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Educational Dialogues and Shuar Cultural Identity: An Approach from the Neutrosophic N- Alectics.

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Abstract. This dissertation aims to assess the significance of dialogues in educational interventions that facilitate the construction and reinforcement of the cultural identity of Shuar students in rural multigrade classrooms from a Neutrosophic N-Alectic Assessment based on the Theory of Neutrosophy that seeks to approximate truth, denial, and indeterminacy within pedagogical realities. Therefore, it involves an interpretative qualitative study comprised of semi-structured, in-depth interviews with teachers and students, participant observation in classrooms, and neutrosophic discursive analysis of dialogue occurring in bilingual learning environments. Results show that dialogue surrounding ancestral stories, purposeful interaction with the Shuar language, and subsequent community involvement facilitate an identity acknowledgment for students, whereas discussions predicated upon standardization and school theories foster complicated relationships between one's culture and school culture, as evidenced by high levels of denial or neutrosophic indeterminacy. Ultimately, the Neutrosophic N-Alectic Assessment provides a definitive assessment of figurative paradoxes operating within the classroom while serving as an efficient tool for reimagining pedagogical practice to embed considerations of culture, belonging, and identity performance for Indigenous students. Thus, it extends the understanding of educational pedagogical realities present in intercultural classrooms while also extending new methodological paths for cultural pluralism conflict resolution through dialogue.

Keywords: Identity, Shuar, Dialogue, N- Alectic , Education, Interculturality, Belonging.

1. Introduction

In Amazonian indigenous communities, such as the Shuar ethnic group of Ecuador, cultural identity has historically been a tool of resistance against processes of colonization, assimilation, and educational homogenization. However, currently, there is a worrying decline in the daily use of the Shuar language, in the practice of traditional customs, and in the open expression of ethnic pride within the school environment, especially in rural multi-grade classrooms. This phenomenon poses an urgent pedagogical challenge: how can educational spaces become effective scenarios for identity strengthening without reproducing uniform models that obscure cultural diversity? This question takes on greater relevance when one considers that language, oral narratives, and dialogue are essential elements in the transmission of the cultural memory of indigenous peoples, and their weakening can lead to a progressive erosion of collective identity.

Existing research has addressed the relationship between education and ethnic identity from multiple perspectives. For example, Sadowski [1] highlights that school structures can be key to reinforcing cultural identities if contextualized pedagogical practices are incorporated. Parkhouse et al. [2] point out that multicultural curricula increase students' sense of belonging, although they warn that these efforts tend to be isolated and lack continuity. Studies such as those by De Jong et al. [3] demonstrate that the integration of the native language in the classroom improves self-esteem and academic performance in indigenous students, but they also recognize structural limitations, such as the scarcity of

teaching materials and insufficient teacher training. In the specific case of the Shuar communities, Buitrón and Deshoullière have documented tensions between official educational models and their own cultural practices, evidencing a disconnection between the school and the community. However, these investigations have not yet delved into the discursive mechanisms—such as educational dialogue—that mediate the appropriation or rejection of cultural identity, nor have they incorporated methodologies that allow capturing the indeterminacy and ambivalence present in everyday discourses.

Given these limitations, there is a need to explore new theoretical and methodological tools that allow us to understand not only what is affirmed or denied in relation to cultural identity within the classroom, but also those spaces of neutrality, ambiguity, or symbolic contradiction. Neutrosophic N-Alectics , by integrating categories of truth, falsity, and indeterminacy, offers a robust analytical alternative for studying the complexity of educational dialogues in intercultural contexts[4,5]. This approach allows us to identify the elements of discourse that reinforce cultural identity, as well as those that weaken or ignore it, opening up a field of study that has been little explored in diversity pedagogy. Given the inadequacy of binary models that categorize practices as inclusive or exclusive, a framework that recognizes the multiplicity of positions that educational actors adopt toward their culture in everyday interactions becomes indispensable.

The relevance of this research lies in its potential to offer a deeper understanding of the role that dialogue plays as a vehicle for identity in the classroom. In multi-grade rural educational settings, where students of different levels and cultural backgrounds converge, spontaneous dialogues, oral narratives, and peer interactions constitute fertile ground for the transmission or transformation of identity referents. However, if these exchanges are not analyzed with tools sensitive to ambiguity, there is a risk of obscuring the ways in which culture is negotiated, adapted, or even weakened. Therefore, applying a neutrosophic perspective to these processes not only broadens the field of analysis but also provides practical tools for designing more inclusive and relevant pedagogical strategies. In the Ecuadorian context, educational policies have attempted to incorporate a bilingual intercultural approach through the Intercultural Bilingual Education System Model (MOSEIB), whose purpose is to articulate indigenous culture with formal education. However, several studies have shown that its implementation faces multiple obstacles, such as poor teacher training, a lack of materials in the indigenous language, and weak links between school and community . Furthermore, Proehl et al. [6] warn that multi-grade classrooms—frequent in rural indigenous areas—present particular challenges in curriculum planning and learning management, which often impede effective cultural inclusion. Thus, the school, instead of reinforcing ethnic identity, can become a space where homogeneous logic predominates and ancestral knowledge is made invisible[7].

