PEDAGOGICAL STRATEGIES FOR RESEARCH TRAINING IN THE PROFESSIONAL PROGRAMS AT THE POPULAR UNIVERSITY OF CESAR

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ABSTRACT

This research focused on analyzing the pedagogical strategies for research training present in the professional programs at the Popular University of Cesar. The level of competencies was diagnosed reviewing the pedagogical strategies embodied in the curriculum and designing a virtual methodology course. It was theoretically supported by authors such as Hernández et al. (2014), Namakforoosh (2014), among others. The research was explanatory, with a non-experimental design, of a descriptive transectional type. The population was made up of 1,203 teachers from the 18 undergraduate programs offered by the Popular University of Cesar in Valledupar. A simple random sampling (Martínez, 2012) was carried out, resulting in a total sample of 209 teachers with a 95% confidence level. An instrument previously validated by five experts was applied while the Alpha Cronbach formula was used to estimate the reliability of the instrument, taking 10% of the sample studied (0.837). An ANOVA test determined that there are differences between the dimensions under study, while the Tukey Post Hoc test determined how much the studied dimensions differed from each other.

Key words: pedagogical strategies, training, investigation, competencies

INTRODUCTION

The development level of research at the Popular University of Cesar differs from other national universities, offering fewer job opportunities in research areas for graduates of its different programs. Due to this, it is necessary to analyze the main components related to the pedagogical strategies used by teachers in the professional training programs offered at the Popular University of Cesar, in order to determine the flaws of last semester students related to researching, and thus create strategies that can contribute in the long term to the resolution of problems of scientific knowledge in the region by their graduates, assisted by a virtual course called Research Methodology that brings teachers closer to the particular studies of students.

This paper starts off with the problem, the objectives —general and specific—, and then shows the results obtained through a diagnosis of the current situation of research in University programs and an analysis of the curriculum in regard to the pedagogical strategies used by teachers during student training.

METHODOLOGY

According to Hernández et al. (2014), non-experimental designs of a descriptive transectional type are those that aim to investigate the incidence and the values in which one or more variables are manifested. The procedure consists of measuring one or generally more variables in a group of people or objects, and describing them. They are, therefore, purely descriptive studies with hypotheses of descriptive nature as well.

Hernández et al. (2014) explain that non-experimental research is carried out without deliberately manipulating variables, that is, without intentionally altering independent variables but rather observing phenomena just as they are in their natural context, and then analyzing them. The nature of this investigation makes it a non-experimental, transectional design, since there is no intentional manipulation of the pedagogical strategies in research training by researchers.

Hernández et al. (2014) also state that field design research data is collected directly from the subjects investigated, or from the reality where the events occur (primary data), without manipulating or controlling any variable.

Population and sample

To comply with the objectives set, the population is made up of 1,203 professors linked to the Popular University of Cesar who teach in the 18 undergraduate programs offered by the college in Valledupar, according to the data provided by the Human Resources office (2019-II).

According to Martínez (2012), a simple random sampling is performed when the population is not large, the units are concentrated in a small area, and the investigated characteristic has very little variability. Therefore, all teachers from research courses in the professional training programs at the Popular University of Cesar for the period (2019-II) were sampled. A simple random sampling was carried out resulting in 209 teachers with a 5% error and a 95% confidence level.

Techniques and instruments for data collection

An instrument called the Questionnaire of Pedagogical Strategies for Research Training was applied, because the data collection is known by other subjects, in this case, 209 teachers who teach research courses at the Popular University of Cesar.

A total of 60 items were applied in the instrument with a Likert scale response format, as recommended by Hernández et al. (2014), who explain these items as a set of statements or judgments that demand the reaction of the participants. Each item is assigned a numerical value, so a score is obtained for each questionnaire, which in turn qualify the attitude being measured.

