Evaluating Strategies of Continuing Education for Academics Supported in the Pedagogical Model and Based on Plithogenic Sets

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Abstract. The preparation with which students graduate in the global environment and become university teachers, reveals that little time is devoted to the content of some disciplines related to the educational act. Therefore, they graduate with the contents that they poorly learned. Throughout their schooling, there is no adequate program on how to develop a teaching that guarantees the learning of university students. That is why continuous training programs are needed to pledge the training of these teaching professionals to confront the new challenges of Ecuadorian higher education. The purpose of this research is to determine and rank the strategies of continuous training for university teachers, proposed and evaluated by four experts. For this purpose, we use Vlsekriterijumska Optimizacija I Kompromisno Resenje (VIKOR) method, in the Plithogenic framework. Plithogenic sets generalize crisp, fuzzy, intuitionistic fuzzy, and neutrosophic sets, and have been applied successfully in decision-making problems. For the first time this method is applied in the pedagogical area.

Keywords: Higher education, continuing education, pedagogical performance, pedagogical model, VIKOR, plithogenic sets.

1 Introduction

Education by extension, continuing education or continuous training are terms that comprise a spectrum of activities and theoretical-practical learning programs, which take place after compulsory or regulated training, such as secondary, high school, or university education, [1]. Among the range of programs, there are courses developed for non-traditional students, forms of training without an academic degree, job training, personal training courses, whether in person or at distance, self-directed education, such as courses through Internet interest groups, personal research activities, internships focused on problem solving, language courses, among others.

Usually the continuing education students have a certain educational or professional level and want to improve it or obtain official recognition for their training or simply continue and deepen their education. Continuing education activities will depend on the acceptance of a regulatory body. In most cases, it requires the approval of a continuing education provider. However, the existence of online educational platforms and virtual courses transcend traditional geographical barriers and allow students to obtain quality continuing education from the comfort of their home, at work and even on mobile devices. The shift in continuing education towards virtualization has been motivated by the busyness of individuals' daily lives, lack of time, and the poverty of locally available educational resources.

Continuous training is necessary because there is a very competitive world environment due to the current speed of change and innovation in technology, rigidity of business structures and work organization, globalization of markets, and strong competitiveness.

The training of teachers in higher education currently requires a new stance that cannot be dissociated from the political, economic and social situation, marked by the incessant growth of State investment in educational infrastructures and in the formulation of the new Ecuadorian educational policy.

This is about evaluating not only the growth in offers in the management and development of inter-institutional

projects for teaching. It also requires in higher education, as in the other instructional subsystems, to develop continuous training in accordance with the social, cultural and political context, which is the main goal of every educational phenomenon.

Scientific and technological advances and new models of production are factors that occur on a global scale and impose a serious reflection by the political entities about the types of organization and the operation of the higher education system. Within the challenges of that reality, the trends are related to:

• The implementation of educational reforms to increase the quality of the educational process. Chinchilla's position is recognized in this field, who refers to the "... need for a change in the curriculum of university majoring.", [2].

• The reengineering of university substantive processes in each management that reflects on the certification and accreditation of universities (plans and programs). In this sense, other researchers such as Campoverde have stated that: "… the improvement of the pedagogical professional performance of teachers should be a reflection of university certification…", [3].

• The curricular reformulation also makes evident the imperativeness of continuous training for teachers and managers, seeking to address the scientific and technological dimensions, for a sustainable and humanistic educational process.

• The development of didactic, communicative, investigative, technological, professional and human competences that show synergy in all the constant disciplines in the curricular programs. That agrees with Oramas who offers a system of competences of university teachers for medical courses, which is a "... system of knowledge, skills and values in the modes of professional performance.", [4].

In higher education, this analysis encourages a critical and complex reflection on the approach made to the continuous training of university teachers and authorities, which promotes the improvement of their pedagogical performance and raises the quality of teaching; this is the main goal of this work.

In this paper, different strategies of continuous training for teachers of higher education in Ecuador are studied. In this regard, a theory known as Plithogeny recently emerged from Neutrosophy. Plithogeny is the genesis or origination, creation, formation, development, and evolution of new entities from dynamics and organic fusions of contradictory and/or neutrals and/or non-contradictory multiple old entities, [5]. Plithogeny pleads for the connections and unification of theories and ideas in any field. "Entities" mean the "knowledge" in various fields, such as soft sciences, hard sciences, arts and letters theories, among others.

