff is low.</p> <p>Most positions are registered as manufacturers of metal products, except machinery and equipment.</p> <p>There are no significant differences between family and commercial enterprises.</p> <p>Many enterprises have had the same owner since their creation.</p> <p>There are no medium-sized enterprises and most are old-fashioned.</p> <p>Products and services directed to other manufacturers in industry and construction.</p> <p>Manufacturing processes focused on manufacture and assembly.</p> <p>Most of their raw materials come from the domestic market.</p> <p>Sales to the local and regional market and no enterprise in the international market.</p> <p>Most enterprises have not required innovations, but others do to meet quality requirements.</p> <p>Most enterprises use word of mouth to make themselves known.</p>
Description of Productive or Service Rendering	<p>Prevalence of machinery distribution under functional scheme or by groups.</p> <p>In most cases, posting any kind of job listing it is not a habit.</p> <p>Most of them have no modern machinery, others have them for quality requirements.</p>
Productive Reliability or Service Rendering Based on Quality	<p>Many do not have inspection records, the ones that do, do not use them afterward.</p> <p>All enterprises use instruments for measuring metrological area lengths.</p> <p>Many enterprises train their employees in quality only at the beginning but training is not constant.</p> <p>Most respondents think that quality offers competitive advantages.</p> <p>The majority of respondents share their opinion of quality with their collaborators.</p> <p>Many of them are interested in quality certifications, but others are not, none are certified.</p>

Variable	Results
Capacity to Produce Products Differentiated in Quality and Guarantee	<p>The majority follow customer specifications and few set their own. Purchase orders determine the line of production or service rendering.</p> <p>Customer dissatisfaction has to do with failures in the final product or service, followed by design.</p> <p>Respondents usually offer warranty or re-processing to deal with customer non-conformities.</p>
Capacity to Produce Their Products Differentiated in Volume and Cost	<p>In many enterprises there is useless capacity.</p> <p>Most respondents are unaware of installed capacity and productivity levels.</p> <p>In general, they have not faced capacity problems in meeting customer demand, those who do reject the order.</p>
Capacity Sell Products Retail	<p>Most enterprises sell according to their cost structure, very few sell according to the customer's price.</p> <p>A high percentage subcontracts transportation service, very few enterprises have their own.</p> <p>Some use quality as an argument for selling or getting new customers.</p>
Competence	<p>All agree that competition is increasing over time.</p> <p>Some distinguished from their competitors by high quality or image.</p> <p>Few cannot differentiate much in the price of their products or services.</p> <p>Most of the respondents stated that sales decrease due to the pandemic.</p> <p>A significant proportion remained stability or increased their sales.</p>

Variable	Results
Other Competitiveness Strategies	<p>Most respondents innovated with successful competitiveness strategies of internal process and, to a lesser extent, they diversified their products and services. Very few use advanced technology or unconventional practices.</p> <p>Lack of capital to invest, scarcity of raw materials and informal competition are the main competitive difficulties. In less proportion, the lack of specific professional profiles in the market and opportunities to expand.</p>
Competitive Alliances	<p>Most respondents do not generate partnerships with third parties due to mistrust.</p> <p>Some are associated with chambers of commerce, committee associations or universities.</p> <p>Most restrict customer relations to business.</p> <p>Some mentor clients or are mentored by them.</p> <p>They demand tax incentives, entry barriers to informal competition, prices control of materials and inputs, and transparency in procurement processes to improve their competitiveness from governmental financial facilities.</p>

Relationship between Quality and Strategic Conduct in Enterprises

During the development of the case, special behaviors were observed in eight of the 11 research variables in some of the enterprises. Table 3 shows the particularities and empirical evidence of the relationship between the quality stages and the enterprises competitiveness, generically, between Quality and SC.

Table 3. *Special Results in Enterprises.*

Principal Research Variable	Enterprises												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Quality Stage					✓								
Strategic Capacity					✓			✓					
Characterization								✓					
Productive Description/Service Rendering				✓									
Productive Reliability/Service Rendering Quality-based				✓									
Capacity to Sell Products Retail								✓					
Competence					✓								
Other Competitiveness Strategies								✓					

Enterprises 4, 5, and 8 show differentiating behavior in several variables that suggest leadership in their sector. Enterprise 4 stands out for its *Productive Description/Service Rendering and Productive Reliability/Service Rendering based on quality*; enterprise 5, in its *Quality Phase, Strategic Capacity and Competitiveness*; and enterprise 8, in *Strategic Capacity, Characterization, Products Retailing Capability and other competitive strategies*. They can be considered as case studies or good practice to be followed by other enterprises in the same or other sectors.

Discussion

Case Study Findings

The outstanding behaviors observed in three of the thirteen enterprises would validate the relationships such as | quality stage → competitiveness | and | quality → SC |. As a result, it deduces the competitive advantage that enterprises have when they improve their ability to more advanced stages of quality. This would allow the differentiation of enterprises products and/or services based on quality that market recognizes as high.

The importance of establishing strategies to strengthening decision-making and SCs of undertakings consideration and the others belonging to the metal-mechanic sector in the region should be noted. TIO could originate internally as part of the actions to improve competitiveness. It could start through initiatives by the metal-mechanical sector or by government interested in supporting them. According to this, participation in the Regional Competitiveness Plan of Risaralda 2032³ would constitute an SC in both directions.

Conclusions

A sector diagnostic methodology is proposed and implemented not limited to a specific productive sector, but that can be extended to any other sector. This tool provides a deep understanding of dynamics and challenges of a particular sector and is also adaptable and scalable for application in different business and geographical contexts. This contributes to the generation of transferable knowledge and to the development of flexible approaches that can be adapted to the specific needs of different communities and economic sectors.

A diagnostic study was conducted for the metal-mechanical sector of the department of Risaralda which revealed that the sector analysis methodology presented has the ability to identify elements that constitute the competitive advantages of enterprises within an economic sector, and particularities that weaken the competition strategies of each evaluated enterprise.

³ This plan identifies specific metal-mechanical challenges for Risaralda in 2032, by identifying the critical factors, bets, cross-sectors that contribute to addressing the challenges, new sector actors and sector information in general.

The use of this tool helped to identify clusters within the analyzed sector. The sector analysis methodology provided a detailed understanding of individual characteristics of companies, and enabled visualization and grouping that share similarities and significant links. This clustered approach represents a valuable tool to identifying areas of specialization, collective strengths, and opportunities for collaboration between related enterprises. A significant element to be identified is the ability to apply this methodology to other sectors where similar patterns could be revealed. The methodology facilitates the development of specific strategies, and synergy stimulation between different business clusters.

This research highlights the urgent need to create spaces such as observatories and laboratories for sector study. It also emphasizes the importance of establishing sector tablelands in such a way to facilitate the understanding of various sectors to identify improvement areas, strategic decision-making and proposals of solutions. These collaborative spaces constitute valuable tools for strengthening partnerships within the framework of four-fold spiral “University-Business-State-Society.” In this way, it contributes to more effective interaction between several actors to promote joint initiatives for sustainable development of regional business.

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Determinants of Economists' Salary Levels in the Cities of Bogotá, Bucaramanga, Medellín, and Cali, Before and After the COVID-19 Pandemic*

[English version]

Determinantes del nivel de salario de los economistas en las ciudades de Bogotá, Bucaramanga, Medellín y Cali, antes y después de la pandemia Covid-19

Determinantes do nível salarial dos economistas nas cidades de Bogotá, Bucaramanga, Medellín e Cali, antes e depois da pandemia Covid-19

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Abstract

Objective: This study investigates the determinants of economists' salaries in Bogotá, Bucaramanga, Medellín, and Cali, before and after the COVID-19 pandemic.

