



Chants, Herbal Knowledge, and Ancestral Wisdom: An Intercultural Proposal for Teaching Natural Sciences in Caribbean Peoples

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ABSTRACT

This article analyzes the relationship between the cultural heritage of Caribbean communities, traditional songs, and herbal medicine as fundamental expressions of ancestral knowledge related to the use of medicinal plants and the deep connection with nature. In these communities, music and herbal practices constitute not only forms of knowledge but also a legacy of cultural resistance and a means of preserving memory, collective identity, and a sense of belonging. Based on the connection between the sung word and knowledge of herbal medicine, the study proposes a pedagogical framework that integrates these cultural expressions into the teaching of natural sciences. The so-called sung singularities are understood as ethnoecological texts that foster a dialogue between school scientific knowledge and the cultural practices of the communities. Finally, the article presents an intercultural pedagogical proposal that combines traditional songs and medicinal gardens as didactic strategies to promote meaningful learning in botany, environmental health, and sustainability, while strengthening respect for cultural diversity and commitment to environmental care, in accordance with international guidelines for education for sustainable development.

KEYWORDS: Ancestral knowledge, Interculturality, Yerbatería, Musical sonorities, Science education, Intercultural pedagogy.

INTRODUCTION

Intercultural relations

The Colombian Caribbean region hosts a rich musical heritage that reflects identities, customs, and ways of life, articulated through a harmonic speech associated with the sea and rivers that connects it both with the Antillean insular world and with continental peoples. Due to its pluriethnic plurality, the Caribbean is at once singular and multiple: the world is perceived as a network of interrelated and interdependent phenomena which, according to Fritjof (2006), is grounded in a logic based on creation, imagination, chance,

illumination, uncertainty, order, and disorder—elements that integrate reality as a complex whole and allow for discussion of the idea of an intercultural Caribbean that goes beyond the merely geographical.

For Froufe¹, interculturality is manifested in acts of communication or contact between people from different cultures; in Colom's terms², it implies the possibility of establishing equitable relationships of exchange and communication among cultural groups that differ according to criteria such as ethnicity, religion, language, or nationality, among others. Therefore, such intercommunication gives concrete form to the rational meaning of human coexistence, where dialogue operates as a metatheory for understanding complementarity from an inter- and transdisciplinary perspective. Encounters between cultural groups are supported by spontaneity, by non-formalized and non-directed interpersonal contacts, and by the use of their own resources.

Herbal Medicine and Popular Wisdom

Knowledge associated with herbal medicine plays a central role in the cultural heritage of Caribbean communities, both in medicinal and spiritual terms. Within these worldviews, plants are treated as living beings with whom communication is possible; in the words of Tarvainen (2019), “there are plants for opening, for closing, for connecting, for calming, for bringing luck, and for making people love you,” while Mutwa (2003) maintains that “we Africans are taught that a tree thinks, that a tree feels, that a tree understands, and that it is also capable of recognizing the animals that approach it.” For the ethnobotanist Sobiećki (2017), even when preparing a herbal steam bath, it is necessary to speak to the plant and ask for its assistance. Angulo et al.³ note that traditional communities conceive plants as a form of popular medicine used to prevent and heal illness; this knowledge is transmitted orally from generation to generation and is present in multiple cultural expressions.

Thus, plants constitute part of the heritage of ethnic groups: speaking about their uses and treatments is equivalent to addressing cultural practices, territory, spirituality, rituals, dietary customs, traditional medicines, collective labor, and oral tradition. It also implies referring to knowledge that is not isolated but interactive and complementary, preserving its essence. According to Maya⁴, botanical knowledge emerged from the experience of enslaved peoples with plants and from techniques developed to enhance their medicinal benefits: they identified a plant's power through its aroma or reaction to heat, knew the proper way to administer it (as a brew, ointment, powder, poultice, or infusion), understood how cold or heat altered its properties, and recognized how the spoken word could enhance healing effects.