While Neutrosophy only deals with the triad (<A>, <neut A>, <anti A>), where A is an item or a concept, Plithogeny is responsible for obtaining new objects from old ones represented by other triads (<B>, <neut B>, <anti B>) or simply <C> or <D>, so that there may be partial or total contradictions between them, which when dynamically interacting with each other create a new object.

A plithogenic set P is a set whose elements are characterized by one or more attributes, and each attribute may have many values, [5-10]. Each attribute value v has a corresponding (fuzzy, intuitionistic fuzzy, or neutrosophic) degree of appurtenance d(x,v) of the element x, to the set P, with respect to some given criteria, [11]. In order to obtain a better accuracy for the plithogenic aggregation operators, a (fuzzy, intuitionistic fuzzy, or neutrosophic) contradiction (dissimilarity) degree is defined between each attribute value and the dominant (most important) attribute value.

Additionally we use the Vlsekriterijumska Optimizacija I Kompromisno Resenje (VIKOR), which is a multi-criteria decision-making method that focuses on the criteria evaluation with respect to others, where the main idea of the method consists in assuming that the compromise is acceptable to resolve conflicts, [12-14]. In this method, each evaluation is compared against the best and worst ideal evaluations. This method has been used with plithogenic sets for hospital medical care systems evaluation, [15-18].

In this paper, we evaluate strategies for the continuous training of higher education teachers. This is a very useful and unprecedented way to make decisions in the university context of Ecuador. There are several papers covering to use Neutrosophy and Plithogeny in decision-making [7, 19-23], and pedagogical situations, [24, 25].

This paper is split into the following sections: section 2 contains a brief overview of the basic concepts of VIKOR and plithogenic sets. In section 3, we describe the results of the study of the strategies that can be applied in higher education for the continuous training of teachers, according to four experts' opinions who evaluate five alternatives based on eight criteria. Section 4 presents the conclusions.

2 Basic concepts

This section contains the basic concepts of plithogenic sets in subsection 2.1 and VIKOR method in subsection 2.2.

2.1 Plithogenic sets

Definition 1. ([5]) A *plithogenic set* (P, A, V, d, c) is a set P that includes numerous elements described by a number of attributes $A = \{\alpha_1, \alpha_2, \ldots, \alpha_m\}$, $m \geq 1$, which has values $V = \{v_1, v_2, \ldots, v_n\}$, for $n \geq 1$. For V there are two main features attributes values, they are the *appurtenance degree function* $d(x, v)$ of the element x,

with respect to some given criteria, and the *contradiction* (*dissimilarity*) *degree function* $c(v, D)$ which is the one that exists between each attribute value and the most important (dominant) one.

Given A, a non-empty set of uni-dimensional attributes $A = \{\alpha_1, \alpha_2, \ldots, \alpha_m\}$, $m \geq 1$, and let $\alpha \in A$ be an attribute with its value spectrum the set S, where S can be defined as a finite discrete set, $S = \{s_1, s_2, \ldots, s_l\}$ $l \in [1, \infty)$, or infinitely countable set $S = \{s_1, s_2, \ldots\}$, or infinitely uncountable (continuum) set $S = (a, b)$, $S = (a, b]$, $S = [a, b)$, or $S = [a, b]$.

Definition 2. ([5]) The *degree of appurtenance* is defined for fuzzy, intuitionistic fuzzy, or neutrosophic degree of appurtenance to the plithogenic set. See expression 1 below:

$$\forall x \in P, d: P \times V \to \mathcal{P}([0,1]^z) \qquad (1)$$

$d(x, v)$ is a subset of $[0,1]^z$, $\mathcal{P}([0,1]^z)$ is the power set of $[0,1]^z$, where $z = 1, 2, 3$, for fuzzy, intuitionistic fuzzy, and neutrosophic degrees of appurtenance, respectively.

