

Neutrosophic Analysis of Nursing Education and Training

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Abstract. Nursing education and training in Ecuador presents a complex and multifaceted situation, marked by ambiguities, inconsistencies, and contradictions in pedagogical and curricular approaches. In this context, the general objective of this neutrosophic analysis was to identify and understand these ambiguities, inconsistencies, and contradictions, while seeking solutions and improvements from a neutrosophic perspective. The results of this research revealed that the variable "relevance of curricular updating" is fundamental and that factors such as updating, relevance, implementation, and continuous evaluation interact in a complex way. Neutrosophic statistics provided precise data on their relative influence. In summary, it is concluded that addressing ambiguities and contradictions in nursing education and training in Ecuador requires continuous evaluation, collaboration between institutions, curricular flexibility, and feedback from multiple stakeholders. This neutrosophic approach is essential to make informed decisions and improve the quality of nursing education in the country.

Keywords: Nursing education, pedagogical approaches, neutrosophy, neutrosophic statistics.

1 Introduction

In Ecuador, the governing bodies of professional education, together with the universities, are responsible for the training of future professionals. Therefore, with the support of the government, vocational-technical training is a priority, and the institutions must be provided with a series of tools to support the development and training of health professionals.

Therefore, as a result of the COVID-19 emergency, there is a need to keep up to date and train each health specialty. However, this study focuses on nursing education and training as the first line of action in the event of a health emergency. Although the curricula and training plans have indeed presented ambiguities, inconsistencies, and contradictions regarding nursing education and training in the different educational institutions [1]. In the context of nursing education programs in Ecuador, it is possible to identify various sources of ambiguity in learning objectives, such as:

- Vagueness in the formulation of objectives: Some learning objectives may be formulated in a vague or general way, making it difficult to accurately understand what students are expected to achieve. For example, an objective such as "develop communication skills" is ambiguous, as it does not specify which communication skills should be developed or in what context.
- Lack of clear evaluation criteria: In some cases, objectives may lack concrete evaluation criteria that indicate how the achievement of the objective will be measured. This can lead to multiple interpretations of what students are expected to demonstrate.[2]
- Overlapping or Duplicate Objectives: Programs may sometimes have objectives that overlap or are duplicated in scope, leading to confusion about educational priorities.
- Use of undefined technical language: In the field of nursing, it is common to use technical terminology. However, if not defined precisely, it can lead to misunderstandings and multiple interpretations.
- Ambiguous objectives in terms of competencies: Ambiguity can also arise when objectives are related to the development of professional competencies [3]. If it is not clearly specified what each competency entails, students may have difficulty understanding how they should acquire them.

Inconsistencies can arise from various sources and can hinder the learning process. Here are some possible areas of inconsistency:

- Outdated content: Nursing is a constantly evolving field due to advances in healthcare and technology. If curriculum content is not updated regularly, there may be inconsistencies between what is taught and current nursing practices.[4]
- Divergence between theory and practice: If there is a lack of alignment between the theory taught in the classroom and the practical skills required in clinical practice, students may face difficulties in

- applying what they have learned in real situations.
- Inconsistencies in course sequence: If courses in the curriculum do not follow a logical sequence or if there are gaps in coverage of the concepts and skills necessary for nursing [5], this can lead to inconsistencies in knowledge acquisition.
- Lack of interdisciplinary integration: Nursing often involves collaboration with other health professionals. If the curriculum does not encourage the integration of interdisciplinary knowledge [6], there may be inconsistencies in how students work in healthcare teams [7-17-18].

Inconsistencies in assessment can have a significant impact on the quality of education and the training of competent nursing professionals. Here are some possible areas of contradiction:

- Divergence between assessment methods: There may be contradictions if different assessment methods are used (e.g., written exams, clinical assessments, peer assessment) that measure competencies and skills inconsistently.[8-14]
- Inconsistency in assessment criteria: If there is no clear alignment between the criteria used to assess student performance and the learning objectives, this can lead to contradictions in the way students are graded.
- Contradictions in feedback: If teachers offer inconsistent or contradictory feedback to students about their performance, this can lead to confusion and difficulties in improving.
- Inequity in assessment: If assessment methods are not equitable or if there are biases in the assessment of certain groups of students, contradictions in the equity and fairness of the assessment process may occur.