From an early age, Africans learned to sharpen their senses to perceive the virtues of plants and to master healing techniques accompanied by prayers taught by herbal masters known as mohanes. These techniques were applied, for example, when it was suspected that someone was ill due to the actions of a malicious herbalist; mohanes even taught how to recognize, through smell, whether a person was under a supposed spell. Africans and their descendants in the Americas affirmed the effectiveness of herbs. Almengor⁵ notes that inquisitorial documents frequently reference “cold” or

“hot” virtues used to combat illnesses of an opposite nature. In 1664, Domingo de la Ascensión declared that he used “for colds, chamomile and hot remedies,” showing that an illness considered cold was treated with plants of opposing virtue.

This thermal criterion also appears in Adja-Évhé traditions brought by most Africans who arrived at Caribbean slave ports during the second half of the seventeenth century. For example, species such as *Palito de Matarratón* (*Gliricidia sepium*), *Mata Siguaraya* (*Trichilia havanaensis*), *Abuyama* (*Cucurbita* sp.), *Matimbá* (*Annona montana*), and *Fruta Bomba* (*Carica papaya* L.) are used in infusions and stews to preserve health and form part of rituals, music, and dances that are inscribed in bodily memory. This is a tradition of life and ritual, rooted in the Americas with African and Indigenous influences, inscribed within the sacred universe of the orishas, whose cosmic perception was more closely linked to the earth than to the celestial realm.

In this context, the present study aims to analyze the relationship between traditional songs, herbal medicine, and ancestral knowledge in Caribbean communities, and to propose an intercultural pedagogical framework for the teaching of natural sciences grounded in these cultural expressions. The study seeks to contribute to science education by articulating school-based scientific knowledge with community-based epistemologies, fostering meaningful learning, environmental awareness, and cultural identity. This proposal is justified by the need to counteract the progressive erosion of ancestral knowledge under modernizing pressures and to promote educational approaches that recognize epistemic plurality, cultural diversity, and sustainability as central dimensions of contemporary science education.

THEORETICAL FRAMEWORK

Herbal Medicine and Its Use in Healthcare

According to Vera (2014), traditional knowledge related to plant-based healing practices, despite its millennia-old origins, remains fundamental to healthcare and holds a value comparable to that of Western medicine. Medicinal plants are used to treat numerous ailments and constitute a safe and effective alternative in both rural and urban settings. Since ancient times, populations in Colombia have used medicinal plants to heal and preserve health.

Traditional medicine was for centuries the only healthcare system for many generations and is still used today by more than 80% of the Amazonian population. Rural communities have preserved and transmitted ancestral knowledge regarding the use of medicinal plants to address everyday needs. Ríos et al. (2019) identified that plants are used to treat numerous diseases: *Sábila* (*Aloe vera* L.) is used for 17 conditions; *Hierbabuena* (*Mentha spicata* L.) for 14; *Manzanilla* (*Matricaria chamomilla* L.) for nine; *Albahaca* (*Ocimum basilicum* L.) and *Toronjil* (*Melissa officinalis* L.) for eight each; *Anamí* (*Petiveria alliacea* Plumier), *Arnica* (*Jatropha aconitifolia* Mill.), *Eucalipto* (*Eucalyptus globulus* Labill.), and *Orégano* (*Origanum vulgare* L.) for six each; and *Jengibre* (*Zingiber officinale* Rosc.), *Lengua de suegra* (*Kalanchoe falciforme* Haw.), *Llantén* (*Plantago major* L.), *Perejil* (*Petroselinum hortense* L.), and *Ruda* (*Ruta graveolens* L.) for five each.

Angulo et al.³ describe these practices as unorthodox, alternative, or popular, transmitted orally from generation to generation and integrated into diverse cultural expressions. However, this ancestral knowledge of medicinal plant use is being affected by modernity and is at risk of being lost to future generations.⁶ Therefore, the manifestations of ancestral herbal knowledge in Caribbean rituals and sonorities constitute evidence of the interpretive richness of social and cultural facts that, despite deprivation, forged a millennia-old wisdom that remains indispensable today.

Herbal Medicine and the Sung Word: Traditional Essence in Colonial Resistance

Traditional essence in colonial resistance Maya⁷, cited by Quintero and Hernández⁶, states that communities, particularly women, sustained a form of clandestine *cimarronaje* through the organization of cabildos to preserve their ancestral knowledge. The practice of herbal medicine and ancestral healing, often labeled as sorcery or witchcraft, was among the frequent reasons why enslaved women were brought before the Tribunal of the Holy Office.