Definition 3. ([5]) The attribute value *contradiction degree function* is defined as follows:

$$c: V \times V \to [0,1] \qquad (2)$$

Such that $c(v_1, v_2)$ represents the dissimilarity between two attribute values v_1 and v_2, and satisfies the following axioms:

- $c(v_1, v_1) = 0$, the contradiction degree between the attribute values and itself is zero,
- $c(v_1, v_2) = c(v_2, v_1)$.

Definition 4. Given a plithogenic set (P, A, V, d, c), a *Plithogenic Neutrosophic Aggregation Operator* is defined in Equation 3:

$$(a_1, a_2, a_3) \text{Aggr}_p(b_1, b_2, b_3) = \Big(\bar{c}(a_1 \wedge_F b_1) + (1 - \bar{c})(a_1 \vee_F b_1), \tfrac{1}{2}[a_1 \wedge_F b_1 + a_1 \vee_F b_1], \bar{c}(a_1 \vee_F b_1) +$$

$$(1 - \bar{c})(a_1 \wedge_F b_1) \Big) \qquad (3)$$

Where $\bar{c} \in [0, 1]$, $\wedge_F$ is a t-norm and $\vee_F$ is a t-conorm.

It is a *Plithogenic Neutrosophic Intersection* when $\bar{c} = 1$ and it is a *Plithogenic Neutrosophic Union* when $\bar{c} = 0$, [5]. This aggregator is more accurate than both the n-norms and n-conorms between neutrosophic sets.

A plithogenic neutrosophic set can be converted into a crisp value using the following formula, [15]:

$$\mathcal{S}(T, I, F) = \tfrac{1}{3}(2 + T - I - F) \qquad (4)$$

2.2 The VIKOR method

One fundamental formula of the VIKOR method is the L_p-metric. Let us denote by $A = \{A_1, A_2, \cdots, A_J\}$ the set of alternatives and $C = \{c_1, c_2, \cdots, c_n\}$ the set of criteria. If f_{ij} denotes the j-th alternative measured against the i-th criterion. Then, the L_p-metric is used as follows, [13, 14]:

$$L_{pj} = \left\{ \sum_{i=1}^{n} \left[w_i (f_i^* - f_{ij}) / (f_i^* - f_i^-) \right]^p \right\}^{1/p} \qquad (5)$$

Where $1 \leq p \leq \infty$; $j = 1, 2, \cdots, J$, $i = 1, 2, \cdots, n$, f_i^* and f_i^- are the best and the worst values of criteria, respectively. If c_i is a beneficial criteria, then $f_i^* = \max_j(f_{ij})$ and $f_i^- = \min_j(f_{ij})$. In contrast, if c_i is non-beneficial criteria, then $f_i^* = \min_j(f_{ij})$ and $f_i^- = \max_j(f_{ij})$. w_i is the weight of the i-th criterion expressing its importance.

Next, for decision making, indexes S_j (maximum group utility) and R_j (minimum individual regret of the opponent) are calculated using L_{1j} and $L_{\infty j}$, respectively through Equations 6 and 7.

$$S_j = \sum_{i=1}^{n} \left[w_i (f_i^* - f_{ij}) / (f_i^* - f_i^-) \right] \qquad (6)$$

$$R_j = \max_i \left[w_i (f_i^* - f_{ij}) / (f_i^* - f_i^-) \right] \qquad (7)$$

Then, the concordance index is calculated using Equation 8:

$$Q_j = v \left[\frac{S_j - S^*}{S^- - S^*} \right] + (1 - v) \left[\frac{R_j - R^*}{R^- - R^*} \right] \qquad (8)$$

Where $S^- = \max_j S_j$, $S^* = \min_j S_j$, $R^- = \max_j R_j$, $R^* = \min_j R_j$, and v is the weight of strategy of maximum group utility, usually it is fixed as 0.5.

Finally, we sort the alternatives A_j according to the values of Q_j in descending order, where alternative having the minimum Q is the best one. Then, for alternative selection, two additional conditions should be satisfied.

