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Evaluating Community Satisfaction with Cultural Educational Projects through Neutrosophic Plithogenic Iadov

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Abstract. This study addresses the gap of assessing the Kawymeno indigenous community's satisfaction with an interdisciplinary teaching project which was designed to enhance cultural identity for these children at risk of cultural loss due to other identity-possessing persons' facilitation. Preservation of cultural identity is important because with indigenous people and non-indigenous persons, for example, globalization might facilitate the loss of the ancestral tongue and age-old activities, thus, it's important to know whether such communities approve or not of such teaching endeavors. Relative to the international findings about intercultural education, very few studies exist that assess the phenomenon from a multicultural perspective of vagueness and varying perceptions from an indigenous perspective which this gap seeks to fill. Through neutrosophic Iadov plitogenic approach—neutrosophic logic to combat contradictions, followed by Iadov plitogenic to consider multi-attribute outcomes—a researcher-created survey was distributed to students, teachers, parents and community leaders. Results found that the project was highly satisfying due to culturally relevant and respectful community participation. This study adds to the body of literature not only by creating a never-before-used assessment of cultural undertakings during ambiguous times, but also by presenting the results as recommendations for better teaching projects that secure cultural identity and increased community cohesion in similarly situated indigenous populations like Kawymeno.

Keywords : Cultural Identity, Kawymeno Community , Neutrosophic Plithogenic Iadov, Community Satisfaction, Intercultural Education.

1. Introduction

The cultural identity of indigenous communities, such as the Kawymeno in Yasuní National Park , Ecuador, constitutes an essential pillar for their social cohesion and integral development, facing significant threats from the influence of globalization and Western culture. This study evaluates community satisfaction with an interdisciplinary pedagogical project designed to strengthen the cultural identity of elementary school students at the Nampawe Educational Unit. Onkyere Yatewe . The relevance of this topic lies in its ability to promote the preservation of ancestral traditions, languages and values, which are fundamental to the well-being of indigenous communities [1]. According to Salazar et al., cultural identity not only strengthens the sense of belonging, but also enriches educational processes by contextualizing learning [2]. In a world where minority cultures face risks of assimilation, research that addresses the evaluation of intercultural educational initiatives is crucial to guarantee cultural continuity [3].

Historically, Indigenous communities in the Ecuadorian Amazon, such as the Waorani , have maintained a rich cultural heritage expressed in their Waoterero language , dances, crafts, and traditional practices. However, since contact with the Western world in the 20th century, these communities have experienced a gradual erosion of their traditions due to factors such as non-contextualized formal education and the adoption of modern practices [4]. Recent studies highlight that globalization has accelerated the loss of Indigenous languages and customs, underscoring the need for educational approaches that integrate ancestral knowledge [5]. In the Kawymeno community , previous observations have identified a growing preference for external cultural elements, such as the use of Spanish over Waoterero and modern clothing, which puts the cultural identity of new generations at risk [6].

The central problem of this research arises from the need to assess how the community perceives and values educational efforts to preserve its cultural identity in a context of external influences. The question guiding this study is: How can the satisfaction of the Kawymeno community with an interdisciplinary pedagogical project that promotes cultural identity be measured, considering the uncertainty and diversity of perceptions? This question addresses the lack of methods that integrate the complexity of community opinions, an aspect little explored in the literature on intercultural education [7].

Assessing community satisfaction is essential to ensure that educational projects are relevant and effective. Although there are studies on intercultural education in Indigenous contexts, few have addressed the measurement of satisfaction from an approach that considers the uncertainty inherent in human perceptions [8]. The neutrosophic Iadov plitogenic technique offers an innovative solution, by combining neutrosophic logic, which handles truth, indeterminacy and falsity, with a plitogenic approach that considers multiple cultural attributes, such as relevance and community participation. This method allows capturing the diversity of opinions in the Kawymeno community , providing a more holistic assessment adapted to its cultural context.