Methodology: Data from 1,480 job offers for economists from the pre-pandemic (2018-2019) and post-pandemic (2021-2024) periods were analyzed. A Multinomial Logit model was constructed to assess the salary levels offered in the analyzed job postings. The covariates considered were educational level, years of experience, English proficiency, and computer skills, controlling for city and sector of the offering company. **Results:** Before the pandemic, English proficiency, educational level, and previous experience were significant factors influencing economists' salaries. After the pandemic, the importance of English proficiency decreased, while specialized computer skills gained prominence. **Conclusions:** This study highlights the need for continuous adaptation of economists and economics curricula to the changing demands of the post-pandemic labor market.

Keywords: economists; labor market statistics; Logit model; overeducation; salary determinants (obtained from the STW English thesaurus for economics).

Resumen

Objetivo: en este estudio se investigan los determinantes del salario de los economistas en Bogotá, Bucaramanga, Medellín y Cali, antes y después de la pandemia COVID-19.

Metodología: se analizaron datos de 1480 ofertas de trabajo para economistas de los períodos pre-pandémicos (2018-2019) y post-pandémicos (2021-2024). Se construyó un modelo Logístico Multinomial para el nivel de salario ofrecido en las convocatorias analizadas. Como covariable se consideraron el nivel educativo, los años de experiencia,

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el nivel de inglés y las habilidades computacionales, controlando por ciudad y sector de la empresa ofertante. **Resultados:** antes de la pandemia, la competencia en inglés, el nivel educativo y la experiencia previa eran factores significativos en los salarios de los economistas. Después de la pandemia, la importancia del inglés disminuyó, mientras que las habilidades especializadas computacionales ganaron protagonismo. **Conclusiones:** este estudio subraya la necesidad de adaptación continua de los economistas y los planes de estudio en economía a las cambiantes demandas del mercado laboral post-pandemia.

Palabras clave: economistas; estadísticas del mercado laboral; modelo logístico; sobreeducación; determinantes salariales (obtenidos del tesoro en inglés para economía STW).

Resumo

Objetivo: este estudo investiga os determinantes do salário dos economistas em Bogotá, Bucaramanga, Medellín e Cali, antes e depois da pandemia COVID-19. **Metodologia:** foram analisados dados de 1480 ofertas de trabalho para economistas dos períodos pré-pandêmicos (2018-2019) e pós-pandêmicos (2021-2024). Foi construído um modelo Logístico Multinomial para o nível de salário oferecido nas vagas analisadas. Como covariáveis foram considerados o nível educacional, os anos de experiência, o nível de inglês e as habilidades computacionais, controlando por cidade e setor da empresa ofertante. **Resultados:** antes da pandemia, a competência em inglês, o nível educacional e a experiência prévia eram fatores significativos nos salários dos economistas. Após a pandemia, a importância do inglês diminuiu, enquanto as habilidades especializadas em computação ganharam destaque. **Conclusões:** este estudo sublinha a necessidade de adaptação contínua dos economistas e dos currículos em economia às demandas em mudança do mercado de trabalho pós-pandemia.

Palavras-chave: economistas; Estatísticas do Mercado de Trabalho; Modelo Logístico; sobreeducação; determinantes salariais (obtidos do tesouro em inglês para economia STW).

Introduction

The training of economists in Colombia traces back to the law schools of the 1930s and 1940s. However, it was not until 1945 that formal economics education began, with the establishment of the Institute of Economic Sciences at the Universidad Nacional (Sarmiento & Silva, 2014). Currently, according to the National Professional Council of Economics, the economics degree is offered in 94 universities in the country (CONALPE, 2024). These institutions are responsible for developing the skills necessary for the labor market, equipping students with the fundamental tools for their professional integration.

On the one hand, there is a discrepancy between the skills economists acquire during their training and those demanded by the labor market. In Colombian universities, emphasis is placed on specific competencies such as microeconomic and macroeconomic analysis, project formulation, model design, and statistical and econometric analysis (Bautista et al., 2012; Sarmiento & Silva, 2014). On the other hand, the labor market increasingly demands broader skills, including language proficiency, commitment, integrity, multidisciplinary abilities, teamwork, process management, ICT knowledge, oral communication, and problem-solving skills (Periáñez et al., 2010; ANECA, 2009)

In this context, it is emphasized that the skills required by the labor market can be acquired by both students and professionals in fields related to economics. This increases the complexity in defining the unique competencies of economists and heightens competition in the labor market, as there are fewer positions available than qualified candidates. This dynamic results in overeducation and contributes to a heterogeneous labor market, where the skills offered by economists often diverge from those demanded (Mora, 2008).

Likewise, in the labor market, geographical location is an important variable that has an impact on labor income. According to Posso (2010a), cities such as Bogotá, Medellín, Bucaramanga, and Cali offer higher labor incomes in Colombia, indicating a higher quality of employment in these regions. In this context, there is not only a discrepancy between the labor market for which economists are trained and the one they actually encounter, but also variations in employment quality—measured by labor income—and the perceived importance of their profession, which may differ by geographic region.

Given these considerations, it is essential to understand the realities economists face in the labor market and the conditions that influence the quality of their employment, particularly concerning their labor income. To achieve this objective, job vacancies in Bogotá, Bucaramanga, Cali, and Medellín were monitored through various sources, including “*Elempleo*,” “*Computrabajo*,” and “LinkedIn.” Using the

collected data, a descriptive statistical analysis was conducted, followed by the development of two multinomial logistic models. These models were designed to explore the relationship between the salary levels offered and the skills requested. Finally, the results were analyzed to draw relevant conclusions regarding the demand for economists and their working conditions in these cities.

State of the Art

The Latin American and Caribbean region faces a critical challenge regarding job quality, particularly for young people. This demography experiences higher rates of unemployment, informality, and job turnover compared to other population groups (Busso et al., 2012). Although many young people pursue additional education to enhance their skills, this does not always result in improved job quality. Companies in the region often struggle to align with workers' skills, leading to imbalances in the labor market (Pagés et al., 2009).

The COVID-19 pandemic has exacerbated these vulnerabilities, particularly for young people. This context has accelerated the need for digital tools, impacting the skills required in the post-pandemic labor market (IDB, 2021). This situation has placed significant pressure on universities, compelling them to equip students with the skills necessary to enhance their employability.

In Colombia, several studies have highlighted issues such as the low quality of the labor market and significant income inequality. In this context, education has been recognized as a crucial factor in enhancing employment conditions and access to the labor market (Farné, 2003; Galvis-Aponte & Pérez-Valbuena, 2015; García-Blanco & Cárdenas, 2015; Gil-León et al., 2020; Mora, 2003; Ortiz et al., 2007; Serna-Gómez et al., 2019). Posso (2010a) highlights that inequality in the Colombian labor market is linked to the distribution of wage earners' characteristics, particularly education and geographical location. Additionally, the disparity in returns on educational investment among the most educated individuals is attributed to factors such as overeducation and the quality of education.

As for other wage determinants, Ortiz et al. (2007) and Posso (2010b) agree on several important points. First, they note that the cities with the highest incomes are Bogotá, Bucaramanga, Medellín, and Cali. Second, they note that labor income generally increases with higher levels of education; however, this effect can vary depending on the specific level of education attained. Finally, they identify that work experience, the type of contract, and the formality of the company are key factors influencing salary levels. Other studies (Forero & Ramírez, 2008) have identified additional variables affecting income, including age, gender, parental education, institutional characteristics, field of study, and

economic activity. Additionally, they highlight that careers in Administration, Economics, Accounting, and Finance offer the best working conditions regarding income and unemployment rates.