Based on the deficiencies detected, it is necessary to apply a neutrosophic analysis due to the level of indeterminacy existing in the study. Determining the ambiguities, inconsistencies, and contradictions at a neutrosophic level allows to visualize the impact on nursing education and training in Ecuador. Therefore, this study's main objective is:

- Analyze nursing education and training to identify ambiguities, inconsistencies, and contradictions in pedagogical and curricular approaches, as well as explore possible solutions and improvements from a neutrosophic perspective.

Specific objectives:

- Determine the neutrosophic variable that affects nursing education and training in Ecuador.
- Determine the neutrosophic factors that intervene in the states of the neutrosophic variable that affect nursing education and training in Ecuador.
- Propose solutions that influence the ambiguities, inconsistencies, and contradictions identified in nursing education and training.

2 Materials and methods

2.1 Neutrosophic Statistics

Neutrosophic probabilities and statistics are a generalization of classical and imprecise probabilities and statistics. The Neutrosophic Probability of an event E is the probability that event E occurs, the probability that event E does not occur, and the probability of indeterminacy (not knowing whether event E occurs or not) [9-15]. In classical probability $nsup \leq 1$, while in neutrosophic probability $nsup \leq 3+$. The function that models the neutrosophic probability of a random variable x is called the neutrosophic distribution:

$$NP(x) = (T(x), I(x), F(x))$$

Where $T(x)$ represents the probability that the value x occurs, $F(x)$ represents the probability that the value x does not occur, and $I(x)$ represents the indeterminate or unknown probability of the value x . Neutrosophic Statistics is the analysis of neutrosophic events and deals with neutrosophic numbers, neutrosophic probability distribution, neutrosophic estimation, neutrosophic regression [10], etc.

It refers to a set of data, which is made up totally or partially of data with some degree of indeterminacy, and to the methods to analyze them. Neutrosophic statistical methods allow to interpret and organize neutrosophic data (data that may be ambiguous, vague, imprecise, incomplete, or even unknown) to reveal underlying patterns.

In short, Neutrosophic Logic, Neutrosophic Sets, and Neutrosophic Probabilities and Statistics have a wide application in various research fields and constitute a new study reference in full development. Neutrosophic Descriptive Statistics comprises all techniques for summarizing and describing the characteristics of neutrosophic numerical data.

Neutrosophic Numbers are numbers of the form $N = a + bI$ where a and b are real or complex numbers, while " I " is the indeterminacy part of the neutrosophic number N . The study of neutrosophic statistics refers to a neutrosophic random variable where X_l and $X_u I_N$ represent the correspondingly lower and upper level that the variable

under study can reach, in an indeterminate interval. The neutrosophic mean of the variable (\bar{x}_N) is calculated with the following expression:

$$X_N = X_l + X_u I_N; I_N \in [I_l, I_u] \tag{1}$$

$$\text{Where, } \bar{x}_a = \frac{1}{n_N} \sum_{i=1}^{n_N} X_{il}, \bar{x}_b = \frac{1}{n_N} \sum_{i=1}^{n_N} X_{iu}, n_N \in [n_l, n_u], \tag{2}$$

It is a neutrosophic random sample. However, for the calculation of neutral frames (NNS), it can be calculated as follows

$$\sum_{i=1}^n N(X_i - \bar{X}_{iN})^2 = \sum_{i=1}^n N \left[\begin{array}{l} \min \left((a_i + b_i I_L)(\bar{a} + \bar{b} I_L), (a_i + b_i I_L)(\bar{a} + \bar{b} I_U) \right) \\ (a_i + b_i I_U)(\bar{a} + \bar{b} I_L), (a_i + b_i I_U)(\bar{a} + \bar{b} I_U) \\ \max \left((a_i + b_i I_L)(\bar{a} + \bar{b} I_L), (a_i + b_i I_L)(\bar{a} + \bar{b} I_U) \right) \\ (a_i + b_i I_U)(\bar{a} + \bar{b} I_L), (a_i + b_i I_U)(\bar{a} + \bar{b} I_U) \end{array} \right], I \in [I_L, I_U] \tag{3}$$