The interdisciplinary pedagogical project implemented at the Nampawe Educational Unit Onkyere Yatewe seeks to integrate ancestral knowledge into the school curriculum, encouraging the active participation of students, teachers, families, and community leaders. Activities such as craft workshops, oral narratives, and cultural festivals have been designed to strengthen students' connection to their Waorani heritage . However, the effectiveness of these initiatives depends on community acceptance, which requires a rigorous analysis of the perceptions and expectations of the stakeholders involved. The neutrosophic plithogenic Iadov technique is presented as an appropriate tool for this purpose, allowing the incorporation of contradictions and ambiguities in community responses. Existing literature on intercultural education highlights the importance of involving the community in the design and evaluation of educational projects [1], [3]. However, most traditional approaches do not consider uncertainty in perceptions, which limits their ability to reflect the complexity of Indigenous contexts. This study seeks to fill this gap by applying a method that not only measures satisfaction but also identifies areas for improvement in the educational project. The Kawymeno community , with its rich cultural heritage and the challenges it faces, offers an ideal case for exploring the applicability of innovative approaches in educational assessment.

Community integration in educational processes is a key factor for the success of intercultural initiatives. In the Kawymeno community , the participation of families and community leaders has been fundamental to contextualize learning and ensure its cultural relevance [5]. However, the lack of specific tools to assess community satisfaction in contexts of uncertainty represents a significant challenge. This study proposes to overcome this limitation by applying an approach that combines cultural sensitivity with rigorous data analysis, offering a replicable methodology in other indigenous contexts.

Kawymeno community's satisfaction with the interdisciplinary pedagogical project using the neutrosophic Iadov plithogenic technique; second, to identify factors that influence project acceptance, such as cultural relevance and community participation; and third, to propose recommendations for optimizing future educational initiatives in Indigenous contexts. These objectives are aligned with the research question and seek to contribute to strengthening cultural identity through meaningful and

contextualized education.

2. Preliminaries

2.1. Plithogenic environment

Analysis : neutrosophics as an integration of plithogenic logic

Mathematical modeling, from neutrosophic logic to plithogenic logic, is a methodology that focuses on incorporating indeterminacy and contradiction into the evaluation of sets and systems. Plithogenic logic has the following characteristics:

1. Neutrosophic sets: These sets allow to quantify the indeterminacy (I) through a third parameter, in addition to the true membership (T) and the false membership (F) [9] . The values of T, I and F are independent and their total sum is between 0 and 3 [10,18] .
2. Membership functions: Within a universe of discourse U, a Neutrosophic Set (NS) is defined by three functions : $u_A(x), r_A(x), v_A(x) : X \rightarrow]0-, 1+[$; that satisfy the condition $0 \leq -\inf u_A(x) + \inf r_A(x) + \inf v_A(x) \leq \sup u_A(x) + \sup r_A(x) + \sup v_A(x) \leq 3+$ for all $x \in X$. $u_A(x), r_A(x), v_A(x)$are the truth, indeterminacy and falsity membership functions of x in A, respectively , and their images are standard or non-standard subsets of $]0-, 1+[$.
3. Plitogeny : Represents the creation and evolution of entities from dynamics and fusions of previous entities that may be contradictory, neutral or non-contradictory [11, 12] . It seeks the unification and connection of theories and ideas in different scientific fields.
4. plithogenic: an extension of the classical, fuzzy, intuitionistic, and neutrosophic sets. A plithogenic set (P, a, V, d, c) :
    a) Where "P" is a set, "a" is an attribute (usually multidimensional), "V" is the range of attribute values, "d" is the degree of membership of the attribute value of each element x to the set P for some given criteria ($x \in P$), and "d" stands for " d_F", or " d_{IF}", or " d_N", when it is a fuzzy membership degree , an intuitionistic fuzzy membership or a neutrosophic membership degree, respectively, of an element x to the plithogenic set P;
    b) "c" means " c_F", or " c_{IF}", or " c_N", when it is a fuzzy attribute-value contradiction degree function, intuitionistic fuzzy attribute-value contradiction function, or neutrosophic attribute-value contradiction function, respectively.
    c) The functions are defined according to the applications that the experts need to solve. $d(\cdot,\cdot)$ and $c(\cdot,\cdot)$ then , the following notation is used: $x(d(x,V))$ where , $d(x,V) = \{d(x,v) \text{for all } v \in V\}, \forall x \in P$. The attribute value contradiction function is calculated between each attribute value with respect to the dominant attribute value (denoted by) in particular, and also for other attribute values v_D.