Mora (2008) delves into the problem of overeducation and the imbalances it generates in the labor market. This phenomenon occurs when employees possess a higher level of education than the average of other employees in similar positions. Their results indicate that salary recognition for individuals with postgraduate, master's, and doctoral degrees is limited within the Colombian labor market. Additionally, it highlights that overeducation also impacts individuals with undergraduate degrees, due to a mismatch between the skills imparted by educational institutions and the requirements of the labor market.

Conceptual Framework

Quality of Employment

Job quality is a multidimensional concept that transcends static definitions, as its perception is influenced by individual needs and preferences. According to the United Nations (2000), 'quality' refers to the set of characteristics that enable workers to meet their basic needs. According to the ILO (2022), quality employment encompasses fair income, workplace safety, social protection, opportunities for personal development, and social integration, among other factors.

Quality assessment employs qualitative and quantitative approaches. On the one hand, from a qualitative perspective, aspects such as labor rights, adherence to international standards, employment opportunities, and social security are considered (UNECE, 2010). On the other hand, the quantitative approach employs estimates and models to focus on variables such as income levels or remuneration received by workers (Arranz et al., 2018; Burgess & Campbell, 1998; Johnson & Corcoran, 2003; Sehnbruch, 2004). The International Labour Organization (ILO) utilizes the Employment Quality Index (EQI), which encompasses dimensions such as income, working hours, employment type, and social security. An adaptation of this index for Colombia was developed by Farné (2003), Posso (2010), Mora & Ulloa (2011) and Farné & Vergara (2015).

In standard economic theory, job quality is typically perceived to be positively related to income and negatively related to hours worked. In the Colombian context, labor income is a crucial element in the definition of quality. Studies by Bustamante and Arroyo (2008), Farné (2003), and Farné & Vergara (2006)

indicate that labor income accounts for at least 40% of the overall result in the employment quality index. Additionally, it is one of the most significant factors for Colombians when assessing their job satisfaction (Farné & Vergara, 2007).

Employment Income Determinants

Disparities in labor income among workers arise from a variety of working conditions and are influenced by the valuation of working hours, which is based on specific individual characteristics. Several authors have examined the relationship between factors such as age (Gallo, 2009), type of employment (Rodríguez, 2013), gender disparities (Colacce, 2018), and various socioeconomic characteristics with the labor income perceived by individuals. From the perspective of human capital theory, educational level emerges as one of the most significant variables. A higher level of education is expected to imply a higher wage, especially in the case of salaried workers (Mora & Ulloa, 2011).

In Colombia, disparities in labor income are closely associated with factors such as educational level, work experience, region, and the type of contract signed (Posso, 2010a; Ortiz et al., 2007). The authors acknowledge that among the variables identified, the most significant contributors to income inequality are the returns to education and geographical location.

Overeducation and Returns to Education

Education plays a fundamental role in income differences in the Colombian labor market. An important phenomenon is overeducation, which occurs when individuals possess a higher level of education than is required by their employers (Domínguez, 2009).

Over-education has several consequences, including creating an imbalance between the supply and demand for skills in the labor market. This imbalance results in frequent job changes, less accumulation of work experience, a higher likelihood of obtaining indefinite-term contracts with lower economic returns, and increased labor market inequality. Additionally, it leads to a decrease in the returns on education (Castillo, 2007; Posso, 2010b).

Although education is valued in the Colombian labor market, the returns on higher educational levels are diminishing. These individuals are often placed in positions that require fewer skills or where their education is not appropriately valued. This phenomenon is attributed to the heterogeneity in training and skills required, as well as the regional diversity in which individuals are located. As a

result, individuals with the same degree may receive different incomes (Mora & Ulloa, 2011; Forero & Ramírez, 2008; Romero, 2008).

Methodological Framework

This study uses data from three job search platforms in Colombia: “*Elempleo*”, “*Computrabajo*” and “LinkedIn”. These platforms are used by a wide range of companies and institutions, such as Banco de la República, Ecopetrol, Grupo Éxito and Colpatria, as well as by renowned universities. Although “voice-to-voice” communication and social networks such as Twitter and Facebook are also important in job searching for economists, job platforms offer a comprehensive view of the labor market and help in understanding its trends and dynamics.

The search for job postings was conducted using the keyword “economist” in Bogotá, Bucaramanga, Cali, and Medellín across two distinct periods: From April 2018 to June 2019 and from February 2021 to February 2024. The goal was to compare changes in the labor market due to the COVID-19 pandemic.

Initially, the investigation was planned for the period from April 2018 to June 2019. However, due to the COVID-19 pandemic, it became necessary to extend the research to capture changes in the characteristics demanded of economists. This extension began in early 2021, coinciding with the economic reactivation. Pre-pandemic data were collected daily by the authors and collaborators, reaching 1020 calls. The post-pandemic data were collected monthly by the Santander Socioeconomic Observatory of Santo Tomás University in Bucaramanga, totaling 460 job postings. This decrease in the number of job postings is attributed to the economic slowdown and changes in the frequency of data collection, as some listings were removed from employment platforms within a few days of their publication.

During data collection, repeated job postings were excluded, as it is common for the same profile to be published multiple times if the vacancy remains unfilled. For this study, only employment contracts other than “Order for Provision of Services” (OPS) were considered. OPS contracts often involve higher fees to compensate for the lack of health, pension, vacation, layoff, and parafiscal benefits provided by the company, which could distort the actual salary data. When a job listing did not specify the type of hiring, it was automatically assumed to be an employment contract rather than an OPS.

Each job offer included an overview of the requirements, the sector of the hiring company, the type of contract, and the number of available vacancies. These data were processed according to expert criteria to construct a standardized data table, creating variables related to salary based on the reviewed literature.

Categorization of Variables

Dependent Variable (Salary).

Job offers typically present salary as an interval rather than a specific point value. Additionally, it is common for job postings to omit salary information altogether. Therefore, it was decided to treat the "salary" variable as categorical. This approach allows for the analysis of different salary levels and includes a separate category for unspecified salaries (either to be agreed upon or not reported).

The salary ranges were determined at expert discretion, using the 2018 Legal Minimum Wage (SMLV) for Colombia as a reference. These ranges were subsequently adjusted according to annual inflation rates up to December of 2019, 2021, 2022, 2023, and 2024, based on data provided by Banco de la República. Table 1 shows the ranges in Colombian pesos (COP) and its equivalent in US dollars (USD). The conversion to USD was performed using the average Market Representative Rate provided by Banco de la República for the corresponding analysis period.

Table 1. Categorization of the Variable "Salaries". ¹

Salary Category	2018	2019	2021	2022	2023	2024
0	Salary not specified or to be agreed					
1	< 2	< 2,08	< 2,11	< 2,23	< 2,52	< 2,75
	<669	<679	<690	<729	<825	<901

¹ The first row in each salary category corresponds to millions of Colombian pesos (COP), and the second is its equivalent in US dollars (USD).

Salary Category	2018	2019	2021	2022	2023	2024
2	[2 - 6)	[2,08 - 6,23)	[2,11 - 6,33)	[2,23 - 6,68)	[2,52 - 7,56)	[2,75 - 8,26)
	[669 a 2007)	[679 a 2038)	[690 a 2071)	[729 a 2188)	[825 a 2475)	[901 a 2704)
3	≥6	≥6,23	≥6,33	≥6,68	≥7,56	≥8,26
	≥ 2007	≥2038	≥2071	≥2188	≥2475	≥2704

Covariates.

