

Elaboration and Validation of a Survey about Research on the Characteristics of Mentoring of University Professors' Lifelong Learning

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Abstract—This paper outlines the design and development of the MENDEPRO questionnaire, designed to analyze mentoring performance within a professional development process carried out with professors at the University of the Basque Country, Spain. The study took into account the international research carried out over the past two decades into teachers' professional development, and was also based on a thorough review of the most common instruments used to identify and analyze mentoring styles, many of which fail to provide sufficient psychometric guarantees. The present study aimed to gather empirical data in order to verify the metric quality of the questionnaire developed. To this end, the process followed to validate the theoretical construct was as follows: The formulation of the items and indicators in accordance with the study variables; the analysis of the validity and reliability of the initial questionnaire; the review of the second version of the questionnaire and the definitive measurement instrument. Content was validated through the formal agreement and consensus of 12 university professor training experts. A reduced sample of professors who had participated in a lifelong learning program was then selected for a trial evaluation of the instrument developed. After the trial, 18 items were removed from the initial questionnaire. The final version of the instrument, comprising 33 items, was then administered to a sample group of 99 participants. The results revealed a five-dimensional structure matching theoretical expectations. Also, the reliability data for both the instrument as a whole (.98) and its various dimensions (between .91 and .97) were very high. The questionnaire was thus found to have satisfactory psychometric properties and can therefore be considered apt for studying the performance of mentoring in both induction programs for young professors and lifelong learning programs for senior faculty members.

Keywords—Higher education, mentoring, professional development, university teachers.

I. INTRODUCTION

MENTORING is a strategy to foster the professional development of teaching staff. It is currently used in active teaching methodologies Programs at the University of the Basque Country. During the evaluation of this training process, a need was identified for valid instruments designed to study mentoring in our context. The aim of this research is to discover the keys to mentoring in professional development, the styles employed by mentors and the characteristics most

highly valued by mentees.

The aim of this study was to design and analyze the psychometric properties of an instrument that could be used to determine the characteristics of the mentoring offered by professors to their colleagues within a lifelong learning process.

The origin of the term mentor dates back to Homer's epic poem [1], *The Odyssey*, in which Odysseus, upon leaving to fight in the Trojan War, gave his friend Mentor the task of bringing up and educating his son and heir, Telemachus. Mentoring can therefore be understood as a relationship in which a more experienced person, or someone with more experience and knowledge, helps a less experienced individual.

Throughout history, the concept of mentoring has been interpreted in a number of different ways in the professional sphere, both in the health field, and in the business and academic worlds. In the first European universities, the work carried out by mentors was seen as a vital part of students' training. Later on, with the advent of the Industrial Revolution, the demand for qualified workers rose, which prompted more widespread training of candidates by means of the relationship established between master craftsmen and their apprentices. Mentoring is therefore the process of guiding, accompanying and supporting that is established between a mentor and his or her mentee, in which the acknowledged experience of the former and the inexperience of the latter in the specific field of knowledge in question become the driving force behind a relationship that aims to foster and improve certain skills and capacities in a climate of trust and communication [2]-[3].

In the field of education, mentoring would be the relationship established between a more experienced teacher and those who are newer to the profession, which fosters reciprocal and collaborative learning between both parties. Mentoring opens up a space for guidance and advice, dialog and reflection, exploration and feedback, with the aim of critically improving professional practice and establishing goals for professional development [4]. Here, we are talking about what is known as formal or intentional mentoring, which has clear and specific aims and is the result of a deliberate, systematic and one-off planning process involving activities carried out within an established timeframe. It is also subject to a contract that aims to satisfy the expectations of both parties, in order to improve the academic and personal performance of the mentee [5].

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TABLE I

DISTRIBUTION: AGE, PROFESSORS' CATEGORY, LENGTH OF SERVICE *SEX

		Sex		Total
		Men	Women	
Age	26 to 40	5	18	23
	41 to 50	19	23	42
	51 to 60	12	17	29
	over 60	4	1	5
Category	Assistant professor	10	19	29
	Associate University College professor	7	7	14
	Associate University professor	22	31	53
	Full professor	1	2	3
Length of service	5 to 10	9	17	26
	11 to 15	5	10	15
	21 to 26	14	15	29
	Over 26	6	8	14
	Total	40	59	99

According to Vélaz de Medrano [6], a competent professional (in our case, the mentor) would be someone who is aware of and regulates their own knowledge construction processes, from both a cognitive and emotional perspective, and may make *strategic* use of these processes by adjusting them to the specific circumstances of the situation or problem with which they are faced.

Authors such as Feiman-Nemser [7] talk about Educative Mentoring, understood as a process which helps teachers use their own teaching practices as learning. In this sense, the mentor and teacher (or mentee) work together to improve their performance, in accordance with the indications provided by research on teaching and learning [8].

The body of research into mentoring in education has grown considerably over the last twenty years [9], although its understanding at a global level has yet to be explored [1]. The diverse studies which have been conducted all agree that mentoring is a process which helps professionals improve their teaching practice, providing opportunities for learning, professional development and enhanced performance [7], [8].