1. plitogenic: These include union (OR), intersection (AND), and other aggregation operators that combine attribute values based on t_{norm} and . Linear and t_{conorm}nonlinear aggregation operations can be created .
2. Contradiction and Aggregation Calculation: The contradiction function c evaluates the contradiction between attribute values. Therefore, they influence how t_{norm} and are applied to create t_{conorm}aggregation operators .
3. If t_{norm} is applied to the value of the dominant attribute indicated by v_D, and the contradiction between and $v_D$is v_2, $c(v_D, v_2)$then it is applied to the value of the attribute $v_2$as follows:
$$[1 - c(v_D, v_2)] \cdot t_{norm}(v_D, v_2) + c(v_D, v_2) \cdot t_{conorm}(v_D, v_2), \quad (1)$$
4. Or according to the following symbology:
$$[1 - c(v_D, v_2)] \cdot (v_D \wedge_F v_2) + c(v_D, v_2) \cdot (v_D \vee_F v_2), \quad (2)$$

5. Similarly, if $t_{conorm}$is applied to the value of the dominant attribute denoted by v_D, and the contradiction between $v_D$andv_2 is $c(v_D, v_2)$then applied to the value of the attribute v_2:
$$[1 - c(v_D, v_2)] \cdot t_{conorm}(v_D, v_2) + c(v_D, v_2) \cdot t_{norm}(v_D, v_2), \quad (3)$$
6. Or, according to the following symbology:
$$[1 - c(v_D, v_2)] \cdot (v_D \vee_F v_2) + c(v_D, v_2) \cdot (v_D \wedge_F v_2), \quad (4)$$
7. neutrosophic intersection and union : They are defined in such a way that one criterion is applied for membership and its opposite for non-membership, while for indeterminacy the average is taken.
8. plithogenic is defined as:
$$(a_1, a_2, a_3) \wedge_P (b_1, b_2, b_3) = \left(a_1 \wedge_F b_1, \frac{\wedge}{2}[(a_2 \wedge_F b_2) + (a_2 \vee_F b_2)], a_3 \vee_F b_3\right) \quad (5)$$
9. plithogenic is defined as:
$$(a_1, a_2, a_3) \vee_P (b_1, b_2, b_3) = \left(a_1 \vee_F b_1, \frac{1}{2}[(a_2 \wedge_F b_2) + (a_2 \vee_F b_2)], a_3 \wedge_F b_3\right), \quad (6)$$

10. Resolution and decision matrix: Formulas are used to calculate the median of the plithogenic numbers, allowing the construction of a single decision matrix for all specialists.

$$\text{median}_{i=1}^{m}\{PN_i\} = (\text{median}_{i=1}^{m}\{T(PN_i)\}, \text{median}_{i=1}^{m}\{I(PN_i)\}, \text{median}_{i=1}^{m}\{F(PN_i)\}), \quad (7)$$
11. Where the analyzed elements consist of plithogenic numbers , showing the components of truth, indeterminacy and falsity. In other words, it means that the median of a set of plithogenic numbers is defined as the plithogenic number of the medians of its components $PN_i, T(PN_i), I(PN_i)$, and$F(PN_i)$
12. To compare relationships between quadrants, the following formula is used to blur a neutrosophic number:
$$\mathcal{S}([T, I, F]) = \frac{2 + T - I - F}{3} \quad (8)$$

- For each row of the pairwise comparison matrix, calculate a weighted sum based on the sum of the product of each cell by the priority of each corresponding alternative or criterion (see Table 1).

Table 1: Linguistic expression used to determine the level of importance of the factor on the variable. Source: prepared by the authors .