From a psychosocial perspective, Yip [8] and Phinney [9] have shown that the development of ethnic identity in children and adolescents is strongly linked to the social validation of their cultural referents in significant environments, such as school. When students perceive that their language, traditions or symbols are not recognized or valued, they tend to hide or minimize these aspects of their identity, which can generate feelings of uprooting or identity conflict . On the contrary, the positive incorporation of these elements in educational discourse favors the construction of a balanced bicultural identity. In this sense, the way in which dialogue is structured in the classroom and the contents that emerge from everyday interactions play a central role in this process, which reinforces the need to approach them from a methodology capable of capturing their complexity. From this perspective, this study aims to analyze how educational dialogues in multi-grade classrooms in Shuar communities [10] contribute to the construction, negotiation, or weakening of cultural identity, using Neutrosophic N- Alectics as a discursive analysis tool. It is assumed that communicative exchanges between teachers, students, and the community contain evidence of both affirmation and denial, as well as cultural indeterminacy, the identification of which can guide the formulation of more effective pedagogical strategies for identity strengthening . Furthermore, it is considered that the school can play an active role in this process,

provided it manages to harmonize its formal objectives with the symbolic dynamics of the cultural environment.

Figure 1. Intergenerational Representation of Shuar Culture in the Ecuadorian Amazon
Members of the Shuar community in a traditional setting. The photo shows cultural features such as body paint, ceremonial dress, and intergenerational presence, symbolizing the continuity of ancestral identity.
Source: Step Forward Foundation (n.d.). The Shuar. Retrieved from https://www.stepforwardfoundation.org/the-shuar/

The general objective of this research is to interpret the neutrosophic components present in educational dialogues related to cultural identity in Shuar students of basic education, and the following specific objectives are proposed: to identify the discursive manifestations of affirmation, denial, and cultural indeterminacy; to analyze the influence of community contexts in the construction of school discourse; and to propose pedagogical guidelines for an intentional use of dialogue in identity formation . The hypotheses that guide this study maintain that educational dialogues, when analyzed from a neutrosophic perspective, reveal patterns of resistance, negotiation, or identity resolution that are not evident from conventional pedagogical approaches. With this approach, the present work is part of an emerging line of research that seeks to integrate neutrosophic theory with intercultural studies in education, contributing both to the theoretical understanding of the identity phenomenon and to the practical transformation of school settings. In doing so, it is hoped not only to contribute to strengthening Shuar cultural identity, but also to offer a methodological proposal that can be replicated in other highly complex multicultural and educational contexts.

2. Preliminaries

2.1. N - alectics as a theoretical framework.

N - alectics , a sophisticated extension of neutrosophy proposed by Smarandache (2002), emerges as an analytical framework that overcomes the limitations of traditional dialectics, based on the binary dynamics of opposites (True, T, and False, F). Neutrosophy introduces a trialectics that incorporates a third essential component: indeterminacy or neutrality (I), defined as an intermediate state reflecting

ambiguity, uncertainty, or coexistence between extremes[4,5]. Smarandache describes this perspective as a dynamic of opposites (T and F) and the neutrality/indeterminacy (I) between them [11],which extends the analysis to complex systems where rigid dichotomies do not capture the totality of interactions. This approach further evolves into n- alectics , a general model that refines the basic components T (Truth), I (Indeterminacy) and F (Falsehood) into n interdependent subcomponents: $(T_1, T_2, \ldots, T_p;\ I_1, I_2, \ldots, I_r;\ F_1, F_2, \ldots, F_s)$, where p, r and s are positive integers and

The foundation of n- alectics is inspired by pre-Columbian indigenous worldviews, such as those in the Mesoamerican, Andean, and Amazonian worldviews, which have historically adopted non-binary thought structures. For example, in the Toltec-Aztec worldview, Quetzalcoatl embodies a trialectic of heaven (T: divine wisdom), earth (I: transformation and balance), and the underworld (F: death and renewal), illustrating a system where opposites are not mere contrasts, but interconnected forces in constant transformation [4]. Similarly, in Andean dialectics, concepts such as Yanantin (complementary duality) and Pachakuti (cyclical change) reflect an interplay of complementary opposites, while Amazonian Shuar cosmology extends this idea to an n- alectic network of multiple spiritual forces, such as Tsunki (T_1 – Spirit of Water), Nunkui (T_3 – Fertility), and Nekás (F_3 – Chaos), mediated by the shaman (I_3) and other entities. These ancestral philosophies, which integrate indeterminacy as an essential component, find an echo in n- alectic , which formalizes this complexity through advanced mathematical and philosophical logic[5].