The assignment of scores according to each response is shown below:

- Always = 5 - Almost always = 4 - Sometimes = 3 - Almost never = 2 - Never = 1

To analyze the data obtained through the questionnaire, the statistical program SPSS, version 20, was used through an inferential statistical analysis. Results after the application of the questionnaire adapted to the pedagogical strategies variable were examined using the variance analysis technique (ANOVA). According to Namakforoosh (2014), two-variable ANOVAs are intended to evidence the effect of two or more independent variables on a dependent variable. Nevertheless, to know with exactitude

where the significant relationship is, the Tukey Post Hoc test was applied. This measures the difference between the means in each dimension, for the study of positioning, and the subsets established from the significant differences between each of the indicators, demonstrating high means in contrast to lower ones (Namakforoosh, 2014).

In this sense, the scale created and used for result interpretation, was established based on the quantity of scale alternatives, taking five categories into account, through the formula: IB = (v - v) / nº categories, where IB is the interval of the scale, (v) is equal to the greater value that was five (5) and (v) the smaller value one (1), resulting in 0.80. (Kerlinger & Lee, 2002).

Table 4. Scale for result interpretation

SCALE	ANALYSIS CATEGORIES
1,00 < 1,80	Absent
1,81 < 2,60	Scarcely present
2,61 < 3,40	Moderately present
3,41 < 4,20	Present
4,21 < 5,000	Very present

Source: Own elaboration (2019)

RESULTS

The results obtained in the application of ANOVA and the Tukey Post Hoc test for each factor were the following:

The significance in the comparison of the averages for first factor —*Pedagogical models*— reached by the indicators of the dimension was verified, obtaining a level of

significance of 0.000. This reflected significant differences between the indicators compared, because the value obtained is less than 0.05, that is, (0.000 <0.05) level of referential significance (see Table 4).

Table 5. Significance level

Dimension: Pedagogical models

One factor ANOVA					
Score1					
	Sum of squares	Gl	Quadratic mean	F	Sig.
Inter-groups	219.391	2	109.695	322.469	.000
Intra-groups	212.268	624	.340		
Total	431.659	626			

Source: Own elaboration (2019) Data from Software SPSS V.20

Table 5. Dimension: Pedagogical models

Post Hoc de Tukey

Score1				
Tukey's HSD				
factor1	N	Subconjunto para alfa = 0.05		
		1	2	3
Heterostructuring Model	209	3.5789		
Self-structuring Model	209		4.7416	
Constructivist Model	209			4.9091
Sig.		1.000	1.000	1.000
The averages for the groups in the homogeneous subsets are shown.				
a. Use the sample size of the harmonic mean = 209,000.				

Source: Own elaboration (2019) Data from Software SPSS V.20

Results regarding the pedagogical models (Table 5) show that teachers from research courses at the Popular University of Cesar have different schemes for the teaching-learning process and differ in the ways of organizing educational purposes, in how the relationship between knowledge, teacher and student is stipulated, and in the way of conceiving the evaluation.

According to the statistical analysis, the Heterostructuring Model is less used by teachers, however, it remains present in the institution, as well as the self-structuring and the constructivist model, although there are differences between these two. The main pedagogical model in the Popular University of Cesar is the contextual-cognitive model with a constructivist approach, achieving the highest score.

An ANOVA test was also applied for the second dimension —*Training according to competencies*—, which allowed establishing the significance obtained in mean comparison for the indicators of this dimension. The level of significance was 0.000, less than the reference level of 0.05 (0.000 <0.05), therefore, there are significant differences between the indicators compared (see Table 6).

Table 6. Significance level

Dimension: Training by competences

One factor ANOVA					
Score2					
	Sum of squares	Gl	Quadratic mean	F	Sig.
Inter-groups	102.319	3	34.106	95.589	.000
Intra-groups	296.861	832	.357		
Total	399.181	835			

Source: Own elaboration (2019) Data from Software SPSS V.20

Table 7. Dimension: Training according to competencies

Post Hoc de Tukey

Score2				
Tukey's HSD				
factor2	N	Subset for alpha = 0.05		
		1	2	3
Curricular perspective	209	3.8182		
Education, training and curriculum	209		4.4019	
Didactic and evaluative strategies	209		4.4354	
Curriculum according to competencies	209			4.7943
Sig.		1.000	.940	1.000
The averages for the groups in the homogeneous subsets are shown.				
a. Use the sample size of the harmonic mean = 209,000.				