Where $a_i = X_l, b_i = X_u$. The variance of the neutrosophic sample can be calculated by

$$S_N^2 = \frac{\sum_{i=1}^{n_N} (X_i - \bar{X}_{iN})^2}{n_N}; S_N^2 \in [S_L^2, S_U^2] \tag{4}$$

The neutrosophic coefficient (NCV) measures the consistency of the variable. The lower the NCV value, the more consistent the factor's performance is with respect to the other factors. The NCV can be calculated as follows.

$$CV_N = \frac{\sqrt{S_N^2}}{\bar{X}_N} \times 100; CV_N \in [CV_L, CV_U] \tag{5}$$

The Neutrosophic Argumentation coefficient evaluates the criteria through Linguistic Terms with SVNN of consensus for the justification of the experts' opinion, (see Table 1)[11-13-16].

Table 1: Linguistic terms that represent the weight of the factors.

Linguistic term	SVNN
Extremely Relevant (ER)	(1,0,0)
Very Very Relevant (VVR)	(0.95,0.12,0.15)
Very Relevant (VR)	(0.85,0.15,0.25)
Relevant (R)	(0.75,0.3,0.35)
Moderately Relevant (MDR)	(0.65,0.35,0.4)
Medium (M)	(0.5,0.5,0)
Moderately Irrelevant (MDI)	(0.4,0.5,0.55)
Irrelevant (I)	(0.3,0.75,0.8)
Very Irrelevant (VI)	(0.25,0.8,0.85)
Very Very Irrelevant (VVI)	(0.15,0.9,0.95)
Extremely Irrelevant (EI)	(0,0,1)

2.2 Data collection

The sample size of respondents is calculated using equation 6, which takes the probabilities as 50% or 0.05, according to the following results:

Maximum margin of error allowed=10.0%

- Population size=460
- Size for a 95% confidence level 80
- Size for a 97% confidence level..... 94
- Size for a 99% confidence level..... 122

Additionally, for statistical processing, the following formula was used to calculate the sample size:

$$n = \frac{ZNpq}{E^2(N - 1) + Z^2pq} \tag{6}$$

Where: n: Sample size, Z: Value of the normal distribution with the assigned confidence level, E: Desired sampling error, N: Population size.

The variability of the data and criteria obtained conditions the use of neutrosophic statistics. The level of instability of democracy characterized by experts denotes indeterminate random components. The existence of the variability of similar responses, but with representative neutrosophic degrees, makes the use of classical statistics impossible.

3 Results

Data collection: Statistics allows to analyze situations in which random components contribute significantly to the variability of the data obtained. To measure the levels of ambiguities, inconsistencies, and contradictions in the pedagogical and curricular approaches, it was decided to work with 95% confidence, so surveys were applied to determine the *level of relevance of the curricular update in the variable* (see Table 2).

To do this, the criteria of 80 respondents from Universidad de los Andes are evaluated by a group of experts in higher education, training and curricula, and health. The impossibility of measuring some determinants of the states of the *relevance of the curricular update* is defined in the variability of similar responses.

Table 2: Characteristics of the variable. Source: own elaboration.