The covariates analyzed were extracted from the job advertisements and subsequently tabulated. The city of work and the sector or area of the contracting company were included as control variables. In cases where the sector of the company was not specified, the sector of the job offer was assumed. The explanatory variables of interest included those related to the worker's human capital, such as educational level and work experience. Additionally, hard skills, such as English proficiency and knowledge of computational tools, as well as specific expertise, were considered. Soft skills were not included due to their low variability (most offers mentioned skills such as responsibility and teamwork). Although these may be important in the hiring process, they do not appear to significantly influence salary determination for economists. The standardization process is presented in Table 2.

Table 2. Model Explanatory Variables.

Variable	Information
City	If the vacancy belongs to Bogotá, Medellín, Bucaramanga or Cali.
Area of the contracting company (A)	1) Administrative, human resources, audit, financial and management; 2) Commercial, sales and customer service; 3) Teaching, consulting and R&D; 4) Purchase of inventories and international trade; 5) Operations and processes; and 6) Others (advertising, marketing, technology, services, etc.).

Variable	Information
Minimum Required Education Level (EL)	1: High School, or Associate degrees; 2: Bachelor's degree; 3: Postgraduate.
Years of Experience (Exp)	Number of Years of Experience Required.
Programming Languages (PL)	It takes the value of 1 if the company required some knowledge of C, C++, <i>Java</i> , <i>JavaScript</i> , PL SQL, <i>Octave</i> , R, <i>python</i> or <i>Visual Basic</i> , 0 if not.
Data Storage Tools (ST)	It takes the value of 1 if the company required some knowledge of <i>Hadoop</i> , <i>Google Analytics</i> , <i>Site Catalyst</i> , <i>Coremetrics</i> , Oracle, <i>Access</i> , <i>AWS</i> , <i>Azure</i> , Databases, <i>Data lakes</i> , <i>IBM Cloud</i> or another storage tool, or 0 if not.
Accounting Tools or <i>Business</i> Type (AT)	It takes the value of 1 if the company required some knowledge of <i>Kactus</i> , <i>Siigo</i> , ERP, <i>as400</i> , BPM, CRM, SAP, AWS, PMI, IAXIS, MRP or <i>Qlik View</i> , 0 if not.
Information Visualization and Processing Tools (VPT)	It takes the value of 1 if the company required some knowledge of <i>PowerBI</i> , <i>Tableau</i> , SPSS, STATA, SAS, <i>Alteryx</i> or <i>DataStudio</i> , 0 if not.
Office Tools (OT)	It takes the value of 1 if the company required some knowledge of <i>Kynote</i> , <i>Power Point</i> , Office Package, Excel, Word and 0 if not.
Specific Skills (SS)	It takes the value of 1 if the company required some area-specific skill (invoicing, purchasing, risk management, etc.) and 0 if not.
English	Level of English required by the company. It is measured in A (basic), B (intermediate), C (advanced) or does not require/not specified.

It is noted that the required level of education might vary from a degree in economics. Some vacancies accepted various profiles, including high school or associate degrees; bachelor's degree; master's degrees, and doctoral degrees. Additionally, different professions were considered, such as economists, industrial engineers, administrators, and others. The only criterion for inclusion in this study was that the job posting explicitly accepted the profile of a "qualified economist," regardless of whether it also accepted other profiles or academic levels.

Statistical Model.

Given that the dependent variable is categorical and not ordinal, a multinomial model was chosen over an ordinal response model. This choice is based on the fact that a multinomial model allows for the analysis of category 0 (salary to be agreed) without assuming a specific order for this category. Unlike ordinal response models, the multinomial model does not assume a preset order between categories (Best & Wolf, 2014). Model estimation was carried out using the *nnet* package in R. The estimated model is as follows.

$$\frac{\Pi_j(X)}{\Pi_3(X)} = \alpha_j + \beta X,$$

where $\Pi_j(X)$ represents the probability that a call is in the category $j \in \{0, 1, 2\}$ given a set of characteristics X ; α_j, β they are parameters of the model and X is the matrix of covariates. It is important to note that the comparison category $\Pi_3(X)$ is the level of wages corresponding to category 3.

To assess potential changes in the characteristics demanded of economists, the same analytical procedure was applied to data collected before and after the pandemic. To determine the optimal model, we initially estimated the "Saturated Model" and then selected the best model using the *Stepwise* algorithm integrated into the *mass* library. This process assisted in selecting the optimal model by including and excluding covariates and assessing their impact on the *Akaike Information Criterion* (AIC).

To evaluate model fit and ensure unbiased coefficient signs, the dataset was randomly divided into training (80%) and test (20%) sets. This division was repeated 1000 times to cross-validate the results and minimize potential biases associated with a single database partition.

The minimum, maximum, and average values of the 1000 partitions were calculated for the Akaike Information Criterion (AIC), the *deviance*, and the percentage of correct classifications to assess the goodness of fit of the model. The interpretation of the effects of the coefficients was based on the averages of the coefficients and their *p-values* from each model.

Results

Descriptive Statistics

During the first period, a total of 1,020 vacancies were analyzed, whereas in the second period, 460 vacancies were evaluated. Most of the offers were located in the city of Bogotá, as shown in Table 3.

Table 3. *Distribution of Job Vacancies by City.*

City	Study Period	
	2018-2019	2021-2024
Bogotá	46,5%	65,22%
Bucaramanga	28,3%	10,22%
Cali	9,0%	8,70%
Medellín	16,2%	15,87%

Figure 1 illustrates the distribution of vacancies by salary category for the two time periods analyzed. It is noted that, in the first period, most of the vacancies did not specify salary information. Although in the 2021-2024 period this category is no longer the most frequent, it remains in the second position. This salary category poses a problem, as it can encompass two scenarios: first, high salaries that are kept confidential by companies to avoid revealing their salary structure; and second, cases where the information is not disclosed because the salaries are low and not competitive compared to other offers. This hypothesis is discussed below. Another relevant category in both periods is Category 2, which represented vacancies with salaries ranging from 2 to 6 million pesos in 2018, and from approximately 2.75 to 8.26 million pesos in 2024.