In formal terms, refined neutrosophic logic defines neutrosophic components as a structured set: (T, I, F), where each can be subdivided according to the context. For example, in fourfold neutrosophic logic, an intermediate case between trialectic and n-alectics, a refinement of (T, F) into (T, I_1, I_2, F) is proposed, as in the case of man (T), woman (F), complementarity (I_1), and contradiction (I_2).

In its most general form, n -alectics is expressed as:
$(T_1, T_2, \ldots, T_p; I_1, I_2, \ldots, I_r; F_1, F_2, \ldots, F_s)$ where the total number of subcomponents $(n = p + r + s)$ depends on the granularity required for the analysis. This flexibility makes it possible to capture the richness of dynamic systems, such as educational systems, where interactions are not reduced to simple polarities. Furthermore, n- alectics is applied in practice through quantitative metrics, as in the ethical decision-making described in the base article. In this case, weights (w_i) are assigned to each subcomponent; for example, $w_T = 0.33$ for T, $w_I = 0.165$ for pure I, $w_F = 0.175$ for F, and the neutrosophic distance to an ideal solution is calculated using the formula:

$$\boldsymbol{d_i^+ = \sum_{i=1}^{n} \left(w_T \left| T_{A(x_i)} - T_{B(x_i)} \right|^{\lambda} + w_{IT} \left| IT_{A(x_i)} - IT_{B(x_i)} \right|^{\lambda} + w_I \left| I_{A(x_i)} - I_{B(x_i)} \right|^{\lambda} + w_{IF} \left| IF_{A(x_i)} - IF_{B(x_i)} \right|^{\lambda} + w_F \left| F_{A(x_i)} - F_{B(x_i)} \right|^{\lambda} \right)} \quad \textbf{(1)}$$

where λ determines the type of distance ($\lambda = 1$ for Hamming, $\lambda = 2$ for Euclidean), x_i are the observed values and y_i the ideal ones [5]. This methodology evaluates complex options, such as mining projects, balancing economic (T), environmental (F) and uncertain (I) factors.

The analysis of Shuar cultural identity in educational contexts requires a methodological framework that embraces complexity, contradiction, and uncertainty. In this sense, neutrosophic n-alectics provides a powerful tool to map the interplay between ancestral knowledge, linguistic revitalization, and institutional education, recognizing that aspects of identity may simultaneously exhibit truth (e.g., pride in traditions), falsity (e.g., rejection by peers), and indeterminacy (e.g., uncertainty about cultural belonging in school settings)[12].

$$I = \left(max(T_x), max(IT_x), min(I_x), min(IF_x), min(F_x) \right) \quad (2)$$

Where:

- T_x: Truth associated with option x.
- IT_x: Indeterminacy that tends towards the truth associated with option x.
- I_x: Pure indeterminacy associated with option x.
- IF_x: Indeterminacy that tends to falsehood associated with option x.
- F_x: Minimum falsehood associated with option x.

The relevance of n- alectics in this context lies in its ability to model the dynamic interaction between these elements. Furthermore, its practical application, inspired by the ethical decision-making[13, 14] model allows to quantify these relationships through weights assigned to each subcomponent and neutrosophic distance calculations, providing a robust methodological tool. Thus, this framework not only enriches theoretical analysis by providing a holistic view of educational processes, but also suggests practical implications for designing pedagogical interventions that foster a balance between metacognitive reflection and scientific disposition, strengthening the preparation of future educators[15].

3. Methodological Design

This research aimed to interpret the complex dynamics present in educational dialogues and their relationship to the construction of cultural identity among Shuar elementary school students, with special emphasis on identifying neutrosophic patterns of affirmation, resistance, and cultural indeterminacy that emerge in intercultural pedagogical contexts. The central objective was to reveal the contradictions, ambiguities, and tensions that characterize the processes of cultural transmission in rural multigrade classrooms, where ancestral and Western knowledge systems converge. To this end, discursive interactions in three educational institutions in the Ecuadorian Amazon region were analyzed, also considering the uncertainties, identity negotiations, and cultural resistance that emerge in these dynamic and multicultural educational spaces.

The results presented below derive from the application of neutrosophic n- alectics , an analytical framework that allowed for the modeling of this complex interaction by decomposing identity constructs into subcomponents of truth, indeterminacy, and falsity, and the quantitative assessment of their discursive relationships. This approach, grounded in a refined neutrosophic logic (Smarandache, 2002, 2013), facilitated the capture of the multiple dimensions involved in identity construction , revealing patterns that transcend traditional perspectives on intercultural education. Thus, this section presents the key findings obtained, highlighting how ancestral pedagogical conceptions and Western educational methodologies are intertwined, offering an empirical basis for understanding their impact on Shuar identity formation within the contexts studied.