Source: Own elaboration (2019) Data from Software SPSS V.20

Table 7 shows the results when comparing the means of analyzed indicators of the dimension *Training according to competencies*. *Curricular perspective*, according to the statistical analysis and despite reaching the present grade, is weak in the trainings, due to the low participation of teachers in curriculum design according to institutional challenges. This is corroborated by the environment in which the teaching and research groups are developed: not all teachers attend or participate in curriculum management to achieve the desired academic quality with an action plan. *Education, training and curriculum* obtained a higher average value than *Curricular perspective* showing a greater concern of teachers to establish a course program aimed at complying with the teaching-learning process in an organized way.

Teaching and evaluative strategies does not present much difference in relation to the *Education, training and curriculum* due to the willingness of teachers to create strategies and implement them in training to improve the learning processes of students in a way more didactic way. Finally, the statistical analysis produced better results regarding *Curriculum according to competencies*, but it shows a great distance with *Curricular perspective* because it is not possible to establish a relationship between two indicators creating a gap in training according to competencies in the institution.

Finally, the ANOVA test for the third factor, that is, the dimension called *Research in higher education*, established the significance in mean comparison for those indicators. Evidence of a level of significance of 0.000, which is lower than the level of referential significance 0.05 (0.000 <0.05), was obtained. Therefore there are significant differences between the indicators compared (see Table 8).

Table 8. Significance level

Dimension: Research in higher education.

One factor ANOVA					
Score3					
	Sum of squares	Gl	Quadratic mean	F	Sig.
Inter-groups	33.113	2	16.557	46.374	.000
Intra-groups	222.785	624	.357		
Total	255.898	626			

Source: Own elaboration (2019) Data from Software SPSS V.20

Table 9. Dimension: Research in higher education.

Post Hoc de Tukey

Score3
Tukey's HSD

factor3	N	Subset for alpha = 0.05		
		1	2	3
Projects formulation	209	3.7081		
Research project	209		4.0670	
Research methodology	209			4.2632
Sig.		1.000	1.000	1.000
The averages for the groups in the homogeneous subsets are shown.				
a. Use the sample size of the harmonic mean = 209,000.				

Source: Own elaboration (2019) Data from Software SPSS V.20

The Tukey Post-Hoc multiple rank test generated three subsets for the *Research in higher education* dimension, as can be seen in Table 10. *Project formulation* obtained a lower score of 3.70, positioning itself in the first subset, catalogued as "present" on the scale. *Research project* was located in the second subset with a score of 4.06, cataloged as "present". And finally, *Research methodology* had the highest rating with an average of 4.26, being in the third subset and listed as "very present".

Analyzing results, despite being present in the professional programs offered by the Popular University of Cesar, it is evident that *Project formulation* presents weaknesses in comparison to *Research project* and *Research methodology*. This is reflected in the fact that the formulation of projects is not integrated with the research methodology many times, which causes a breakdown in research projects.

CONCLUSIONS

When obtaining instrument results and making the diagnosis based on the ANOVA tests and Tukey Post Hoc test of multiple ranges, it can be concluded that, for the first factor, *Pedagogical models*, the main model with the highest score was the constructivist model since the Popular University of Cesar stipulates its pedagogical model as cognitive, contextual with constructivist approach. However, teachers from research subjects differ

in the ways of organizing educational purposes, in how the relationship between knowledge, teacher and student is stipulated, and in the way of conceiving the evaluation, which is evidenced in the scores of the Heterostructuring (cataloged as "present") and Self-structuring ("very present") models.

The second factor, *Training by competences*, showed that *Curricular perspective* is weak in training because teachers do not take institutional challenges in terms of research into account in their curricular design. Therefore, a relationship between the curricular perspective and the competency curriculum must be established so that all the teachers in research courses carry out an action plan in search of academic quality including investigations as the main objective to achieve.

In the results for the third factor, *Research in higher education*, *Project formulation* showed weaknesses with respect to the other two indicators, which is evidenced in the extent that project formulation is often not integrated with the research methodology, causing a breakdown in research projects.

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