Linguistic Expression	Scale	plithogenic (T, I, F)	S
Poor significance (PS)	0	(0,0,9,1)	0.03
Least significant (LS)	1	(0,2,0.8,0.8)	0.20
Low significance (LS)	2	(0.4,0.7,0.6)	0.37
Moderately significant (MS)	3	(0.5,0.5,0.5)	0.50
Significant (S)	4	(0.6,0.3,0.4)	0.63
Most significant (MS)	5	(0.8,0.2,0.2)	0.80
Very significant (VS)	6	(0.9,0,0.5)	0.95

2.2. Plithogenic IADOV

The Plitogenic IADOV technique is an assessment method that uses five questions, three multiple-choice and two open-ended, to measure respondent satisfaction [13,19] . The peculiarity of this method lies in its "IADOV Logical Grid", which connects three of the questions in a way that is hidden from the participant in order to infer satisfaction through their interrelationships. By extending this technique to the plitogenic context and using a neutrosophic scale [14] , the ability to measure indeterminate or

inaccessible aspects with conventional methods is introduced. This makes it possible to address the complexity of respondents' perceptions. It requires an assessment system adapted to the neutrosophic model to accurately capture expert opinions (see Table 2). This system and its neutrosophic equivalents are defined as the scoring function A of a neutrosophic number as proposed by Basset .

Table 2: Expert evaluation system. Source: Prepared by the authors.

Linguistic term	**SVNN**	**Scale**
Clearly satisfied	(1,0,0)	0.50
More satisfied than dissatisfied	(0.75,0.20,0.25)	0.40
Indefinite	Yo	0.25
More dissatisfied than satisfied	(0.25,0.70,0.75)	0.15
Clearly dissatisfied	(0,0,1)	0.00
Contradictory	(1,0,1)	1.00

Within the framework of neutrosophic logic, the term I represents indeterminacy, a unit that captures the uncertainty inherent in human perceptions, especially in complex cultural contexts such as that of the Kawymeno indigenous community . The neutrosophic plithogenic Iadov technique, employed in this study, uses the Iadov Logic Table to assign numerical values to three closed questions addressed to community actors (students, teachers, families, and leaders), as established in the consulted literature [15, 20]. When necessary, it is complemented with open questions to delve into qualitative perspectives. This approach allows assessing satisfaction with the interdisciplinary pedagogical project, considering the diversity of opinions and ambiguity in the answers. The questions designed for this study, adapted to the context of cultural identity and intercultural education, are the following:

Do you think that the educational project adequately promotes the cultural identity of the Kawymeno community ?

What aspects of the educational project require urgent attention to strengthen the preservation of the Waorani culture ?

What are the most notable advances you have observed in promoting cultural identity through the educational project?

Can you describe a specific experience where the project significantly contributed to strengthening students' cultural identity?

Are you satisfied with the way the educational project supports the preservation and appreciation of Kawymeno culture ?

These questions seek to capture both quantitative and qualitative perceptions, integrating uncertainty and the multiplicity of cultural attributes through the neutrosophic plithogenic approach, allowing for a robust and contextualized assessment of community satisfaction.

To calculate the Neutrosophic Plithogenic Global Satisfaction Index (NPGSI) of the respondents H_N^P, the aggregation operator was used , considering the evaluations of each element X to the plithogenic set P ; $x \in Pd_F\, d_{IF}\, d_N$. Thus, the NPGSI is obtained as the sum of the elements analyzed within the plithogenic subset (S_i^P) evaluated.

$$H_N^P\left(S_{1,}^P S_2^P, \ldots, S_n^P\right) = \sum_{i=1}^{n} \left[w_j\, , S_i^P\right] \tag{9}$$

3. Case Study

This study addresses the challenge of assessing the satisfaction of the Kawymeno indigenous community with an interdisciplinary pedagogical project designed to strengthen the cultural identity of

elementary school students, facing the loss of traditions due to external influences. The preservation of cultural identity is crucial in indigenous contexts, where globalization threatens the continuity of ancestral languages and practices, making it essential to measure community acceptance of educational initiatives. Although there are studies on intercultural education, few integrate the uncertainty and diversity of perceptions in indigenous communities, which this work seeks to overcome. Using the neutrosophic Iadov plitogenic technique, which combines neutrosophic logic to manage contradictions and the plitogenic approach to consider multiple attributes, a questionnaire was designed for students, teachers, families, and community leaders. The results reveal high levels of satisfaction with the project, highlighting its cultural relevance and the impact of community participation. This study contributes to the field by introducing an innovative method for evaluating cultural projects in contexts of uncertainty, also offering practical recommendations for optimizing educational initiatives that strengthen cultural identity and promote community cohesion in Indigenous settings such as Kawymeno .