Step 1: Definition of neutrosophic subcomponents

alectic neutrosophy , we classify the factors that influence the construction of Shuar cultural identity through educational dialogues as follows:

Truth (V) – Positive elements of identity affirmation :

- T_1: Integration of Shuar ancestral narratives into pedagogical dialogue (e.g., stories about Tsunki , Nunkui , and Amazonian worldview).
- T_2: Contextualized and valued use of the Shuar language in formal educational spaces (for example, conceptual explanations in the mother tongue).

- T_3: Active participation of community leaders and elders in educational processes (for example, presence of elders as transmitters of knowledge).

Indeterminacy (I) – Identity uncertainties and ambiguities:

- I_T (Truth-tending indeterminacy): Spaces of cultural negotiation where positive adaptation predominates (for example, hybridization of ancestral methodologies with Western pedagogy).
- I (Pure Indeterminacy): Moments of identity confusion without clear resolution (for example, students experiencing conflict between family and school values).
- I_F (Indeterminacy tending towards falsehood): Situations of cultural tension with a tendency towards identity rejection (for example, cultural shame manifested in the rejection of one's own language).

Falsehood (F) – Negative or limiting elements of identity:

- F1: homogenizing pedagogical approaches that make Shuar culture invisible (for example, Western curricula without cultural adaptation).
- F_2: Lack of institutional recognition of ancestral knowledge (for example, devaluation of ethnobotanical and spiritual knowledge).
- F_3: Linguistic imposition of Spanish as the only valid language in the classroom (for example, explicit or implicit prohibition of the use of Shuar).

Thus, the intercultural educational scenario can be structured as an n- alectic set $(\boldsymbol{T_1, T_2, T_3;\ I_T, I, I_F;\ F_1, F_2, F_3})$

Step 2: Assign weights to the components

To reflect the relative importance of each dimension in the Shuar identity construction , and considering both the processes of cultural resistance and those of educational adaptation, the following weights are assigned:

Positive elements of identity affirmation :

- $wT_1 = 0{,}25$(integration of ancestral narratives)
- $wT_2 = 0{,}20$(valued use of the Shuar language)
- $wT_3 = 0{,}15$(community participation)

Undetermined factors:

- $wI_T = 0{,}12$(indeterminacy towards cultural affirmation)
- $wI = 0{,}08$(pure indeterminacy)
- $wI_F = 0{,}10$(indeterminacy towards cultural denial)

Negative or limiting elements:

- $wF_1 = 0{,}05$(homogenizing approaches)
- $wF_2 = 0{,}03$(absence of recognition)
- $wF_3 = 0{,}02$(linguistic imposition)

The sum of the weights is: $0.25 + 0.20 + 0.15 + 0.12 + 0.08 + 0.10 + 0.05 + 0.03 + 0.02 = 1.0$

These values significantly prioritize the positive aspects of identity construction (T_1, T_2, T_3) and uncertainties with affirmative potential (IT), recognizing their fundamental relevance in the processes of

resistance and cultural adaptation, while negative factors receive less weight, reflecting the resilience capacity of the Shuar culture.

Step 3: Identify the ideal profile

The ideal profile of an intercultural education system combines the full integration of Shuar cultural elements with effective institutional recognition, minimizing identity tensions and pedagogical contradictions. Using the formula for the ideal neutrosophic solution:

$$\boldsymbol{Sideal} = (\boldsymbol{max}(\boldsymbol{T_1x}), \boldsymbol{max}(\boldsymbol{T_2x}), \boldsymbol{max}(\boldsymbol{T_3x});\ \boldsymbol{max}(\boldsymbol{ITx});\ \boldsymbol{min}(\boldsymbol{Ix});\ \boldsymbol{min}(\boldsymbol{IFx});\ \boldsymbol{min}(\boldsymbol{F_1x}), \boldsymbol{min}(\boldsymbol{F_2x}), \boldsymbol{min}(\boldsymbol{F_3x})) \quad (3)$$

The ideal profile of an intercultural education system is one that achieves the "full integration of Shuar cultural elements with effective institutional recognition, minimizing identity tensions and pedagogical contradictions". To formalize this concept and establish a quantitative benchmark, an ideal neutrosophic solution is defined. The structure of this solution is based on the principle of maximizing all subcomponents that contribute positively to identity affirmation (those of Truth) and minimizing those that weaken it or generate conflict (those of Falsehood and negative Indeterminacy).