It was common for herbalists to perform abortions and other acts that were misunderstood by Catholics, which exposed them to torture. Likewise, during the colonial period, the sung word constituted an essential instrument through which enslaved people transmitted African traditions and legacies from generation to generation.

The construction of memory through oral tradition was a form of resistance to the processes of colonization experienced by Indigenous peoples. Music, as a vehicle for the expression of sociocultural identities, generated communicative processes aimed at offering a worldview that, in the words of Figueroa⁸, occupied a privileged place by serving not only as a means to resolve linguistic problems between conquerors and the conquered, but also as a way to express aspirations for freedom. In this regard, Perea (2006) argues that herbal medicine and musicality form part of the heritage of knowledge and experience that shapes the singular identity of peoples; they are memory and oral tradition born of pluriethnic syncretism: there is magic in the making of musical objects, in dance and movement, in songs recreated in this rhyme and in forestry labor, in the rhythm of airs and percussions.

Magics of resistance, offense, or balance against exploiters, with the re-signification of evangelical contents syncretic for some love magic to keep alive the fire of passions or sexuality through botanical means: *siete queremos, sígueme, pega-pega, amansa justicia*, among others; translated into scents, foods, baths, balms, and preparations, those of ritual or territorial spatiality. Likewise, Zapata⁹ maintains that acquired knowledge has been transmitted among people, accumulating as a pedagogical resource recreated and taught in diverse ways according to context and the level of development of each person.

Relationship between Musicality and Knowledge Associated with Herbal Medicine

The connections between chants and herbal medicine emerge as a contemporary expression born from the encounter between ancestral poetic speech and Western tradition, contributing, through their singularity, to the dialogue of knowledge and to the vindication

of ancient poetic genres. This relationship between herbal medicine and song forms part of the ancestral culture defined by Muñoz (2022) as “the set of ritual practices, beliefs, bromatology, legends, and mythical narratives in Indigenous populations: Wayúu, Kankuamo, Kogui, Wiwa, Arhuaco peoples, Black communities, and Raizal communities of San Andrés Island and Providencia, and San Basilio de Palenque.”

This relationship integrates an intercultural amalgam encompassing a network of shared events and millennia-old practices in the management of medicinal herbal knowledge, with contributions exchanged between Africa and the Americas. These contributions shaped ways of being and thinking, as well as a dynamic system of cultural possibilities placed at the service of healthcare in the territories, where populations build and transform traditions that define what we are today as peoples and cultures, in a diverse and unrepeatable confluence of the insular and continental worlds—a metaphorical multicolored swell in the rhythm of the Caribbean Sea.

Within this framework, Quiñonez (2015) argues that these practices should be interpreted from an intercultural perspective as expressions of collective vitality: the existence of individuals who share a natural and social environment during a given period, producing an image of movement, connection, and communication among different cultural actors in a dialogue of knowledge with ancestry. These relationships are dynamic constructions of identity and interaction linked to ethnic and cultural richness and allow for the maintenance of ties to territory and culture, even in contexts of friction and disruption.

Despite external transformations, ancestral knowledge endures, and both biological sciences and biocultural communities recognize primordial knowledge regarding the medicinal use of plants.

Sung Singularities as a Bridge between Ancestral Knowledge and the Teaching of Natural Sciences

The link between sung singularities and the teaching of natural sciences constitutes fertile ground for dialogue between culture and science. These musical expressions, emerging from Afro-descendant and Indigenous Caribbean knowledge systems, incorporate empirical observations on biodiversity, the medicinal properties of plants, and ecological relationships among living beings; therefore, they may be interpreted as ethnoecological texts and local epistemologies that enrich modern science education.^{10,11}

According to Cobern¹², science education processes must acknowledge the cultural frameworks through which students perceive nature, recognizing traditional knowledge as a legitimate form of understanding the environment.

In this way, chants related to herbal medicine can be transformed into didactic resources to explain processes such as photosynthesis, adaptation, botanical classification, or the medicinal uses of local plant species. Intercultural learning in natural sciences entails acknowledging that students bring knowledge inherited from their communities. Incorporating sung singularities into the classroom fosters meaningful and contextualized learning, promoting scientific literacy that respects identity. From this perspective, science education is articulated with the ecology of knowledge proposed by De Sousa

Santos¹¹, encouraging respect for epistemological and cultural diversity.