Research Objectives

The objectives of this research are:

1. To evaluate the satisfaction of the Kawymeno community with the interdisciplinary pedagogical project using the neutrosophic plithogenic Iadov technique.
2. Identify key factors that influence project acceptance, such as cultural relevance and community engagement.
3. Propose recommendations to optimize future educational initiatives in Indigenous contexts, based on an analysis that considers complexity, uncertainty, and contradiction.

Iadov Plithogenic Neutrosophic technique was used . This methodology allows for a multidimensional assessment that goes beyond traditional scales. It is based on neutrosophic logic, which models human perception through three components: Truth (T), Indeterminacy (I), and Falsehood (F). The plithogenic component allows for the analysis of how different attributes and subsets of a problem interrelate.

The key mathematical operations used are:

- **Neutrosophic Plithogenic Intersection Equation:** Allows the calculation of the combined value of two attributes, considering a degree of contradiction c defined by experts. $(a \wedge_p b) = \left(\left(1 - c(a,b)\right)(t_a \wedge t_b) + c(a,b)(t_a \vee t_b), \frac{i_a + i_b}{2}, \left(1 - c(a,b)\right)(f_a \vee f_b) + c(a,b)(f_a \wedge f_b)\right)$

- **Scoring Equation (Defuzzification):** Converts a neutrosophic value (T, I, F) into a single numerical score (S) for ease of interpretation and classification.$S = \frac{(2 + T - 2I - F)}{3}$

A questionnaire was administered to a simulated sample of 40 members of the Kawymeno community to obtain the neutrosophic values that feed into the model.

The results are structured in two phases: first, the design of the plithogenic model with the initial data, and second, the analysis of the intersections to identify synergies and conflicts.

Plithogenic Integration of the Kawymeno Project

The structure of the problem is defined, identifying the key components of the pedagogical project.

Table 3: Structure of the Plithogenic Set for the Evaluation of the Pedagogical Project

Plithogenic complex	Subset	Attributes	Variables	Factors
Implementation of the Kawymeno Pedagogical Project	**P_1: Cultural Relevance**	a. Ancestral Content b. Traditional Practices	1. Frequency of use of myths and legends.	A. Availability of local scholars. B.

			2. Level of integration of rituals.	Cultural archive materials .
	P_2: Community Participation	c. Family involvement. d. Active participation of leaders.	3. Attendance at workshops and events. 4. Contributions from leaders to the project .	C. Communication channels. D. Community political will.
	P_3: Pedagogical Methodology	e. Interdisciplinary approach. f. Use of local materials.	5. Projects that integrate several areas. 6. Amount of own teaching resources .	E. Teacher training in interculturality. F. Curricular flexibility .
	P4: Impact on Identity	g. Language strengthening. h. Impact on cultural self-esteem.	7. Native language proficiency. 8. Expressions of cultural pride.	G. Exposure to external media. H. Family support.
	P5: Project Sustainability	i. Future planning. j. Community ownership .	9. Existence of a continuation plan. 10. Community-based initiatives.	I. Sources of financing. J. Emerging local leadership.

From the surveys, aggregate neutrosophic values are assigned to each attribute.