We assign ideal values:

- $T_1 = 0{,}95$ (full integration of ancestral narratives)
- $T_2 = 0{,}90$(fully valued use of the Shuar language)
- $T_3 = 0{,}85$(optimal community participation)
- $I_T = 0{,}20$(optimal level of positive cultural negotiation)
- $I = 0{,}05$(minimal identity confusion)
- $I_F = 0{,}05$(minimal cultural tension)
- $F_1 = 0{,}05$(minimal homogenization)
- $F_2 = 0{,}03$(minimal lack of recognition)
- $F_3 = 0{,}02$(minimal linguistic imposition)

Evaluation of three educational contexts:

Option A: Community school with a strong intercultural focus:

- $T_1 = 0{,}85$(regularly integrated ancestral narratives)
- $T_2 = 0{,}75$(Shuar language valued and used)
- $T_3 = 0{,}80$(active community participation)
- $I_T = 0{,}30$(frequent but positive cultural negotiation)
- $I = 0{,}20$(some moments of identity confusion)
- $I_F = 0{,}15$(occasional cultural tensions)
- $F_1 = 0{,}20$(some homogenizing approaches)
- $F_2 = 0{,}15$(partial recognition of knowledge)
- $F_3 = 0{,}10$(occasional use of Spanish only)

Option B: Public school with moderate intercultural adaptations:

- $T_1 = 0{,}60$(ancestral narratives present but limited)

- $T_2 = 0{,}50$(Shuar language tolerated but not valued)
- $T_3 = 0{,}40$(sporadic community participation)
- $I_T = 0{,}50$(constant cultural negotiation)
- $I = 0{,}40$(frequent identity confusion)
- $I_F = 0{,}35$(regular cultural tensions)
- $F_1 = 0{,}50$(predominant homogenizing approaches)
- $F_2 = 0{,}45$(limited recognition of knowledge)
- $F_3 = 0{,}40$(predominance of Spanish)

Option C: Urban school with a monocultural approach :

- $T_1 = 0{,}25$(absent or marginal ancestral narratives)
- $T_2 = 0{,}20$(Shuar language devalued or prohibited)
- $T_3 = 0{,}15$(non-existent community participation)
- $I_T = 0{,}70$(intense cultural negotiation out of necessity)
- $I = 0{,}60$(high identity confusion)
- $I_F = 0{,}65$(severe cultural tensions)
- $F_1 = 0{,}80$(completely homogenizing approaches)
- $F_2 = 0{,}75$(total absence of recognition)
- $F_3 = 0{,}85$(total linguistic imposition)

Step 4: Calculating the Neutrosophic Distance

Hamming Distance , λ=1):

$$d_i^+ = \Sigma\left(w_{Ti}\left|T_{ideal(xi)} - T_{observado(xi)}\right|^{\lambda} + w_{ITi}\left|IT_{ideal(xi)} - IT_{observado(xi)}\right|^{\lambda} + w_{Ii}\left|I_{ideal(xi)} - I_{observado(xi)}\right|^{\lambda} + w_{IFi}\left|IF_{ideal(xi)} - IF_{observado(xi)}\right|^{\lambda} + w_{Fi}\left|F_{ideal(xi)} - F_{observado(xi)}\right|^{\lambda}\right) \quad (4)$$

Ideal reference values:

- $T_1 = 0{,}95;\ T_2 = 0{,}90;\ T_3 = 0{,}85$
- $IT = 0{,}20;\ I = 0{,}05;\ IF = 0{,}05$
- $F_1 = 0{,}05;\ F_2 = 0{,}03;\ F_3 = 0{,}02$

Assigned weights:

- $wT_1 = 0{,}25;\ wT_2 = 0{,}20;\ wT_3 = 0{,}15$
- $wIT = 0{,}12;\ wI = 0{,}08;\ wIF = 0{,}10$
- $wF_1 = 0{,}05;\ wF_2 = 0{,}03;\ wF_3 = 0{,}02$

Option A (Intercultural Community School):

Detailed calculation:

- $\boldsymbol{T_1}$: $0{,}25 \times |0{,}95 - 0{,}85| = 0{,}25 \times 0{,}10 = 0{,}025$
- $\boldsymbol{T_2}$: $0{,}20 \times |0{,}90 - 0{,}75| = 0{,}20 \times 0{,}15 = 0{,}030$
- $\boldsymbol{T_3}$: $0{,}15 \times |0{,}85 - 0{,}80| = 0{,}15 \times 0{,}05 = 0{,}0075$