Variable	Coding	Sample	Scale $[0 ; 1], \forall F_n$
Levels of Relevance of the curricular update	RCU	[45;203]	<p>[1,0,0]: On this scale, the variable indicates that the curricular update in nursing education and training in Ecuador is highly relevant and is completely aligned with the latest trends and advances in nursing. There are no uncertainties, meaning there is high confidence that the curriculum is up-to-date and relevant.</p> <p>[0.75,0.3,0]: On this scale, the variable indicates that the curricular update is mostly relevant, but with some indeterminations. This could mean that, while efforts are made to keep the curriculum up to date, there are still areas where alignment with the latest trends is uncertain or where further improvements are needed.</p> <p>[0.5,0.5,0]: In this scale, the variable reflects a balance between the relevance and lack of relevance of the curricular update. There is significant indeterminacy, suggesting that it is unclear to what extent the curriculum is kept up-to-date and relevant. There may be a mix of updated and outdated items.</p> <p>[0.3,0.75,0.8]: On this scale, the variable indicates that curricular updating is mostly irrelevant, but with some indeterminations. This could reflect a situation where substantial revision of the curriculum is needed to bring it in line with current nursing practices.</p> <p>[0,0,1]: On this scale, the variable indicates that the curricular update is completely irrelevant and does not adjust at all to the latest trends and advances in nursing. There are no indeterminacies, meaning there is high confidence that an urgent review of the curriculum is required.</p>

Development of the method: For neutrosophic statistical modeling, experts select five factors that prevail in the neutrosophic sets (factors that intervene in the states of the variable), starting from defining the variable to be studied (Table 3). It should be considered that the proposed solutions are subject to constant updates motivated by advances in research, technologies, and contributions of statistical information on nursing education and training in Ecuador.

Table 3: Development of the method. Source: own elaboration.

Factor	Source elements	Relationship between factor and set	Acceptance range	Observations
F1	Scope factors	Subsets: <ul style="list-style-type: none"> Comprehensive update Limited update 	Subsets: <ul style="list-style-type: none"> $[0 ; 0; 0.5]$ $[0.5 ; 0; 1]$ 	These factors indicate the extent and depth of the update. They can vary from $[0 ; 0; 1]$ (thorough and complete update) to $[1; 0; 0]$ (limited or superficial update)
F2	Upgrade factors	Subsets: <ul style="list-style-type: none"> Fully updated. Partially updated. 	Subsets: <ul style="list-style-type: none"> $[0 ; 0; 0.5]$ $[0.25 ; 0; 0.75]$ 	These factors represent the degree to which the curriculum is updated to reflect the latest trends and advances in the field of nursing in Ecuador. Neutrosophic values can vary from $[0; 0; 1]$ (fully updated) to $[1 ; 0;$

Factor	Source elements	Relationship between factor and set	Acceptance range	Observations
		<ul style="list-style-type: none"> Completely outdated. 	<ul style="list-style-type: none"> [0.5 ; 0; 1] 	0] (completely outdated).
F3	Relevance factors	Subsets: <ul style="list-style-type: none"> Highly relevant Partially relevant Not relevant 	Subsets: <ul style="list-style-type: none"> [0 ; 0; 0.5] [0.25 ; 0; 0.75] [0.5 ; 0; 1] 	These factors evaluate whether the curricular update adapts to the specific needs and challenges of nursing in Ecuador. The neutrosophic values could range from [0; 0; 1] (highly relevant) to [1 ; 0; 0] (not relevant at all).
F4	Implementation factors	Subsets: <ul style="list-style-type: none"> Successful implementation Implementation failure 	Subsets: <ul style="list-style-type: none"> [0 ; 0; 0.5] [0.5 ; 0; 1] 	These factors reflect the extent to which the proposed updates are effectively carried out in practice, including their integration into curricula and adoption by educational institutions. They can vary from [0 ; 0; 1] (successful implementation) to [1 ; 0; 0] (implementation failure).
F5	Continuous evaluation factors	Subsets: <ul style="list-style-type: none"> Effective continuous evaluation Lack of continuous evaluation 	Subsets: <ul style="list-style-type: none"> [0 ; 0; 0.5] [0.5 ; 0; 1] 	These factors consider whether there is a systematic evaluation and feedback process to ensure that the curriculum update remains relevant over time. Neutrosophic values can range from [0; 0; 1] (effective continuous evaluation) to [1; 0; 0] (lack of continuous evaluation).

For the development of the neutrosophic statistical study, it is recommended by experts to analyze the levels of relevance of curricular updating in Ecuador. Studies under conditions of indeterminacy are associated, based on the results of the statistical bases and the surveys carried out (Table 4). To obtain the frequency of the interval for RCU, a score referring to Table 1 (Linguistic terms for each factor) is applied to each survey. The respondent (belonging to the group of experts) determines from the analyzed sample which factors are affected and under what level of relevance.