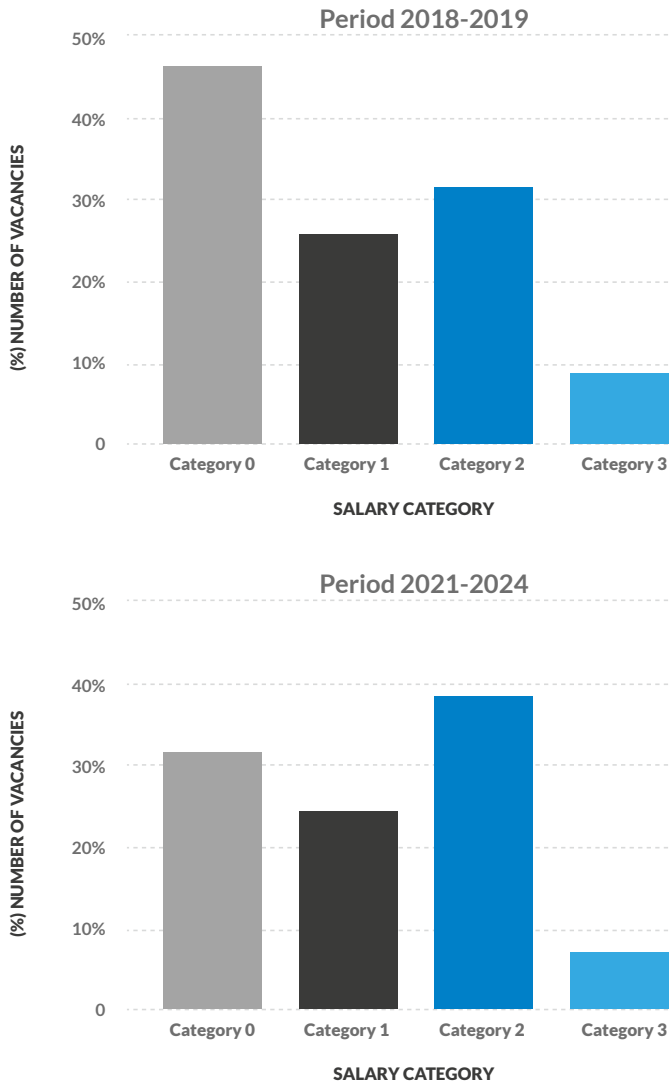
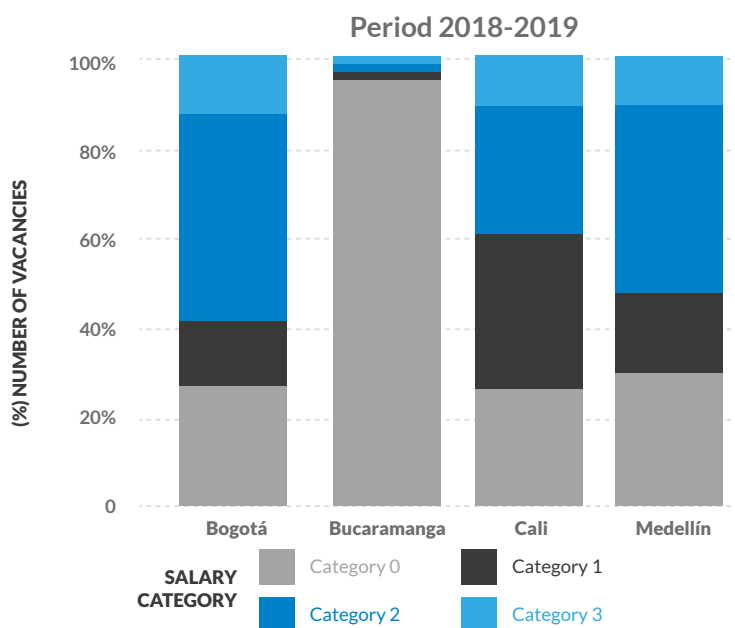


Figure 1. *Distribution of Vacancies According to Salary Categories.*

Figure 2 presents the distribution of vacancies at each salary level for each city. It is observed that, during the first study period, Bucaramanga is the city offering the most vacancies for economists without providing salary information, with 95%. This trend in Bucaramanga changes in the second study period, where there is an increase in vacancies with salaries categorized as 1 and 2.

On the one hand, in Bogotá and Medellín the most relevant salary category in both periods is 2. However, after the pandemic, there is evidence in Bogotá of a reduction in higher wages, represented by category 3, and an increase in lower wages, represented by category 1. On the other hand, in Medellín, there is a decrease in the number of vacancies without salary information (category 0) and an increase in vacancies falling into categories 1 and 2. In Cali, the main salary category in the first period was 1, while in the second period it was reduced, giving a greater share to category 2.

Considering salaries exclusively, it could be interpreted that, after the pandemic, job postings in the cities —except Bogotá— readjusted their salary categories, often moving towards higher salary ranges. In the first period, categories 0 and 3 represented 46.8% and 8.9% of total calls. In the second period, there was a decrease in the participation of these categories, with 30.9% and 7%. Meanwhile, categories 2 and 1 experienced an increase in their participation, from 13.3% and 31.4% to 24.1% and 38%, respectively. However, it is important to note that this interpretation should be approached with caution, as the nature of category 0 —where salary information is unspecified— means that its implications are not entirely clear.



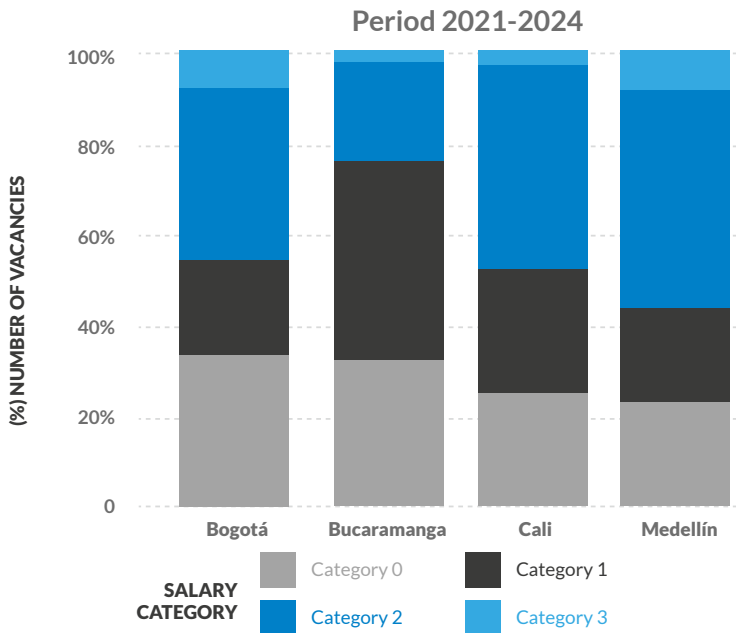


Figure 2. *Distribution by City of Vacancies According to Salary Level.*

Figure 3 illustrates the relationship between years of experience and the salary offered in the job vacancies. In the first period, job categories 0, 1, and 2 each have a median of 2 years of experience, but they differ in their dispersion. Category 0 exhibits a wider variation, supporting the idea that this category can hide two different types of employment and salary.

Most category 1 vacancies are below the median, suggesting that these positions typically require little or no experience. This facilitates the entry of newly graduated economists into the labor market in exchange for lower wages. In contrast, category 2 shows the majority of wages above their median. Category 3 exhibits a considerable dispersion in their salaries, requires a minimum level of experience of 2.5 years and presents a median of 5 years.

In the second period, categories 0 and 2 maintain a median of 2 years of experience. However, for category 0, the dispersion increases further compared to the previous period. Category 1 reduces its median to one year of experience, while category 3 increases its median slightly to 5.5 years.