Agricultural Knowledge and Musicality

Ethnobotany, herbalism, and yerbatería constitute an archive of medical and musical knowledge of African roots that shaped the cultural formation of the Caribbean. In countries such as Cuba, Haiti, Colombia, and others, these bodies of knowledge are integrated into cuisine, medicine, and ritual practices; thus, Caribbean music, as a social manifestation, traces a shared history around the sea.

Enslaved Africans left a profound imprint on Caribbean culture, contributing agricultural, medicinal, and rhythmic knowledge that gave rise to identity-based practices across the region. Their traditions, centered on relationships with the land and celebrated to the beat of the drum, contrast with the celestial worship of Catholicism and, following the diaspora, gave rise to Afro-American expressions that still endure. The magical–spiritual dimension, born of knowledge that is their own rather than of the European hegemonic narrative, represents an affirmation of ancestral values and knowledge collectively constructed from the territory.

Within practices involving medicinal plants and their rituals, sonorities and dancing deities reveal a worldview distinct from the positivism imported from Europe. Africans brought to the Americas preserved ancestral knowledge, chants, and ritual rhythms in memory as living forms of resistance. Even after losing their tribal languages, they transformed their heritage, for example, the term *cumbila*, a probable origin of cumbia into music, herbal practice, and spirituality, leaving a marked trace of Africanity.

Proclaiming through the Musicality of Caribbean Herbal Medicine

Philosophy, born of wonder and inquiry, seeks answers by exploring historical memory and traces of truth to restore history. This search may have originated with the *pregonero* who announced medicinal plants, a voice that expressed a lived reality transmitted orally. Within these proclamations, the nature of human action is revealed in its unfolding, and through the narrative understanding of subjects who, in the public square of history, bring forth an approximate restoration of a plural truth.

The musical proclamation, an open heritage for public use, disseminates herbal remedies and ancestral knowledge that link the material with the spiritual through ritual chants. In the encounter between Indigenous and Black traditions, the sung word transforms plants into emblems of knowledge and health in the face of the Western gaze. The *pregonero*, with an animated voice, sings the virtues of nature and echoes ancestral knowledge, multiplying understanding and resonating ancient generational memories:

ⁱ*The morning star illuminates our path,*

ⁱ Interviews with Luis Alberto Mármol Utria (Cartagena, 2006), Pablo Cantillo, street vendor in Barrancabermeja, Josefa Atencia, fruit vendor in San Pablo (Middle Magdalena region), and Ana María Cantero in Barrancabermeja (2006). See *The Memory of Water: Sung Dances Navigating the Magdalena River*.

*Early dew announces romance
Amid lemon grass gathered in the twilight.*

This verse evokes natural elements starlight, dew, and medicinal plants as symbolic mediators of intimacy, memory, and ancestral knowledge. The imagery reflects the integration of emotional experience with environmental awareness in Caribbean and rural oral traditions.

In the sung narratives of elders, knowledge about the therapeutic use of medicinal plants in Colombia is transmitted, celebrating life and awakening concerns regarding ecological knowledge that is valuable. Many plants such as borage, lemon balm, plantain, aloe vera and oregano are part of the traditional repertoire of musical proclamation.

The ecology of knowledge from Afro-American America validates orally transmitted cognitive practices that promote the art of good living. In the face of ecocide driven by the arrogance of global powers, only environmental rationality will allow reconciliation with the Earth.

In this sense, the proclamation becomes a pedagogical vehicle for promoting healthy living and harmony with nature. *I will gather for you a good remedy / to heal you and bring you relief / from the top of the waterfall / I will bring you medicinal flowers / so that you may be healed.* The proclamation functions as an oral newscast: stories in street melodies that announce the fruits of the land. Rooted in ancestral knowledge, as illustrated by Emirto de Lima in *Colombian Folklore* (1942), proclamations link the informal economy with biology, history, literature, philosophy, anthropology, and music, serving simultaneously as a means of livelihood and cultural expression. Other forms of Caribbean sonority should also not be overlooked, such as *fandangos*. Muñoz (2006), citing sociologist Orlando Fals Borda in *Return to the Land: Double History of the Coast – 4*, reproduces a 1905

Testimony from one of its narrators: “The sung *fandango* was played and danced in the street in front of the house of a friend who would distribute rum or *chicha*, especially during the Easter season.