Table 4: Neutrosophic frequency of the RCU. Source: own elaboration.

No	F1	F2	F3	F4	F5
1	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]
2	[(0.4,0.5,0.55);(1,0,0)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]	[(0.15,0.9,0.95);(0.25,0.8,0.85)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]
3	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.95,0.12,0.15)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
4	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
5	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.95,0.12,0.15)]
6	[(0,0,1);(0.3,0.75,0.8)]	[(0,0,1);(0.3,0.75,0.8)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.25,0.8,0.85)]	[(0,0,1);(0,0,1)]
7	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
8	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0,0,1);(0,0,1)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]
9	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0,0,1);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
10	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(1,0,0)]
11	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0,1);(0.25,0.8,0.85)]	[(0.3,0.75,0.8);(0.95,0.12,0.15)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]
12	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
13	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0,1);(0.15,0.9,0.95)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]
14	[(0,0,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]
15	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0,0,1);(0.25,0.8,0.85)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
16	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
17	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.95,0.12,0.15)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]
18	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
19	[(0.4,0.5,0.55);(0.95,0.12,0.15)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]
20	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.25,0.8,0.85)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
21	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0,1);(0.15,0.9,0.95)]	[(0.3,0.75,0.8);(0.95,0.12,0.15)]
22	[(0,0,1);(0,0,1)]	[(0,0,1);(0,0,1)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.25,0.8,0.85)]
23	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.95,0.12,0.15)]
24	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0,1);(0.3,0.75,0.8)]
25	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.95,0.12,0.15)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.95,0.12,0.15)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]
26	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0,0,1);(0.3,0.75,0.8)]	[(0,0,1);(0,0,1)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
27	[(0,0,1);(0.4,0.5,0.55)]	[(0,0,1);(0.15,0.9,0.95)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]
28	[(0,0,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.15,0.9,0.95);(0.15,0.9,0.95)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]
29	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.95,0.12,0.15)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0,0,1);(0.3,0.75,0.8)]
30	[(0.25,0.8,0.85);(0.25,0.8,0.85)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]
31	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
32	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]	[(0,0,1);(0.15,0.9,0.95)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]
33	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.95,0.12,0.15)]	[(0,0,1);(0.25,0.8,0.85)]	[(0.3,0.75,0.8);(0.95,0.12,0.15)]	[(0.4,0.5,0.55);(0.95,0.12,0.15)]
34	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0,0,1);(0.25,0.8,0.85)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]