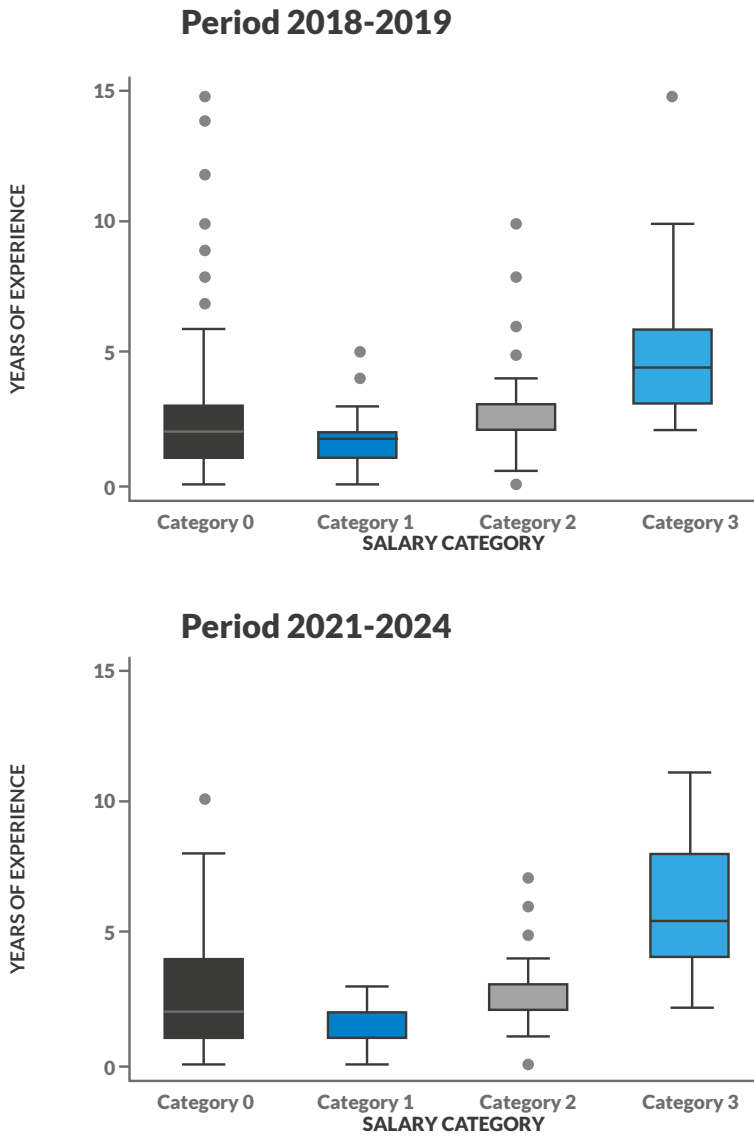
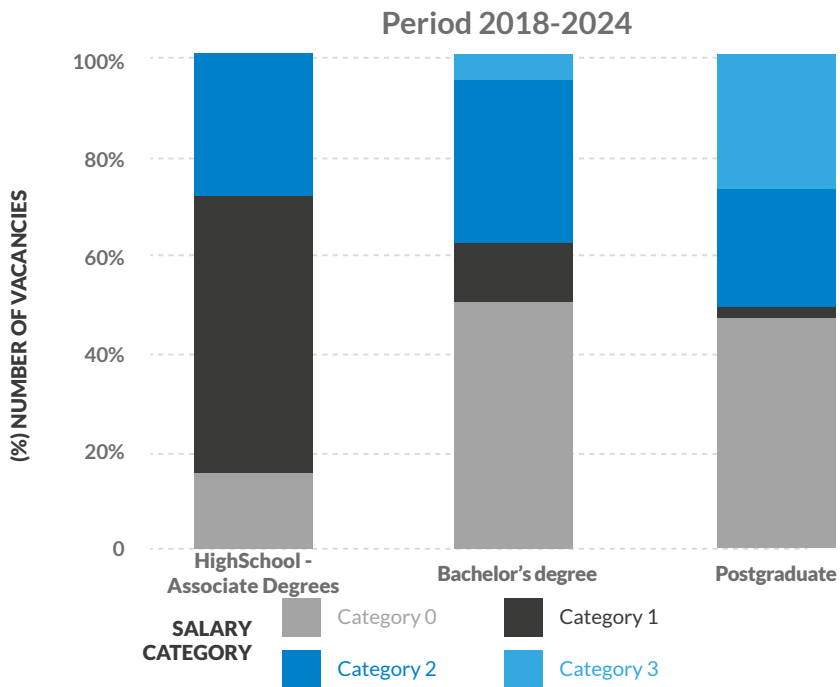


Figure 3. Relationship Between Experience and Salary Category.

Figure 4 shows the relationship between education level and salary category. As expected, Bachelor's degrees with postgraduate degrees tend to receive more offers in the higher salary categories, particularly in category 3. For

their part, those with undergraduate degrees show a different distribution of salary categories. For this group, the predominant salary categories are 0 and 2, indicating a wider range in the wages offered—from unspecified amounts to moderately high wages. In contrast, profiles with technical degrees show a significant concentration in the lower salary categories, particularly in category 1. This clearly indicates a symptom of overeducation, where the offered salary is relatively low compared to the level of technical or technological training required, yet the job vacancy extends to profiles with a higher qualification, such as a graduate economist.



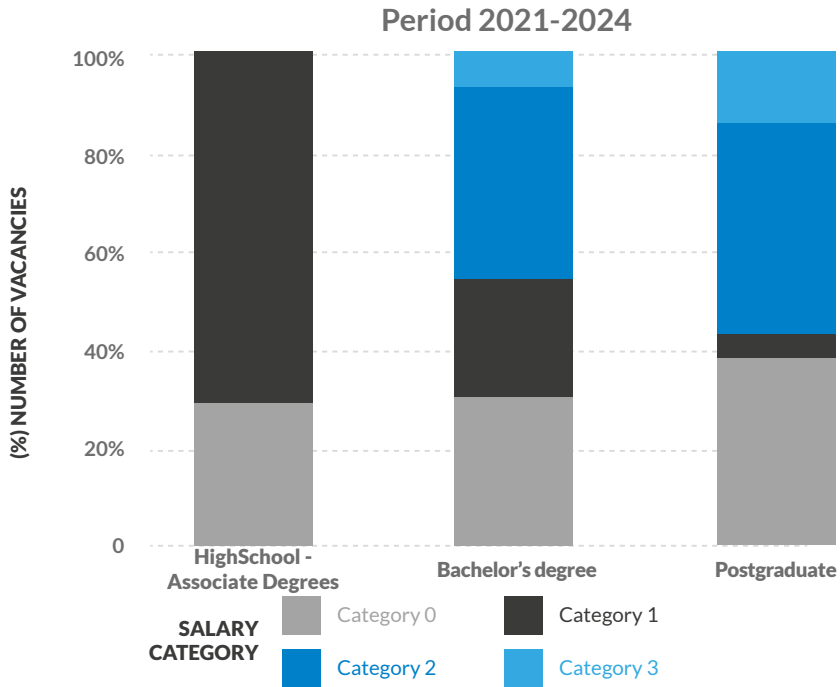


Figure 4. *Relationship Between Level of Education and Salary Category.*

Other variables of interest include computational skills related to data management and analysis, such as proficiency in programming languages, data storage tools, accounting software, data visualization tools, office software, and specific knowledge areas. Table 4 illustrates these skills, which should be interpreted by columns, as many vacancies required multiple hard skills.

In both the first and second periods, the most demanded skills are specific knowledge and the use of office tools. This could suggest that the economist profile sought on these job boards may not always require expertise in programming languages or data visualization tools. On the other hand, skills related to office tools are more valued, which are not exclusive to economists and can be acquired through various levels of study and areas of knowledge. This demand could explain the low wage levels; however, after the pandemic, there is evidence of a relative increase in demand for data visualization tools and programming languages compared to the pre-pandemic period.

Table 4. List of Vacancies that Require Some Type of Knowledge with the Salary Offered.

Term 2018 – 2019						
Vacancies that require knowledge in:						
Salary Category	Programming Languages	Storage Tools	Accounting Tools	Data Visualization Tools	Office Tools	Specific Skills
0	15	206	18	8	45	275
1	2	10	5	2	37	64
2	18	27	21	15	94	194
3	3	5	10	3	16	56
Total	38	248	54	28	196	589
Term: 2021-2024						
Vacancies that require knowledge in:						
Salary Category	Programming Languages	Storage Tools	Accounting Tools	Data Visualization Tools	Office Tools	Specific Skills
0	22	8	5	20	57	88
1	7	1	4	4	32	38
2	37	13	18	29	89	134
3	24	9	3	13	21	29
Total	90	31	30	66	199	289

Regarding the variable of English language proficiency, Figure 5 provides information on the linguistic requirements demanded in the job offers. It should be noted that, in most of the calls, no specific skill level in English is mentioned. However, the demand for English proficiency increases as you move up in the salary categories. In the lower salary categories, it is less common to find requirements for intermediate or advanced English proficiency; however, in the higher categories, the proportion of job vacancies requesting advanced English skills increases.