People would go with a *tambor macho* and a female singer. She, who needed a strong chest to project her voice, would stand next to the drummer, while a single couple danced freely and without candles within the circle of people who clapped in rhythm and sometimes joined in chorus. It turns out to be the same *tambora* dance, of Black origin, and of the same style as *bullerengue*. A *bullerengue* song praises the medicinal and nutritional value of purslane (*Portulaca oleracea*), a resilient plant commonly found in Caribbean patios. Considered a weed, it is a superfood due to its multiple virtues: it improves circulation, is diuretic, anti-inflammatory, antiseptic, and antifungal, and has long been used in cuisine and traditional medicine. The *bullerengue* performed by Estefanía Caicedo from Caño Salao (Rocha, Bolívar), with her genuine voice and festive spirit, sang *Verdolaga*, a piece of her own compositional creation. This verse employs the image of purslane (*verdolaga*) as a metaphor for fertility, resilience, and continuity of traditional agricultural knowledge. Its repetitive structure reflects oral tradition and reinforces the symbolic connection between human care, land, and cultural identity.

*She is beautiful, she is beautiful,
Across the ground.
Gentlemen, see how purslane spreads
Across the ground.*

*Oh, she is beautiful,
Across the ground.
Oh, I planted her,
Across the ground.*

*Oh, she is so green and fresh,
Across the ground.*

This verse employs the image of purslane (*verdolaga*) as a metaphor for fertility, resilience, and continuity of traditional agricultural knowledge. Its repetitive structure reflects oral tradition and reinforces the symbolic connection between human care, land, and cultural identity.

“*El yerbatero*” composed by Winston Muegues and performed by Ivo Díaz in 2002, later revisited by Rafa Pérez in 2019, pays tribute to the wise herbal practitioners of the Caribbean. This *vallenato* song celebrates traditional medicine and inherited knowledge about plants, transmitted from generation to generation. It underscores the relationship with nature, the cultural value of herbal practice, and its role as a symbol of resistance.

*Oh, they say here, they say there,
That I am the herbal healer,
That I can cure and restore
With my homemade remedies.*

*Whoever catches the flu,
I give totumo syrup with eucalyptus and yarumo,
So they may see how it fades away.*

*Whoever has itching and stomach cramps
Takes fig milk with crushed wormseed,
And purple garlic is good
For the endocrine glands.
Mandarin peel
Heals the throat,
And for breastfeeding women,
So their breasts do not dry up,
I give jasmine with fern,
To be taken with lettuce,
Blended into a drink.*

*It treats high blood pressure,
And for heart conditions,*

*I prescribe valerian.
Do not use marijuana,
For it may cause madness.*

*If the problem is obesity,
I prescribe *pringamosa*,
A poisonous plant:
If it does not kill, it heals.
A poisonous plant:
If it does not kill, it heals.*

*Whoever suffers from itching
Should rub pineapple peel,
And those with chafing
Should avoid chives.*

*These homemade remedies
Are offered by the herbalist,
Offered by the herbalist.*

*Oh, they say here, they say there,
That many illnesses
May be cured and healed
With medicinal plants.*

*Whoever suffers from gastritis
Takes a bundle of wormwood.
Fennel seeds
Treat conjunctivitis.*

*For muscle tears and arthritis,
Its consumption relieves pain.
For high cholesterol,
I prescribe balsamina,
With small hidden flowers
And *cpw*'s-foot leaves.*

*For anemia, spinach;
For chilblains, jarilla.
Sarsaparilla is used
To soothe the lungs.*

*For kidney disorders,
I prescribe kidneywort.
Luminaria is useful
To cure hoarseness.*

*When fever becomes intense,
Elderflower is recommended.
And I also carry a vine
For single women.*

*If sadness appears,
Drink plantain water.
To heal sorrow,
Use mint.*

*These homemade remedies
Are offered by the herbalist,
Offered by the herbalist.*

*They cannot claim
That I am a charlatan.
I will prove
That I can heal,
For I am a herbalist.*

*For liver disorders,
Boldo tea with lemon.
Frailéjón leaves
Relieve ear pain.*

*For dizziness caused by headaches,
Horehound, cherry, and malambo
Are used for pain.*

*For impotence,
Cardamom and Turkish delight.
For colon inflammation,
Drink flaxseed water.*

*For excess fat,
Eggplant water.
Tarifuria, verbena,
And grapefruit peel are taken.*

*For hair loss,
A chain vine is used.*

*If a man is about to leave,
Rum with lemon balm is given,
So he remains at home,*

Along with chuchuguaza.