No	F1	F2	F3	F4	F5
35	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
36	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0,0,1);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
37	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.15,0.9,0.95)]
38	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
39	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]
40	[(0.25,0.8,0.85);(0.25,0.8,0.85)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0,0,1);(0,0,1)]	[(0,0,1);(0.25,0.8,0.85)]
41	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
42	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0,1);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]
43	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0,1);(0,0,1)]	[(0.4,0.5,0.55);(1,0,0)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
44	[(0,0,1);(0.25,0.8,0.85)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0,0,1);(0.25,0.8,0.85)]
45	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.15,0.9,0.95)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
46	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.15,0.9,0.95)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0,0,1);(0.15,0.9,0.95)]	[(0,0,1);(0,0,1)]
47	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.95,0.12,0.15)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
48	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0,1);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
49	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0,1);(0.25,0.8,0.85)]	[(0.4,0.5,0.55);(1,0,0)]
50	[(0.15,0.9,0.95);(0.25,0.8,0.85)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]
51	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0,0,1);(0,0,1)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
52	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]
53	[(0.3,0.75,0.8);(0.95,0.12,0.15)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
54	[(0.25,0.8,0.85);(0.25,0.8,0.85)]	[(0,0,1);(0,0,1)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
55	[(0,0,1);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.25,0.8,0.85)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0,1);(0.15,0.9,0.95)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]
56	[(0,0,1);(0.25,0.8,0.85)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
57	[(0.4,0.5,0.55);(1,0,0)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0,0,1);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.15,0.9,0.95)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]
58	[(0.4,0.5,0.55);(0.95,0.12,0.15)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0,0,1);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]
59	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]
60	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
61	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
62	[(0,0,1);(0.15,0.9,0.95)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.25,0.8,0.85)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
63	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
64	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.25,0.8,0.85)]	[(0,0,1);(0.3,0.75,0.8)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]
65	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0,0,1);(0.15,0.9,0.95)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0,0,1);(0.15,0.9,0.95)]
66	[(0.15,0.9,0.95);(0.15,0.9,0.95)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0,1);(0.25,0.8,0.85)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]
67	[(0,0,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0,1);(0.25,0.8,0.85)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0,0,1);(0.15,0.9,0.95)]
68	[(0,0,1);(0.3,0.75,0.8)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
69	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]
70	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]
71	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0,0,1);(0.15,0.9,0.95)]	[(0.25,0.8,0.85);(0.25,0.8,0.85)]	[(0.25,0.8,0.85);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
72	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.15,0.9,0.95)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]
73	[(0.15,0.9,0.95);(0.15,0.9,0.95)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.3,0.75,0.8);(0.95,0.12,0.15)]
74	[(0,0,1);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(1,0,0)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]
75	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0,0,1);(0.4,0.5,0.55)]
76	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0,0,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]
77	[(0,0,1);(0,0,1)]	[(0.4,0.5,0.55);(1,0,0)]	[(0,0,1);(0,0,1)]	[(0.3,0.75,0.8);(0.75,0.3,0.35)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]
78	[(0,0,1);(0.15,0.9,0.95)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0,1);(0.25,0.8,0.85)]	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0,0,1);(0.3,0.75,0.8)]
79	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0,1);(0.15,0.9,0.95)]	[(0.15,0.9,0.95);(0.25,0.8,0.85)]	[(0.15,0.9,0.95);(0.3,0.75,0.8)]	[(0.15,0.9,0.95);(0.4,0.5,0.55)]
80	[(0.4,0.5,0.55);(0.75,0.3,0.35)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(1,0,0)]	[(0,0,1);(0,0,1)]	[(0.4,0.5,0.55);(1,0,0)]
1-80	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.4,0.5,0.55)]	[(0.25,0.8,0.85);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]

For the development of the statistical study, the neutrosophic frequencies of the factors are analyzed to determine the level of relevance that affects nursing education and training in Ecuador. For each factor, a sample of the elements associated with the surrounding environment of the curricula for nursing education and training by specialists is analyzed. The analysis of the sample that makes up the analyzed groups with respect to determining the relationship between updating, scope, relevance, implementation, and continuous evaluation of nursing training plans (Table 3).

The preliminary tracking results have an average indeterminacy level close to (0.4,0.5,0.55) per factor analyzed, except for F4. The result diagnoses the deterioration of each factor that affects nursing education and training in Ecuador according to the sample analyzed:

- I. For the scope factors of education and training plans, it is between irrelevant and moderately irrelevant. Therefore, they present a tendency towards limited updating in reference to the advancement of the health field in the world.
- II. For the updating factors of education and training plans, it is between very irrelevant and moderately irrelevant. Therefore, they tend to be partially updated to reflect the latest trends and advances in the field of nursing in Ecuador.
- III. For the relevance factors of education and training plans, it is between very irrelevant and irrelevant. Therefore, they tend to be partially relevant when evaluating whether the curricular update adapts to the specific needs and challenges of nursing in Ecuador.
- IV. For the implementation factors of the proposed updates, it is between very irrelevant and irrelevant. Therefore, they present a tendency towards failure in implementation, in the proposed updates with the objective of including their integration in the study plans and adoption by educational institutions. So not all institutions manage to integrate it into nursing training.
- V. For the continuous evaluation factors of curricular updating, whether it remains relevant over time is

between irrelevant and moderately irrelevant. Therefore, they have a tendency towards a lack of continuous evaluation to ensure that there is a systematic process of evaluation and feedback of curricular updating, which remains relevant over time in Ecuador.