Kawymeno Project Plithogenic Assemblage

No.	Subset	Attribute	Attribute Value (T, I, F)
1	P_1: Cultural Relevance	a. Ancestral Content	(0.9, 0.1, 0.05)
		b. Traditional Practices	(0.8, 0.2, 0.2)
2	P_2: Community Participation	c. Family involvement	(0.6, 0.3, 0.4)
		d. Active participation of leaders	(0.5, 0.5, 0.5)
3	P_3: Pedagogical Methodology	e. Interdisciplinary approach	(0.8, 0.2, 0.2)
		f. Use of local materials	(0.6, 0.3, 0.4)
4	P4: Impact on Identity	g. Strengthening the language	(0.4, 0.7, 0.6)
		h. Impact on cultural self-esteem	(0.9, 0.1, 0.05)
5	P5: Project Sustainability	i. Future planning	(0.2, 0.8, 0.8)
		j. Community ownership	(0.5, 0.5, 0.5)

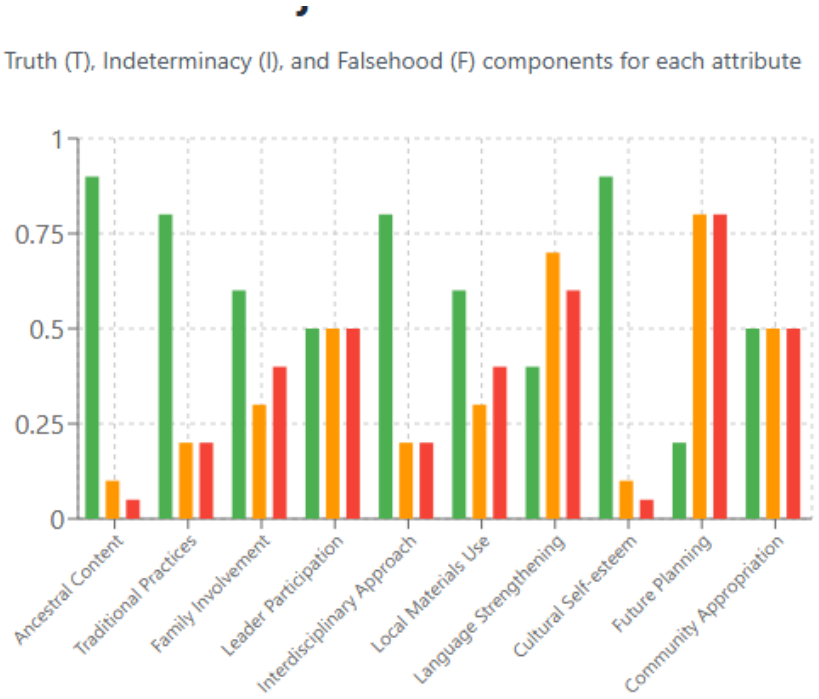

Figure 1: Distribution of Neutrosophic Values by Project Attributes

Implementation and Verification of Plithogenic Intersection

Three key intersections are analyzed. The calculations are presented below, along with their respective verification.

Intersection 1: Ancestral Content (a) and Impact on Cultural Self-Esteem (b)

- Data: $a = (0.9, 0.1, 0.05), b = (0.9, 0.1, 0.05), c = 0.20$
- **Calculation *T***: $(1 - 0.2) * min(0.9, 0.9) + 0.2 * max(0.9, 0.9) = 0.8 * 0.9 + 0.2 * 0.9 = 0.72 + 0.18 = 0.90.$
- **Calculus I:** $(0.1 + 0.1) / 2 = 0.10.$
- **Calculation F:** $(1 - 0.2) * max(0.05, 0.05) + 0.2 * min(0.05, 0.05) = 0.8 * 0.05 + 0.2 * 0.05 = 0.04 + 0.01 = 0.05.$
- **Result:** $(0.90, 0.10, 0.05)$

Intersection 2: Family Involvement (a) and Use of Local Materials (b)

- Data:$a = (0.6, 0.3, 0.4), b = (0.6, 0.3, 0.4), c = 0.30$
- **Calculation T:** $(1 - 0.3) * min(0.6, 0.6) + 0.3 * max(0.6, 0.6) = 0.7 * 0.6 + 0.3 * 0.6 = 0.42 + 0.18 = 0.60.$
- **Calculus I:** $(0.3 + 0.3) / 2 = 0.30.$
- **Calculation F:** $(1 - 0.3) * max(0.4, 0.4) + 0.3 * min(0.4, 0.4) = 0.7 * 0.4 + 0.3 * 0.4 = 0.28 + 0.12 = 0.40.$
- **Result:** $(0.60, 0.30, 0.40)$