*Chuchuguaza is given,
Chuchuguaza is given,
Chuchuguaza is given.*

Pedagogical Proposal – Intercultural Didactic Approach for Teaching Natural Sciences through Sung Singularities

The present proposal is grounded in the approaches of critical intercultural education^{13,14}, which recognize epistemic plurality and the legitimacy of ancestral knowledge, promoting dialogue between scientific knowledge and local cultural knowledge. It is also supported by the conception of humanistic and sociocultural science education,^{15,16} which understands science as a historically, socially, and culturally situated construction.

From the perspective of meaningful learning¹⁷ and sociocultural constructivism,¹⁸ learning is understood as a process of active knowledge construction based on experience, social interaction, and students' prior knowledge. The integration of traditional songs and herbal practices makes it possible to anchor scientific content to culturally familiar references, strengthening conceptual understanding and the meaningfulness of learning. The proposal also aligns with the principles of education for sustainable development by promoting attitudes of environmental care, appreciation of biodiversity, and ethical responsibility toward the environment.^{19,20}

The proposal adopts an intercultural, critical, and participatory pedagogical approach that conceives the classroom and community spaces as settings for encounters among knowledge systems. Priority is given to active, student-centered methodologies, collaborative work, school-based inquiry, and the resolution of contextualized problems. The educational process is structured around a dialogue of knowledge, in which school-based scientific knowledge is articulated with local cultural practices, particularly traditional songs and knowledge associated with herbal medicine, recognizing the community as a fundamental pedagogical agent.

From a didactic perspective, the proposal integrates two core strategies:

1. Traditional Songs as Didactic Resources

Traditional songs are used as ethnoecological texts that convey information about plants, ecosystems, natural cycles, and practices of territorial care. Through listening, analysis, interpretation, and recreation of songs, students identify botanical concepts, ecological relationships, and environmental health practices, fostering the understanding of scientific content from a culturally situated perspective.

2. Medicinal Gardens as Living Laboratories

The medicinal garden is conceived as a living pedagogical laboratory in which students investigate plant characteristics, therapeutic uses, growth conditions, ecological interactions, and contributions to sustainability. Activities include planting, observation, recording, botanical classification, the development of ethnobotanical records, and analysis of local environmental issues.

The implementation of this proposal is expected to: develop meaningful learning in botany, ecology, and environmental health; strengthen environmental awareness and commitment to sustainability; value cultural diversity and ancestral knowledge as legitimate sources of knowledge; and foster critical thinking, cultural identity, and community participation. This proposal contributes to the education of sensitive, critical, and responsible citizens capable of understanding science not merely as an accumulation of concepts, but as a tool for interpreting, caring for, and transforming their natural and social environment, in coherence with contemporary environmental and cultural challenges.

The intercultural pedagogical proposal based on traditional songs and medicinal gardens is directly aligned with the following Sustainable Development Goals (SDGs).

The proposed intercultural didactic sequence is structured as a progressive, participatory, and situated formative process, aimed at the construction of meaningful learning in natural sciences through dialogue between cultural knowledge systems and school-based scientific knowledge. Drawing on the foundations of meaningful learning¹⁷ and sociocultural constructivism,¹⁸ the sequence begins with a phase of sensitization and recognition of prior knowledge, in which students explore through dialogues with tradition bearers and the analysis of traditional songs community knowledge about medicinal plants and the natural environment, promoting the activation of cultural experiences as a basis for new learning.