Condition 1 (acceptable advantage):
If A^1 and A^2 are the first and the second alternatives, respectively in the order, then this condition is:
$$Q(A^1) - Q(A^2) \geq \frac{1}{J-1}$$

Condition 2 (acceptable stability):
As the ranking of Q, A^1 must be the superior in both, the ranking of S and R. In case that one condition is not satisfied, a set of alternatives is proposed:

- If condition 2 is not satisfied, then A^1 and A^2 are compromise solutions;
- If condition 1 is not satisfied, then A^1, A^2,..., A^J are compromise solutions, where A^J is determined by the following equation:
$$Q(A^J) - Q(A^1) < \frac{1}{J-1}.$$

In [15] there is a solution obtained with VIKOR method using plithogenic sets. They define linguistic terms for assessing the weights of criteria and the classification terms, as in Tables 1 and 2, respectively.

Linguistic expressions	The plithogenic number of all expressions (T, I, F)
Low significance (LS)	(0.10, 0.70, 0.80)
Equal significance (ES)	(0.30, 0.40, 0.80)
Robust significance (RS)	(0.50, 0.40, 0.60)
Very robust significance (VRS)	(0.70, 0.30, 0.10)
Absolute significance (AS)	(0.90, 0.10, 0.10)

Table 1: Semantic expressions for the significance weights of criteria. Source [15].

Linguistic expressions	Plithogenic number (T, I, F)
Very poor (VP)	(0.10, 0.75, 0.85)
Poor (P)	(0.25, 0.60, 0.80)
Medium poor (MP)	(0.40, 0.70, 0.50)
Medium (M)	(0.50, 0.40, 0.60)
Medium Good (MG)	(0.65, 0.30, 0.45)
Good (G)	(0.80, 0.10, 0.30)
Very Good (VG)	(0.95, 0.05, 0.05)

Table 2: Linguistic expressions for rendering classification of substitutions. Source [15].

This method contemplates a matrix where the k-th evaluator assesses the J alternatives according to the n criteria as follows:

$$\widetilde{M}_k = \begin{matrix} & & c_1 & c_2 & \cdots & c_n \\ Contradiction\ degrees & \begin{matrix} \\ A_1 \\ A_2 \\ \vdots \\ A_J \end{matrix} & \begin{bmatrix} cd_1 & cd_2 & \cdots & cd_n \\ \widetilde{X}_{11k} & \widetilde{X}_{12k} & \cdots & \widetilde{X}_{1nk} \\ \widetilde{X}_{21k} & \widetilde{X}_{22k} & \cdots & \widetilde{X}_{2nk} \\ \vdots & \vdots & \cdots & \vdots \\ \widetilde{X}_{J1k} & \widetilde{X}_{J2k} & \cdots & \widetilde{X}_{Jnk} \end{bmatrix} \end{matrix} \quad (9)$$

Where $\widetilde{X}_{jik} = (T_{jik}, I_{jik}, F_{jik})$ $(j = 1,2,...,J)(i = 1,2,...,n)$ is the evaluation given by the k-th expert about the j-th alternative evaluated according to the i-th criterion. These values are obtained from Table 2.

On the other hand, experts evaluate every criterion according to matrix in Equation 10.

$$\widetilde{N} = \begin{matrix} & & c_1 & c_2 & \cdots & c_n \\ Contradiction\ degrees & \begin{matrix} \\ E_1 \\ E_2 \\ \vdots \\ E_m \end{matrix} & \begin{bmatrix} cd_1 & cd_2 & \cdots & cd_n \\ \widetilde{X}_{11} & \widetilde{X}_{12} & \cdots & \widetilde{X}_{1n} \\ \widetilde{X}_{21} & \widetilde{X}_{22} & \cdots & \widetilde{X}_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ \widetilde{X}_{m1} & \widetilde{X}_{m2} & \cdots & \widetilde{X}_{mn} \end{bmatrix} \end{matrix} \quad (10)$$

Here, $\widetilde{X}_{ki}$ is the evaluation of the k-th expert on the importance of the i-th criterion. The values are obtained from the linguistic terms in Table 1 and $\widetilde{X}_{ki}$ are their equivalent plithogenic numbers.

Then, the algorithm to calculate the best alternative is the following:

1. Select the set of experts $E = \{E_1, E_2, \cdots, E_m\}$, the set of criteria $C = \{c_1, c_2, \cdots, c_n\}$, and the set of alternatives $A = \{A_1, A_2, \cdots, A_J\}$.

2. Each expert evaluates the criteria according their importance using the linguistic terms in Table 1, then their associated plithogenic numbers are used to form matrix $\widetilde{N}$.