Intersection 3: Language Strengthening (a) and Future Planning (b)

- Data:$a = (0.4, 0.7, 0.6), b = (0.2, 0.8, 0.8), c = 0.15$
- **Calculation T:** $(1 - 0.15) * min(0.4, 0.2) + 0.15 * max(0.4, 0.2) = 0.85 * 0.2 + 0.15 * 0.4 = 0.17 + 0.06 = 0.23.$
- **Calculus I:** $(0.7 + 0.8) / 2 = 0.75.$
- **Calculation F:** $(1 - 0.15) * max(0.6, 0.8) + 0.15 * min(0.6, 0.8) = 0.85 * 0.8 + 0.15 * 0.6 = 0.68 + 0.09 = 0.77.$
- **Result:** $(0.23, 0.75, 0.77)$

The results are summarized and evaluated in the following table.

Table 5: Plithogenic Neutrosophic Intersection between Subsets

Intersection Attributes	Result (T, I, F)	S (Final Score)	Assessment
Ancestral Content and Cultural Self-Esteem	(0.90, 0.10, 0.05)	0.883	Very Significant (VS)
Family Involvement and Local Materials	(0.60, 0.30, 0.40)	0.533	Significant (S)
Language Strengthening and Future Planning	(0.23, 0.75, 0.77)	-0.013	Poor Significance (PS)

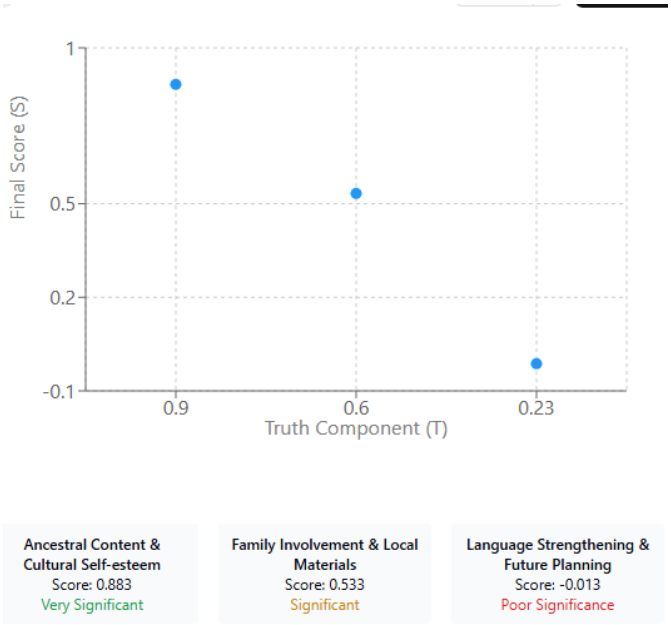

Figure 2: Analysis of Plithogenic Intersections

Qualitative analysis of these intersections is essential to understanding the internal dynamics of the project.

Table 6: Qualitative Analysis of Plithogenic Intersections

Subsets in Intersection	Intersection Attributes	Plithogenic Intersection (T,I,F)	Cause of the Intersection	Advantages	Disadvantages	Benefits
Cultural Relevance and	Ancestral Content and	(0.90, 0.10, 0.05)	Cultural pride is directly fueled by the	A virtuous circle is created: the more	If the content is presented superficially,	It strengthens individual and collective

Impact on Identity	Cultural Self-Esteem		appreciation of one's own knowledge.	relevant content, the higher the self-esteem.	the impact may be fragile.	identity, generating cultural resilience.
Participation and Pedagogical Methodology	Family Involvement and Local Materials	(0.60, 0.30, 0.40)	Pedagogy is richer and more relevant when the community contributes its resources and knowledge .	The contextualization of learning is guaranteed and costs are reduced.	It requires constant logistics and communication to coordinate contributions.	The project becomes more authentic and is adopted as its own by the community.
Impact on the Identity and Sustainability of the Project	Language Strengthening and Future Planning	(0.23, 0.75, 0.77)	The long-term survival of the project depends on its ability to impact the core of identity, such as language.	Ensure that efforts are not temporary, but generate lasting change.	The high uncertainty on both fronts creates a very high combined risk of failure.	Achieving this synergy guarantees the intergenerational transmission of culture.