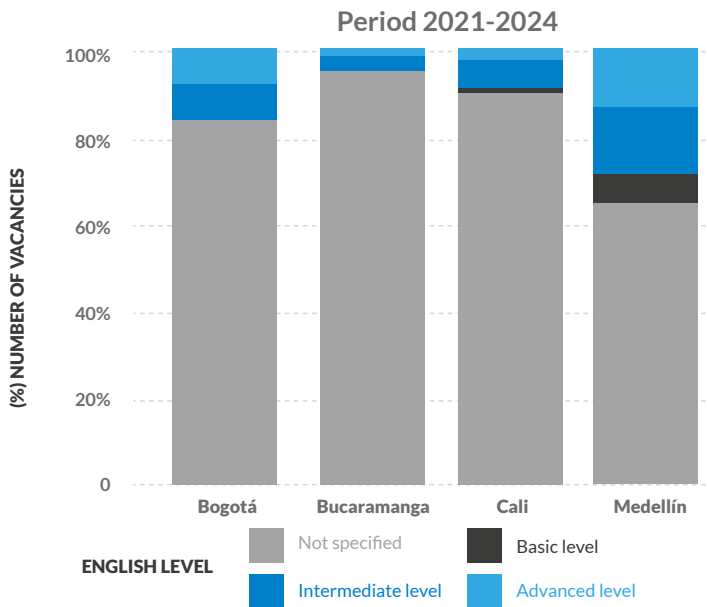
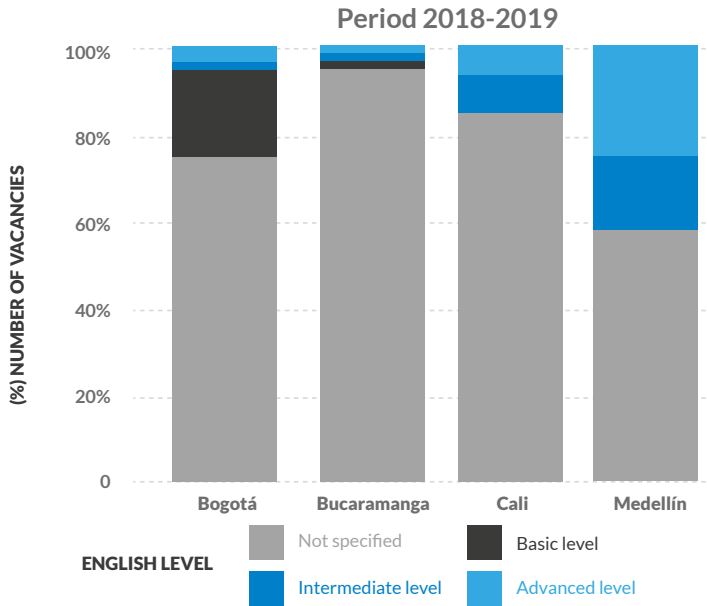


Figure 5. Relationship Between Salary Offered and Level of English.

Multinomial Model 2018-2019

The "saturated model" for the periods before and after the pandemic uses grouped salary as the dependent variable. The covariates include those listed in Table 2, along with their transformations Exp^2 and interactions $Exp*PL; Exp*ST; Exp*AT; Exp*VPT; Exp*OTy Exp*SS$. Below are the adjustment criteria for the "Saturated" model and the best model, as determined by the *Stepwise algorithm*, for both pre-pandemic and post-pandemic data.

Table 5. Adjustment Criteria of the Proposed Models.

Average, Minimum, and Maximum Values of the 1000 Random Partitions			
Model	Success	AIC	Deviance
Saturated model 2018-2019	0.59 (0.44-0.75)	1311 (1216-1398)	1149 (1054-1236)
Adapted Stepwise Model 2018-2019	0.61 (0.44-0.76)	1287(1190-1364)	1197 (1100-1274)
Saturated Model 2021-2024	0.54 (0.16-0.73)	730 (665-789)	599 (533-657)
Adapted Stepwise Model 2021-2024	0.56 (0.34-0.77)	713 (645-772)	635(567-695)

Table 5 concludes that the models proposed by the *Stepwise* algorithm exhibit better indicators in terms of the Akaike Information Criterion (AIC) and the percentage of correct classifications, while the deviance values are close to those of the saturated model. In this way, the model proposed by the *Stepwise* method is a parsimonious model, achieving indicators that are either higher or comparable to those of the saturated model, but with a lower number of covariates.

Below are the best models for the two periods analyzed:

Best Adapted Stepwise Model 2018-2019

$$\log \frac{\Pi_j(x)}{\Pi_3(x)} = \alpha_j + \beta_{1j} City_i + \beta_{2j} EL_i + \beta_{3j} Exp_i + \beta_{4j} Exp_i^2 + \beta_{5j} PL_i + \beta_{6j} (Exp_i * PL_i) + \beta_{7j} AT_i + \beta_{8j} (Exp_i * AT_i) + \beta_{7j} English_i + \epsilon_i.$$

The model for the years 2018-2019 included the AT variable to maintain the hierarchy of the Exp*AT. interaction. The remaining variables were included by the algorithm automatically.

Table 6 presents the model results. For proper interpretation, it should be noted that salary category 3 serves as a benchmark. In addition, the base categories of the polytomous covariates used must be considered, such as the city (Bogotá), the level of education (undergraduate), and the level of English (no requirement).

Table 6. Average Coefficients and Average p-values of the Nominal Model 2018-2019.²

	Coefficients			P Values		
	0	1	2	0	1	2
Intercept	34,47	38,15	8,45	0,00*	0,00*	0,00*
Bucaramanga	2,23	-2,37	-2,20	0,00*	0,00*	0,00*
Cali	0,40	0,54	-0,29	0,40	0,33	0,56
Medellín	0,84	0,20	0,56	0,03*	0,68	0,15
EL 1	30,32	33,21	31,76	0,00*	0,00*	0,00*
EL 3	-0,69	-1,48	-0,217	0,08	0,04*	0,59
Exp	-0,60	-1,06	-0,25	0,00*	0,03*	0,39
Exp2	0,04	-0,07	-0,05	0,00*	0,49	0,15
PL	67,66	64,79	68,42	0,00*	0,00*	0,00*
PL*Exp	-13,43	-13,19	-14,02	0,00*	0,00*	0,00*
AT	2,34	0,90	3,31	0,17	0,68	0,09
AT*Exp	-0,56	-0,02	-1,08	0,10	0,98	0,02*
English A	21,38	20,86	-10,50	0,00*	0,00*	0,00*
English B	-1,12	-29,17	-0,934	0,02*	0,00*	0,05*
English C	-1,23	-2,69	-0,94	0,00*	0,00*	0,00*

² * Statistical significance of at least 5%.

By analyzing the coefficients (log odds ratios) of the variable EL 3 (Postgraduate), it is interpreted that a job posting requiring a postgraduate level of education will be associated with a higher likelihood of offering a salary in category 3, compared to a posting that requires only an undergraduate level of education. However, this association is statistically significant only for salary category 1, not for categories 0 and 2 (*ceteris paribus*).

It is essential to consider that the magnitude of the effect of the covariates is not directly represented by the coefficient, as the multinomial model is not linear in its parameters. Therefore, for a more streamlined presentation of the results, the focus should be on the significance and direction of the coefficients. The calculation of marginal effects and the discussion of the base categories of the polytomous covariates are omitted.

However, the most significant factors explaining the salary categories for the years 2018-2019 were knowledge of programming languages, use of *business* and accounting tools, years of experience, educational level, and proficiency in English.

Regarding the effects, it was found that postgraduate education, years of experience, and proficiency in English (levels B or C) are negatively associated with the probability of receiving lower salary levels. However, in category 0, the effect of years of experience diminishes at increasing rates, as evidenced by the positive and significant coefficient exp^2 . This indicates that an increase in years of experience is associated with a decreased probability of a job offer being classified in salary category 0. However, this effect is met to a certain extent, where a high level of experience increases the probability of belonging to category 0. It is important to remember the hypothesis that this wage category could include both very low wages and very high wages.