   The elements of each column of $\widetilde{N}$ are aggregated using formula 3 and cd_i.

   Then, each obtained value is converted into a crisp number using formula 4, let us call them w_i.

   Next, normalize each w_i as $\widetilde{w}_i = \frac{w_i}{\Sigma_{i=1}^{n} w_i}$. Subsequently, $\widetilde{w}_i$ are used as weights in the formulas.

3. Each expert evaluates each alternative against the criteria and matrices $\widetilde{M}_k$ are obtained, where their elements are those in Table 2, such that the linguistic terms are converted into their equivalent plithogenic numbers shown in the table.

   Aggregate matrices $\widetilde{M}_k$ in a matrix $\widetilde{M}$, where $\widetilde{M}(j, i) = \text{Aggr}_{p,k} \widetilde{M}_k(j, i)$.

   $\widetilde{M}(j, i)$ is converted into a crisp matrix using Equation 4 for all its elements, let us call it M.

4. Apply crisp VIKOR method, i.e., calculate S_j, R_j, and Q_j, using $\widetilde{w}_i$ for the weights and the elements of M, fixing v. We recommend to use $v = 0.5$.

5. Sort the alternatives following the steps of the classical VIKOR method. Thus, the best alternative can be selected.

3 Best alternative for continuing education

This section analyzes and selects the best alternative for continuing education in the Ecuadorian universities. For this purpose, we apply the algorithm explained in section 2, where VIKOR method is used combined with plithogenic sets, as proposed in [15].

Four experts were selected, they are denoted by $E = \{E_1, E_2, E_3, E_4\}$, thus m = 4. The criteria to evaluate alternatives are the following:

c_1: Economical feasibility,

c_2: Technical feasibility,

c_3: Correspondence with the pedagogical model of the Ecuadorian higher education centers,

c_4: Cost,

c_5: Profitability,

c_6: Predicted pedagogical results,

c_7: Social, economic and political impact of the alternative in case of successful result, and

c_8: Availability of qualified teachers.

Whereas the alternatives (strategies) are the following:

A_1: Not to perform continuous education, the regular education is sufficient.

To perform continuous education that is associated with the following programs:

A_2: Diploma course in pedagogical sciences,

A_3: Program of educational improvement at distance,

A_4: Training program in organization and administration for work teams, and

A_5: Program of doctoral training at distance.

Table 3 summarizes the assessment of the criteria by the four experts.

Expert\Criteria	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8
Contradiction Degrees	1/10	1/20	1/10	1/10	1/10	0	0	1/10
E_1	VRS	VRS	VRS	RS	VRS	VRS	VRS	RS
E_2	ES	VRS	ES	RS	LS	VRS	RS	LS
E_3	AS	RS	LS	RS	AS	AS	RS	ES
E_4	VRS	VRS	RS	ES	LS	VRS	RS	RS

Table 3: Importance of the criteria assessed by the four experts and their contradiction degrees.

We aggregate the results shown in Table 3 for all the experts using formula 3 and c_is, next we convert the obtained vector into a crisp vector using Equation 4, and finally we normalize it. The results are the following:

$\widetilde{w}_1 = 0.13999$, $\widetilde{w}_2 = 0.13751$, $\widetilde{w}_3 = 0.11322$, $\widetilde{w}_4 = 0.10999$, $\widetilde{w}_5 = 0.11763$, $\widetilde{w}_6 = 0.14399$, $\widetilde{w}_7 = 0.13383$, and $\widetilde{w}_8 = 0.10384$.

Now, experts evaluate the alternatives against the criteria using the linguistic terms in Table 2. The results are summarized in Tables 4-7.

Alternative\Criteria	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8
Contradiction Degrees	1/10	1/20	1/10	1/10	1/10	0	0	1/10
A_1	VG	VG	VG	VG	VP	M	P	VG
A_2	G	G	VG	G	VG	VG	VG	G
A_3	MG	MG	VG	MG	VG	VG	VG	G
A_4	G	G	G	G	G	VG	VG	G
A_5	G	G	VG	G	G	VG	MG	M

Table 4: Alternatives assessed against the criteria by expert 1.