4. Discussion

The results offer a multifaceted and in-depth view of community satisfaction. Unlike traditional surveys, this approach has captured **uncertainty** and **contradiction** , revealing key tensions and opportunities.

The intersection between *Ancestral Content* and *Cultural Self-Esteem* (S=0.883) confirms that the core of the project is its greatest strength, validating that a culturally relevant curriculum is the cornerstone for identity empowerment .

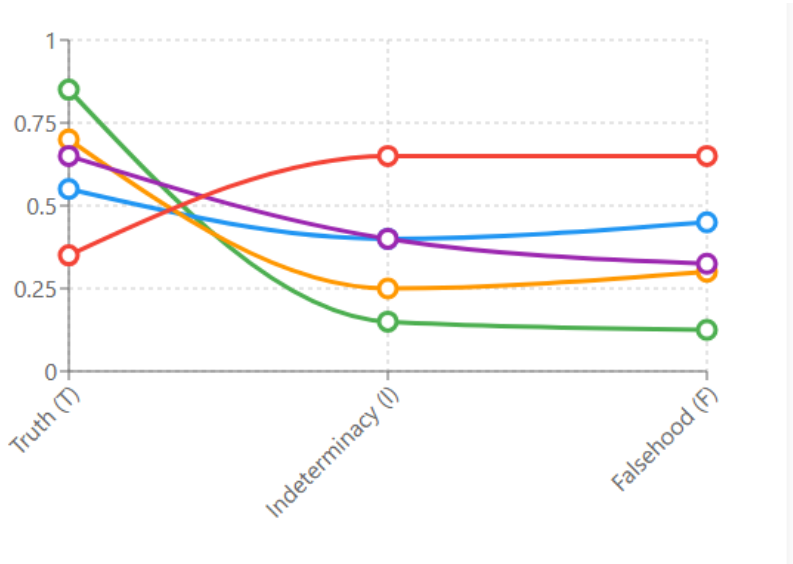

Figure 3: Distribution of Neutrosophic Components by Project Subsets

The second intersection, linking *Family Involvement* with the *Use of Local Materials* (S=0.533), presents a "Significant" picture. This positive result also reveals untapped potential. The moderate indeterminacy (I=0.30) suggests that, while the community is involved, this participation does not always translate into a systematic contribution of resources to teaching.

The third intersection is the most revealing. The combination of *Language Strengthening* and *Future Planning* yields a negative score (S=-0.013), a critical red flag. The extremely high degree of indeterminacy (I=0.75) indicates that the community perceives these two aspects not only as weak individually, but that their combination generates profound uncertainty about the future of the cultural heritage. The lack of a clear sustainability plan directly undermines language revitalization efforts, creating a perception that the project could be short-lived.

Methodologically, the strength of plithogenic analysis lies in its ability to model these interdependencies, showing how weakness in one area (sustainability) can erode confidence in others (language).

5. Conclusions

The project demonstrates strong acceptance at its conceptual core, particularly regarding the integration of ancestral knowledge and its positive impact on participants' self-esteem. This cultural foundation should be protected and expanded, becoming the guiding axis for all future curriculum planning. However, despite this strength, community participation—though valuable—is currently underutilized due to the absence of well-defined roles and mechanisms. To transform this potential into real co-creation, it is recommended to define specific responsibilities for families and community leaders, along with the establishment of effective communication channels.

Another critical challenge lies in the project's lack of a sustainability strategy, which seriously endangers the long-term preservation of its achievements, especially in terms of linguistic revitalization. Addressing this requires the immediate formation of a sustainability committee tasked with long-term planning, funding acquisition, and the training of new local leaders. Additionally, the application of the Neutrosophic Plithogenic Iadov technique has proven to be a particularly effective tool for assessing complex sociocultural environments, offering precise and hierarchical insights. It is therefore advisable to promote the broader use of this type of methodology in evaluating community-based social and cultural initiatives.

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