From the results obtained, it can be seen that the existing levels of indeterminacy require the use of neutrosophic statistics for a greater understanding of the interrelated neutrosophic sets.

Neutrosophic statistical analysis: Modeling the data on the level of deterioration existing in the factors associated with nursing education and training in Ecuador shows that factors 2, 3, and 4 require studies with a level of depth. To determine the level of incidence between the causes and conditions that affect the levels of RCU, it is necessary to analyze the means (Table 5). To understand which factor implies a representative mean, $\bar{x} = \in [\bar{x}_L; \bar{x}_U]$, the values of the neutrosophic means are calculated to study the variations of the effects and the values of the neutrosophic standard deviation $S_N \in [S_L; S_U]$. To determine which factor requires a higher level of accuracy when diagnosing each subset, therefore the values $CV_N \in [CV_L; CV_U]$ are calculated.

Table 5: Neutrosophic statistical analysis of the RCU level. Source: own elaboration.

Factors	\bar{x}_N	S_N	CV_N
Scope factors	0.275 + 0.496 I	0.017 + 0.322 I	0.062 + 0.649 I
Upgrade factors	0.249 + 0.473 I	0.016 + 0.322 I	0.064 + 0.681 I
Relevance factors	0.226 + 0.49 I	0.017 + 0.301 I	0.075 + 0.614 I
Implementation factors	0.216 + 0.449 I	0.016 + 0.328 I	0.074 + 0.731 I
Continuous evaluation factors	0.276 + 0.521 I	0.015 + 0.329 I	0.054 + 0.631 I

The relevance of curricular updating in nursing education and training in Ecuador is a multidimensional concept that involves several neutrosophic factors. The neutrosophic variable "*relevance of curricular updating*" depends on the interaction and balance of these factors. From the analysis of Table 5, the factors that affect the levels of RCU and the associated level of indeterminacy are observed. Some factors having average evaluations $\bar{x} = \in [\bar{x}_L; \bar{x}_U]$ close to the lower evaluation values stand out, for example:

- **Updating Factors:** Constantly updating the curriculum to reflect advances in nursing is essential to maintain relevance. If this factor is at or near the lower end of the neutrosophic scale, it indicates that the curriculum is not updated regularly and could have a very negative impact on relevance.
- **Relevance factors:** The relevance of the curricular update to the specific needs of nursing in Ecuador is also crucial. If the curriculum is not adapted to the real needs and challenges of the local health system, this could make the update less relevant.
- **Implementation factors:** Even if updates are made, if they are not implemented effectively in practice, relevance may be compromised. Lack of successful implementation could result in a curriculum that is out of date in practice, negatively affecting relevance.

These neutrosophic factors may have a particularly significant impact on the relevance of curricular updating in nursing education and training in Ecuador. Therefore, the neutrosophic variable "*relevance of curricular updating*" depends on the interaction and balance of these factors. Therefore, to determine which of these neutrosophic factors is the most influential, it is necessary to analyze other neutrosophic statistical elements.

Therefore, it is necessary to analyze the current state of nursing education and training in Ecuador to mitigate the impact of the imbalance observed between the analyzed factors. This means that the level of affectation of the variable due to these three factors depends on defining the weight in the levels of indeterminacy at the scale of the factor analyzed. To do this, it is necessary to resort to the CV_{ND} analysis of these factors and determine the one that most affects the variable to determine the planned solutions.

Comparative analysis: To determine the measure of referent indeterminacy for $\bar{x} = \in [\bar{x}_L; \bar{x}_U]$, $S_N \in [S_L; S_U]$ y $CV_N \in [CV_L; CV_U]$ associated with the form of neutrosophic numbers (Table 6). In the results obtained, it is observed that the values range from 0.054 to 0.075 with the indeterminacy measure of [0.878;0.914] generated by a sample of [100;203] questionnaires and statistical information, obtained from the analyzed sample.

Table 6: Neutrosophic forms with a measure of indeterminacy. Source: own elaboration.