Alternative\Criteria	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8
Contradiction Degrees	1/10	1/20	1/10	1/10	1/10	0	0	1/10
A_1	VG	VG	G	G	P	P	P	G
A_2	VG	G	VG	VG	G	G	VG	G
A_3	M	M	G	MG	G	VG	VG	VG
A_4	G	G	VG	VG	G	G	VG	G
A_5	VG	G	G	G	G	G	M	M

Table 5: Alternatives assessed against the criteria by expert 2.

Alternative\Criteria	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8
Contradiction Degrees	1/10	1/20	1/10	1/10	1/10	0	0	1/10
A_1	M	G	MG	G	P	P	P	VG
A_2	G	VG	G	VG	VG	G	VG	G
A_3	MG	MG	G	G	G	VG	VG	G
A_4	VG	VG	G	G	G	G	VG	VG
A_5	G	VG	G	G	G	VG	MG	MG

Table 6: Alternatives assessed against the criteria by expert 3.

Alternative\Criteria	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8
Contradiction Degrees	1/10	1/20	1/10	1/10	1/10	0	0	1/10
A_1	VG	VG	G	G	P	VP	VP	VG
A_2	VG	VG	VG	VG	VG	VG	VG	VG
A_3	M	G	G	G	G	G	VG	VG
A_4	VG	VG	G	MG	MG	G	G	G
A_5	G	G	G	G	G	G	M	M

Table 7: Alternatives assessed against the criteria by expert 4.

Table 8 contains the values of matrix M defined in step 3 of the algorithm. Before we aggregated the associated elements of matrices $\widetilde{M}_k$ to obtain $\widetilde{M}$ using $\widetilde{M}(j, i) = {}_{k=1}^{4}Aggr_p\widetilde{M}_k(j, i)$, then, the crisp values are obtained through formula 4.

Alternative\Criteria	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8
A_1	0.94510	0.97658	0.92375	0.94440	0.46028	0.59016	0.50337	0.97693
A_2	0.97027	0.97684	0.97316	0.97693	0.97693	0.97698	0.98333	0.96637
A_3	0.78517	0.89715	0.94440	0.91470	0.94440	0.97498	0.98333	0.97027
A_4	0.97403	0.97684	0.94440	0.89808	0.89028	0.96817	0.97498	0.95020
A_5	0.94440	0.96051	0.94440	0.93816	0.93816	0.97281	0.84466	0.76852

Table 8: Matrix M of alternatives according to the criteria.

Thus, the results of S and R are obtained through Equations 6 and 7, respectively:

$S_1 = 0.5759448$, $S_2 = 0.0080519$, $S_3 = 0.4416774$, $S_4 = 0.2145537$, and $S_5 = 0.3230270$.

$R_1 = 0.1439900$, $R_2 = 0.0052624$, $R_3 = 0.1399900$, $R_4 = 0.1099900$, and $R_5 = 0.1038400$.

Hence, the values of Q through Equation 8 are:

$Q_1 = 1$, $Q_2 = 0$, $Q_3 = 0.86737$, $Q_4 = 0.55927$, and $Q_5 = 0.63261$.

Sorting the alternatives in descending order according to Q, we have $A_1 \succ A_3 \succ A_5 \succ A_4 \succ A_2$. Therefore A_2 is the best one.

Checking the satisfaction of the two conditions, we have:

$Q(A_4) - Q(A_2) = 0.55927 \geq \frac{1}{5-1} = 0.25$, then the condition of acceptable advantage is satisfied.

The condition of acceptable stability is also satisfied, A_2 is the best alternative with respect to S, R and Q.

Conclusion

This paper contains the investigation on continuing education in the Ecuadorian higher education centers. This aims to select the best strategy for continuous training in pedagogical sciences of the postgraduate professionals who are teaching in the universities and colleges around the country. For this purpose, we used the VIKOR method in the framework of plithogenic sets, which has had a good performance applied in the medical management decision-making. Four specialists assessed five strategies according to eight criteria. The best strategy among those related to continuing education is "to perform the diploma course in pedagogical sciences", whereas the worst option is to "do not perform any continuous education". These conclusions are particularly useful to design the pedagogical models in Ecuadorian higher education. For the first time this method is used to select strategies in the area of pedagogical sciences, especially in continuing education.

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