Subsequently, a phase of inquiry and understanding is developed, in which students articulate such knowledge with scientific concepts from botany, ecology, and environmental health through activities of observation, classification, the preparation of ethnobotanical records, and critical analysis of the so-called sung singularities as ethnoecological texts, fostering conceptual construction and the problematization of knowledge.^{15,16}

The sequence then continues with a phase of pedagogical action, centered on the implementation of the school medicinal garden as a living laboratory, in which students apply acquired knowledge, develop scientific skills, and strengthen attitudes of environmental care and collective responsibility, in coherence with the principles of education for sustainable development.^{19,20}

Next, a phase of cultural integration and creation is proposed, in which students re-signify learning through artistic productions, reinterpretations of songs, exhibitions, and community-based activities, consolidating the social appropriation of knowledge and the strengthening of cultural identity.^{13,21}

Finally, the sequence culminates in a phase of evaluation and critical reflection, understood as a formative and comprehensive process that values not only cognitive achievements but also students' cultural, social and environmental development, enabling the formation of critical, intercultural citizens committed to the transformation of their territory.^{14,22-32}

FINAL CONSIDERATIONS

Music has been an essential tool for Indigenous and Afro-descendant peoples in the transmission of knowledge and in cultural resistance. In particular, songs inherited from the enslaved African population have served to preserve identities from the colonial period through processes of *cimarronaje*, understood as conscious ruptures with the oppressive system.

Ancestral knowledge about medicinal plants forms part of the intercultural amalgam of the Caribbean, a fabric of millennia-old practices in the use of herbal medicine contributed by Africa and enriched by American knowledge systems. These forms of knowledge shape ways of being and thinking, as well as systems of cultural possibilities oriented toward healthcare in territories where diverse populations converge and interact. In this way, traditions were

SDG	Contribution of the Proposal
SDG 3: Good Health and Well-being	Promotes knowledge of medicinal plants, disease prevention, and community health practices.
SDG 4: Quality Education	Strengthens meaningful, inclusive, and intercultural learning in natural sciences.
SDG 5: Gender Equality	Highlights the historical role of knowledgeable women and midwives in the transmission of herbal knowledge.
SDG 11: Sustainable Cities and Communities	Revitalizes cultural practices and community knowledge as living heritage.
SDG 12: Responsible Consumption and Production	Encourages responsible use of natural resources and medicinal plants.
SDG 13: Climate Action	Develops environmental awareness and commitment to mitigating ecological impact.
SDG 15: Life on Land	Promotes the care of local biodiversity and the conservation of plant species.

Adapted from: UNESCO (2023). Education for Sustainable Development A Roadmap.^{19,20}

<https://unesdoc.unesco.org/ark:/48223/pf0000380387>

constructed that define who we are today as a people and a culture: a diverse and unique union of the insular and continental worlds, a multicolored swell in the rhythmic metaphor of the Caribbean Sea.

Music has served as a means through which Indigenous and Afro-descendant peoples have transmitted their ancestral knowledge; within songs, historical memories of resistance by enslaved peoples during the colonial period and subsequent eras are preserved. Caribbean cultural music reveals, through its singularity, the relationship between medicinal practices and musical traditions transmitted from generation to generation.

Herbal medicine is deeply rooted in the cultural traditions of Caribbean peoples; therefore, understanding these singularities is crucial, as it involves recognizing how music and herbal knowledge intertwine to constitute an essential part of cultural identity within these communities. The spoken and sung word enabled enslaved peoples to preserve African traditions across generations. This orality functioned as a form of resistance against the colonization of thought and action.

Within this framework, herbal medicine and musicality are consolidated as expressions of cultural heritage that reinforce the pluriethnic identity of peoples. Music, re-signified through cultural *cimarronaje*, enabled the preservation of Afro-Caribbean subjectivities and legacies, affirming itself as human heritage. Songs, rhythms, and narratives-built bridges with the world to express lived experiences, hopes, and resistance, ensuring the continuity of their musical roots.

Future research could empirically deepen the intercultural proposal presented here through intervention studies conducted in specific school contexts. Such studies may evaluate the impact of integrating traditional songs and medicinal gardens on students' scientific literacy, environmental awareness, and cultural identity development. Assessing learning outcomes, attitudinal changes, and community engagement processes would contribute to validating and refining this pedagogical framework, while generating evidence-based insights into the role of intercultural approaches in contemporary science education.

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