Factors	\bar{x}_N	S_N	CV_N
F1	0.275 + 0.496 I;I \in [0,0.446,0]	0.017 + 0.322 I;I \in [0,0.947,0]	0.062 + 0.649 I;I \in [0,0.904,0]
F2	0.249 + 0.473 I;I \in [0,0.474,0]	0.016 + 0.322 I;I \in [0,0.95,0]	0.064 + 0.681 I;I \in [0,0.906,0]
F3	0.226 + 0.490 I;I \in [0,0.539,0]	0.017 + 0.301 I;I \in [0,0.944,0]	0.075 + 0.614 I;I \in [0,0.878,0]
F4	0.216 + 0.449 I;I \in [0,0.519,0]	0.016 + 0.334 I;I \in [0,0.951,0]	0.074 + 0.731 I;I \in [0,0.899,0]
F5	0.276 + 0.521 I;I \in [0,0.47,0]	0.015 + 0.329 I;I \in [0,0.954,0]	0.054 + 0.631 I;I \in [0,0.914,0]

From the results expected by the neutrosophic statistical study, from the three factors analyzed, there is a greater prevalence in the *updating factors*, with a frequency of $0.249 + 0.473 I$, for a 90.6% CV_N . Therefore, it is necessary to mitigate the negative effects coming from the predominant factor "*updating factors*" that most influence the neutrosophic variable "*relevance of curricular updating*" in nursing education and training in Ecuador. To this end, neutrosophic solutions are proposed aimed at treating the ambiguities, inconsistencies, and contradictions identified. Among the proposed solutions are:

- Ongoing Needs Assessment: Conduct a periodic and systematic needs assessment involving practicing nurses, employers, and other stakeholders to identify areas requiring updating. This helps remove ambiguity about which updates are necessary and relevant.
- Interinstitutional collaboration: Promote collaboration between different nursing educational institutions in Ecuador to share resources and experience in curricular updating. This can help reduce inconsistencies in how updating is approached across different programs.
- Continuing education for teachers: Provide continuing education and professional development opportunities for nursing teachers. This allows them to stay up to date and facilitate the effective implementation of new curricular updates.
- Rigorous impact evaluation: Implement a rigorous evaluation process to measure the impact of curricular updates on nursing practice and graduate performance. This helps remove ambiguity about whether the updates are having a positive effect.
- Curriculum Flexibility: Introduce flexibility into the curriculum to allow for more agile updates and adjustments as needed. This can help address the inconsistency between the rapidity of changes in practice and the ability of the curriculum to adapt.
- Permanent review committees: Establish permanent curriculum review committees that include teachers, students, nursing professionals, and external experts. These committees can review and adjust the curriculum on an ongoing basis, thereby eliminating contradictions and ensuring ongoing relevance.
- Clinical Practice Integration: Integrate more up-to-date clinical practice opportunities into the curriculum, where students can directly apply what they have learned in real-world healthcare settings.
- Resources for updating: Provide adequate resources, such as access to up-to-date literature and technology, to support ongoing updating of the curriculum.
- Feedback from employers: Collect regular feedback from employers on graduate performance and use this information to guide curriculum updates.
- External review mechanisms: Implement external review mechanisms, such as accreditations and peer reviews, to ensure the quality and relevance of the curriculum.

Conclusion

The relevance of curricular updating in nursing education in Ecuador is a complex variable that involves multiple neutrosophic factors, including *updating*, *relevance*, *implementation*, and *continuous evaluation* factors. The results obtained through neutrosophic statistics have highlighted how these factors interact interdependently, and how their values influence the perception of curricular relevance.

The results of neutrosophic statistics have shown that periodic and systematic evaluation is essential to understand the evolution of the relevance of curricular updating. This assessment must involve all stakeholders and address ambiguities, inconsistencies, and contradictions identified through concrete data and precise measurements.

Collaboration between nursing educational institutions and curricular flexibility are effective strategies that have been statistically validated through neutrosophic research. The data have shown how these strategies can contribute to reducing ambiguities and improving the adaptation of training programs to the changing needs of nursing and society in Ecuador.

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