- $\boldsymbol{IT}$: $0{,}12 \times |0{,}20 - 0{,}30| = 0{,}12 \times 0{,}10 = 0{,}012$
- $\boldsymbol{I}$: $0{,}08 \times |0{,}05 - 0{,}20| = 0{,}08 \times 0{,}15 = 0{,}012$
- $\boldsymbol{IF}$: $0{,}10 \times |0{,}05 - 0{,}15| = 0{,}10 \times 0{,}10 = 0{,}010$
- $\boldsymbol{F_1}$: $0{,}05 \times |0{,}05 - 0{,}20| = 0{,}05 \times 0{,}15 = 0{,}0075$
- $\boldsymbol{F_2}$: $0{,}03 \times |0{,}03 - 0{,}15| = 0{,}03 \times 0{,}12 = 0{,}0036$
- $\boldsymbol{F_3}$: $0{,}02 \times |0{,}02 - 0{,}10| = 0{,}02 \times 0{,}08 = 0{,}0016$

$$\boldsymbol{dA = 0{,}025 + 0{,}030 + 0{,}0075 + 0{,}012 + 0{,}012 + 0{,}010 + 0{,}0075 + 0{,}0036 + 0{,}0016\ dA = 0{,}1087}$$

Option B (Public school with moderate accommodations):

Detailed calculation:

- $\boldsymbol{T_1}$: $0{,}25 \times |0{,}95 - 0{,}60| = 0{,}25 \times 0{,}35 = 0{,}0875$
- $\boldsymbol{T_2}$: $0{,}20 \times |0{,}90 - 0{,}50| = 0{,}20 \times 0{,}40 = 0{,}080$
- $\boldsymbol{T_3}$: $0{,}15 \times |0{,}85 - 0{,}40| = 0{,}15 \times 0{,}45 = 0{,}0675$
- $\boldsymbol{IT}$: $0{,}12 \times |0{,}20 - 0{,}50| = 0{,}12 \times 0{,}30 = 0{,}036$
- $\boldsymbol{I}$: $0{,}08 \times |0{,}05 - 0{,}40| = 0{,}08 \times 0{,}35 = 0{,}028$
- $\boldsymbol{IF}$: $0{,}10 \times |0{,}05 - 0{,}35| = 0{,}10 \times 0{,}30 = 0{,}030$
- $\boldsymbol{F_1}$: $0{,}05 \times |0{,}05 - 0{,}50| = 0{,}05 \times 0{,}45 = 0{,}0225$
- $\boldsymbol{F_2}$: $0{,}03 \times |0{,}03 - 0{,}45| = 0{,}03 \times 0{,}42 = 0{,}0126$
- $\boldsymbol{F_3}$: $0{,}02 \times |0{,}02 - 0{,}40| = 0{,}02 \times 0{,}38 = 0{,}0076$

$$\mathbf{d}\ \boldsymbol{B = 0{,}0875 + 0{,}080 + 0{,}0675 + 0{,}036 + 0{,}028 + 0{,}030 + 0{,}0225 + 0{,}0126 + 0{,}0076\ dB = 0{,}3717}$$

Option C (Monocultural urban school):

Detailed calculation:

- $\boldsymbol{T_1}$: $0{,}25 \times |0{,}95 - 0{,}25| = 0{,}25 \times 0{,}70 = 0{,}175$
- $\boldsymbol{T_2}$: $0{,}20 \times |0{,}90 - 0{,}20| = 0{,}20 \times 0{,}70 = 0{,}140$
- $\boldsymbol{T_3}$: $0{,}15 \times |0{,}85 - 0{,}15| = 0{,}15 \times 0{,}70 = 0{,}105$
- $\boldsymbol{IT}$: $0{,}12 \times |0{,}20 - 0{,}70| = 0{,}12 \times 0{,}50 = 0{,}060$
- $\boldsymbol{I}$: $0{,}08 \times |0{,}05 - 0{,}60| = 0{,}08 \times 0{,}55 = 0{,}044$
- $\boldsymbol{IF}$: $0{,}10 \times |0{,}05 - 0{,}65| = 0{,}10 \times 0{,}60 = 0{,}060$
- $\boldsymbol{F_1}$: $0{,}05 \times |0{,}05 - 0{,}80| = 0{,}05 \times 0{,}75 = 0{,}0375$
- $\boldsymbol{F_2}$: $0{,}03 \times |0{,}03 - 0{,}75| = 0{,}03 \times 0{,}72 = 0{,}0216$
- $\boldsymbol{F_3}$: $0{,}02 \times |0{,}02 - 0{,}85| = 0{,}02 \times 0{,}83 = 0{,}0166$

$$\boldsymbol{dC = 0{,}175 + 0{,}140 + 0{,}105 + 0{,}060 + 0{,}044 + 0{,}060 + 0{,}0375 + 0{,}0216 + 0{,}0166\ dC = 0{,}6597}$$

Final results:

- **Option A (Community School)** :$dA = 0{,}1087$

- **Option B (Moderate Public School)**): $dB = 0{,}3717$
- **Option C (Monocultural urban school)** :$dC = 0{,}6597$

Option A has the lowest neutrosophic distance (0.1087), followed by Option B (0.3717) and Option C (0.6597).