Conversely, job offers that require programming languages, accounting tools, and educational qualifications below the professional level are more likely to be associated with salary categories 0, 1, and 2, as opposed to higher salary categories. However, interactions between high levels of experience $Exp*LP$ and $Exp*AT$ the simultaneous requirement of programming languages or accounting tools reveal a reversed relationship, favoring the presentation of salary category 3.

Some variables showed combined effects. For example, the basic level of English has a negative relationship with wages in category 2, but a positive relationship with wages in categories 0 and 1. Regarding the control variable, "city" it was found that job calls for Bucaramanga are more likely to offer category 0 salaries and less category 1 and 2 salaries. In the case of Medellín, it was found more likely to offer a category 0 salary compared to category 3.

Adapted Stepwise Model 2021-2024

$$\log \frac{\Pi_j(x)}{\Pi_3(x)} = \alpha_j + \beta_{1j} \text{City}_i + \beta_{2j} \text{EL}_i + \beta_{3j} \text{Exp}_i + \beta_{4j} \text{Exp}_i^2 + \beta_{5j} \text{SS}_i + \beta_{6j} \text{PL}_i + \beta_{7j} \text{ST}_i + \beta_{8j} (\text{Exp}_i * \text{ST}_i) + \epsilon_i.$$

The model for the years 2021-2024 underwent two modifications from the original model proposed by the *Stepwise algorithm*: the elimination of OT and AT due to their lack of 5% significance, and the inclusion of ST to preserve the hierarchy of interaction Exp*ST. The remaining exogenous variables were included by the algorithm.

Table 7 illustrates significant changes in the structure of profiles required for economists and their correlation with wage levels. The most notable change is the output of the variables “English level” and “management of accounting tools”; and the inclusion of “storage tools” and “specific skills” in the final model.

Table 7. Average Coefficients and Average p-values of the Nominal Model 2021-2024.³

	Coefficients			P Values		
	0	1	2	0	1	2
Intercept	77,77	79,62	26,77	0,00*	0,00*	0,16
Bucaramanga	7,52	8,16	6,86	0,69	0,48	0,78
Cali	76,50	76,53	77,11	0,00*	0,00*	0,00*
Medellin	-1,10	-1,01	-0,50	0,24	0,31	0,55
EL1	4,00	4,68	-10,30	0,00*	0,00*	0,00*
EL3	7,04	6,74	6,71	0,03*	0,02*	0,03*
Exp	-2,88	-2,98	-2,01	0,00*	0,00*	0,02*
Exp2	0,21	0,03	0,06	0,00*	0,78	0,41
SS	-57,11	-57,94	-56,19	0,07	0,049*	0,12
PL	-6,82	-9,33	-6,82	0,01*	0,00*	0,01*
ST	44,35	31,56	45,07	0,43	0,00*	0,33
Exp*ST	-23,20	-28,85	-23,29	0,03*	0,00*	0,02*

³ * Statistical significance of at least 5%.

Variables such as “years of experience” and “knowledge of programming languages” are negatively related to wages in categories 0, 1 and 2. This indicates an increased likelihood that job postings requiring more years of experience or knowledge of programming languages will offer salaries in category 3. Additionally, the quadratic effect of years of experience on category 0 mirrors the findings from before the pandemic, further reinforcing the hypothesis that category 0 encompasses two distinct types of profiles.

When the call requests at least one specific skill, the probability that the offer presents category 1 salaries (the lowest) is reduced. Regarding storage tools, it is observed that their requirement increases the probability of receiving salaries in the lowest category. However, when these tools are requested alongside a higher level of experience, the likelihood of receiving a category 3 salary—the highest category—increases.

On one hand, the postgraduate educational level yields unexpected results in the post-pandemic period, as it shows a positive coefficient for categories 0, 1, and 2. This indicates that a postgraduate requirement is more likely to be associated with these salary levels, which may highlight issues of over-education. Conversely, the level of basic education retains the behavior observed before the pandemic. It remains unlikely to be associated with salaries in category 2 and more likely to be associated with salaries in categories 1 and 0.

Regarding the control variable “city”, it shows significant effects for Cali with a higher probability of having salary categories 0, 1 and 2 compared to Bogotá. In the cases of Bucaramanga and Medellín, no significant effects were found.

Finally, the model's pre-pandemic and post-pandemic intercepts do not reflect major changes. Subsequently, job postings in Bogotá requiring an undergraduate education level have a higher probability of falling into salary categories 0 and 1 compared to category 3. Prior to the pandemic, intercepts also considered unspecified English level and category 2.

Conclusions

This research enhances the understanding of labor market dynamics for economists in Colombia, with a focus on four major cities, both before and after the pandemic. The primary objective was to identify, in both periods, the most significant characteristics that explain the various salary categories. This was

done to understand which attributes are most in demand and valued in the labor market.

Descriptive statistics reveal that Bogotá dominates the labor market for economists in Colombia, as it is the city with the highest number of job openings both before and after the pandemic. Category 0 was prominent in both periods, accounting for over 35% of the total job openings, highlighting the need to understand its determinants. After the pandemic, there was an increase in the demand for skills such as office tools, programming languages, and data visualization tools, indicating a heightened emphasis on these competencies in the labor market for economists.

Before the pandemic, factors such as English proficiency, education level, prior experience, and the use of programming languages were critical in determining salaries for economists. Additionally, non-traditional skills in economic training, such as proficiency in accounting and administrative tools, showed significant influence. Thus, job postings frequently required skills that deviated from the classical training of an undergraduate economist.

In the post-pandemic scenario, education, experience, and programming languages remain relevant. Additionally, the use of storage tools has emerged as a significant explanatory factor. Surprisingly, English proficiency has lost relevance in this new scenario. This shift in wage determinants may reflect an adjustment in labor market priorities. There is now a greater emphasis on advanced technical skills and the use of specialized storage and programming tools. This could be indicative of an evolution and increased specialization within the labor market for economists in Colombia.

The research also uncovered intriguing trends regarding postgraduate education in the post-pandemic wage landscape. It was found that postgraduate qualifications were associated with lower salary categories (1 and 2), highlighting an issue of overeducation. This phenomenon could be linked to the widespread decrease in wages during the pandemic, a period in which many professionals had to accept lower salaries to remain in the labor market.

The results of the model, in both periods analyzed, confirm the hypothesis of the ambiguity of the unspecified salary category (category 0). On one hand, some job postings were associated with high levels of compensation and required advanced academic qualifications, extensive experience, and specialized technical skills. On the other hand, other offers shared similarities with the typical characteristics of lower salary calls.

The model highlighted the relevance of 'experience' variable interactions in the pay structure. It was found that the use of programming tools and storage systems, when coupled with considerable experience, significantly increases the likelihood of securing a higher salary. Also, through the variable "experience"

the idea of duality within category 0 is reinforced. The data suggest that an increase in years of experience generally decreases the likelihood that a job offer will fall into the 0 salary category. However, there is a threshold beyond which a particularly high level of experience again increases the probability of classification in this ambiguous category.

These findings are valuable for Colombian universities offering economics programs, as they provide insights for adjusting and aligning curricula with current labor market demands. Future research could deepen the analysis of additional categories that contemplate a broader spectrum of competencies. Additionally, increasing the sample size would enable a more detailed differentiation among postgraduate categories, distinguishing between specializations, master's degrees, and doctoral levels. A more detailed segmentation by business areas is also recommended, overcoming the current limitations imposed by the low number of calls.

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