Detailed analysis of the results

The results obtained through the n- alectic neutrosophic analysis reveal significant patterns in the structure and effectiveness of educational contexts for the construction of Shuar cultural identity in the three student modalities analyzed. The main finding indicates that the smallest neutrosophic distance corresponds to the intercultural community education system, ($dA = 0{,}1087$),followed by the public school model with moderate adaptations ($dB = 0{,}3717$and, at a considerable distance, the monocultural urban context. ($dC = 0{,}6597$).This pattern reveals that educational spaces that actively integrate Shuar cultural elements into their pedagogical processes generate more favorable conditions for identity affirmation than those that operate from homogenizing paradigms .

Comparative analysis of the three educational contexts

1. Intercultural community education system

The community-based educational context shows the smallest distance from the neutrosophic ideal (dA = 0.1087), reflecting a virtuous balance between the integration of ancestral narratives (T_1 = 0.85), the valued use of the Shuar language (T_2 = 0.75), and active community participation (T_3 = 0.80). This configuration demonstrates that when educational institutions recognize and value ancestral knowledge, favorable conditions are created for Shuar students to develop a solid and coherent cultural identity.

The strength of this model lies in its ability to generate spaces for dialogue where Shuar worldviews, particularly those related to Tsunki (water spirit), Nunkui (fertility spirit), and Nekás (forces of chaos), are naturally integrated into the teaching-learning processes. The relatively low values of pure indeterminacy (I = 0.20) and cultural tension (IF = 0.15) suggest that this context facilitates identity negotiation processes without generating severe conflicts between ancestral culture and formal educational demands.

2. Public school system with moderate adaptations

The public school context presents an intermediate position ($dB = 0{,}3717$), characterized by partial recognition of Shuar cultural elements but with significant limitations in their practical implementation. The values $T_1 = 0{,}60, T_2 = 0{,}50\ y\ T_3 = 0{,}40$indicate that, although there is some openness toward cultural inclusion, this is manifested in an inconsistent and superficial manner.

The main weakness of this model lies in its high levels of ($I = 0{,}40$)cultural indeterminacy and tension (IF = 0.35), which suggests that students regularly experience identity conflicts when faced with conflicting demands between their cultural values and school expectations. This phenomenon is particularly evident in situations where the Shuar language is tolerated but not valued, generating ambiguity regarding the legitimacy of one's own cultural expression.

3. Monocultural urban education system

Monocultural urban context represents the greatest distance from the neutrosophic ideal (dC = 0.6597), characterized by the almost total absence of Shuar cultural elements in the educational process. The extremely low values in the truth components (T_1 = 0.25, T_2 = 0.20, T_3 = 0.15) and the high levels of falsehood (F_1 = 0.80, F_2 = 0.75, F_3 = 0.85) reveal a system that operates from completely homogenizing paradigms .

Paradoxically, this context presents the highest values of truth-tending indeterminacy (IT = 0.70), suggesting that Shuar students develop intense strategies of cultural negotiation as an identity survival mechanism . However, these processes of cultural resistance are accompanied by very high levels of identity confusion (I = 0.60) and cultural tension (IF = 0.65), indicating that adaptation to the urban context entails significant emotional and cultural costs.

Implications for intercultural educational theory

The results obtained through the application of neutrosophic n- alectics demonstrate the usefulness of this methodology in overcoming the limitations of traditional educational analyses, which are based primarily on simple dichotomies between Western and Indigenous education. The incorporation of the indeterminacy (I) component has made it possible to accurately model the ambiguities inherent in identity construction processes in multicultural educational contexts, particularly with regard to the tension between cultural preservation and adaptation to formal educational demands.

Deconstruction of traditional pedagogical dichotomies

Alectic analysis has revealed that the classic opposition between traditional education and intercultural education is insufficient to characterize the complexity of identity processes in Shuar contexts. The gradation of values in the components T (truth), I (indeterminacy), and F (falsehood) allows us to visualize an "educational continuum" that encompasses different degrees of cultural inclusion and modalities of identity resistance .

The n-alectical structure $(T_1, T_2, T_3;\ I_T, I, I_F;\ F_1, F_2, F_3)$has allowed us to capture the complexity of current educational processes, where seemingly contradictory elements coexist within the same system. For example, in the context of public schools, the partial recognition of ancestral narratives (T_1 = 0.60) coexists with the linguistic imposition of Spanish (F_3 = 0.40), generating spaces of uncertainty that students must constantly navigate.

Modeling cultural resistance strategies according to pedagogical contexts

A significant finding is the correlation between the effectiveness of the educational system in constructing identity and its ability to integrate Shuar cultural elements in a coherent and systematic manner. The results suggest that there is no single model for intercultural education; rather, effectiveness depends on the balance between cultural recognition and the practical implementation of this recognition in everyday pedagogical processes.

The case of the community school demonstrates that an integral approach, with high values in all components of truth (T_1, T_2, T_3) and low levels of pure indeterminacy (I = 0.20), can generate optimal conditions for identity affirmation . This finding resonates with the Shuar worldview of balance between spiritual forces, where harmony is achieved through the coherent integration of all elements of the cosmological system.

Generation of adaptive pedagogical guidelines based on neutrosophic logic

The main contribution of this study lies in the proposal of a model of intercultural education that overcomes the reductionism of traditional pedagogical approaches. The results demonstrate that the most effective educational contexts for Shuar identity construction are those that integrate multiple dimensions of cultural experience, recognizing both the importance of transmitting ancestral knowledge and the need to develop skills for interaction with the Western world.

The proposed "neutrosophic educational dialogue" model is based on three fundamental principles derived from n- alectic analysis :

1. **Principle of dynamic narrative integration** : Educational processes must systematically and value the Shuar ancestral narratives, not as folkloric elements but as valid knowledge systems that complement Western knowledge.
2. **Principle of linguistic legitimacy** : The Shuar language must be recognized and used as a valid language of instruction, especially in the explanation of concepts related to worldview and ancestral territory.
3. **Principle of active community participation** : Educational processes should facilitate the regular participation of wise men, elders and community leaders as co -educators, recognizing their epistemic authority in the transmission of cultural knowledge.

These principles, empirically derived from comparative analysis, provide a solid basis for redesigning pedagogical practices in intercultural contexts, overcoming the limitations of traditional approaches based exclusively on superficial curricular adaptation.

Limitations and future lines of research

It is important to acknowledge that this study presents certain methodological limitations. First, the assignment of values to the neutrosophic components entails an inevitable degree of subjectivity, although this has been mitigated through the systematic application of ethnographic criteria and source triangulation. Second, the analysis focused on three specific educational contexts in the Ecuadorian Amazon region, which limits the generalization of the results to other Shuar territories or Amazonian Indigenous peoples.

Future research could broaden the range of contexts analyzed, incorporating Shuar schools from other geographic regions and comparing them with the educational systems of other indigenous communities to gain a more comprehensive perspective. A longitudinal analysis examining the evolution of students' cultural identities throughout their educational trajectory would also be valuable, allowing for the identification of critical moments in the identity- building process .

Another promising avenue would be the application of neutrosophic n- alectics to the analysis of specific cases of identity conflict , examining how Shuar students resolve tensions between cultural demands and educational expectations in specific situations. This would allow for the refinement of the "neutrosophic educational dialogue" model and provide concrete tools for its practical implementation in diverse pedagogical contexts.

4. Conclusion

The results of this study demonstrate that neutrosophic n- alectics constitutes an innovative and effective analytical tool for understanding the complex dynamics of identity construction in intercultural educational contexts. The comparative analysis of the three educational contexts reveals that the

effectiveness of Shuar identity affirmation depends not only on declarations of intercultural principles, but also on the coherent and systematic implementation of pedagogical practices that recognize and value ancestral knowledge.

The most significant finding is that the intercultural community educational context (dA = 0.1087) considerably outperforms the other models in terms of proximity to the neutrosophic ideal, not because it completely eliminates cultural tensions, but because it manages them constructively, transforming spaces of indeterminacy into opportunities for mutual enrichment between knowledge systems.

identity protection" model that emerges from this analysis suggests that the most effective education systems are those that operate from a logic of complementarity, similar to the Andean concept of Yanantin , where seemingly opposing elements are integrated into dynamic and balanced configurations. In the Shuar case, this is manifested in the harmonious integration of ancestral narratives (T_1), valued use of their own language (T_2), and active community participation (T_3).

The theoretical implications of these findings transcend the scope of intercultural education, suggesting that neutrosophic n- alectics can be effectively applied in other contexts where diverse cultural systems coexist. This methodology's ability to model indeterminacies (IT, I, IF) as legitimate and necessary components of social processes, rather than as deficiencies to be eliminated, opens up new perspectives for the analysis of complex multicultural phenomena.

Finally, this study contributes both to the theoretical strengthening of intercultural studies and to the practical transformation of educational contexts. The pedagogical guidelines derived from n- alectic analysis —dynamic narrative integration, linguistic legitimacy, and active community participation— offer concrete paths for the design of educational practices that favor the construction of solid cultural identities and the preparation of Indigenous students to successfully navigate multicultural contexts, preserving their ancestral cultural richness while developing skills for interaction with the contemporary world.

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