While some authors [10] highlight the need to describe the processes and the challenges of effective mentoring practices. There is a marked absence of research exploring mentoring practices themselves and examining the style and strategies used, the difficulties experienced, the doubts and uncertainties that arise, the conflicts generated and the needs detected.

A review of previous research reveals that the analysis of mentoring in the university field is a fairly new area of study. Few papers focus on mentoring in lifelong learning programs aimed at university professors [11]. Nevertheless, some authors [12] have compiled a catalog of mentor behaviors, in accordance with an inductive process of grouping together the different actions contemplated by the Educative Mentoring described [13]. The questionnaires reviewed have a structure with between 2 and 4 dimensions [12], [14], [15], and uneven validity and reliability.

The aim of this present study was to design a new instrument for studying mentoring in our specific context.

II. METHOD

A. Aim

The aim of the present study was to develop a valid and reliable questionnaire for measuring the characteristics of the mentoring function as a strategy for fostering the professional development of university professors.

B. Sample Group

The sample group comprised 99 university professors (out of a population of 260), who had engaged in a lifelong learning program focused on active methodologies. All had participated in a mentoring process lasting 18 months.

C. Procedure

Based on a study of the mentoring construct, an initial five-dimension questionnaire was compiled, containing 54 items. The content was validated by a group of experts made up of 12 professors with extensive experience in research for verifying the instrument was sufficient and adequate for responding to the research aims. A second version was then drafted, taking into account the feedback provided by the group of experts. This questionnaire had the same number of dimensions, but only 43 items.

It was administered to a sample group of 25 professors, who were asked to assess the mentoring process they had experienced as part of their lifelong learning program on a 6-point Likert-type scale.

Following the statistical analysis of the results obtained, the final version of the questionnaire was drafted, containing 33 items distributed between five dimensions, as outlined in Table II: Convergence (5), Advice and Guidance (7), Interpersonal relationship and bond (8), Reflection (6), and Integrity, model (7).

Once the questionnaire had been administered and the information gathered, version 19.0 of the SPSS statistical package was used to conduct the quantitative analysis. To analyze the data obtained from the questionnaire, different non-parametric statistical tests were used, based on the distribution of the questionnaire itself. We also conducted traditional exploratory and confirmatory factor analyses, as well as Multidimensional Scaling analyses, in which the number of variables is more important than the number of subjects.

III. RESULTS

A reliability analysis was carried out of each dimension in order to guarantee that when we calculated the score for that dimension based on the mean of the different items, we were in fact averaging consistent or closely-related elements.

As shown in Table III, the results obtained for all dimensions (with Cronbach's Alpha) were high. However, the highest value (0,991) was found for the reliability of the scale contemplated as a single dimension.

TABLE II
DIMENSIONS AND THEIR CORRESPONDING ITEMS

Dimensions	items
Convergence	01.-I talked with my mentor about what we had to do in the mentoring process for methodological innovation. 04.-We worked towards goals that we agreed upon jointly at the beginning of the process. 07.-We agreed upon the important issues to work on in teaching design and implementation. 11.-We had the same impression regarding my particular difficulties. 16.-My mentor usually behaved as I expected.
Advice and Guidance	02.-Mentoring has enabled me to learn about new forms of approaching the design and implementation of innovation. 12.-My mentor demonstrated that he/she understood my opinions and proposals. 17.-My mentor motivated me, especially in moments of uncertainty and difficulty. 23.-My mentor gave me ongoing feedback. 28.-My mentor helped me achieve a greater degree of emotion regulation in overwhelming or stressful situations. 31.-My mentor helped me develop skills and strategies which have made me a better teacher. 33.-The mentoring process prompted a change in my teaching identity.
Interpersonal relationship and bond	03.-I trusted my mentor's ability to help me improve my teaching skills. 05.-I felt appreciated by my mentor. 08.-My mentor demonstrated his/her trust and confidence in my capability. 13.-I felt able to express any emotions that arose during the course of the innovation project. 20.-I felt that my mentor understood my concerns and fears. 22.-My mentor maintained close contact with me, paying attention to my teaching interests. 25.-I felt that my efforts were appreciated and acknowledged. 30.-My mentor was empathetic.
Reflection	06.-My mentor made me aware of different ways of approaching a teaching situation. 09.-My mentor helped me gain a better understanding of what I do. 14.-My mentor made me think about my approaches to problem-solving. 18.-My mentor encouraged me to develop a more critical outlook. 24.-My mentor helped me to consider and reflect upon my experiences and concerns. 26.-My mentor encouraged me to adopt a more reflective attitude.
Integrity - Model	10.-My mentor questioned him/herself when presenting his/her proposals and teaching experiences. 15.-I value my mentor's knowledge of teaching methodology. 19.-My mentor was available for anything I needed. 21.-My mentor shared his/her teaching experiences in relation to the various situations tackled. 27.-My mentor was a role model for reflective teaching. 29.-My mentor was a role model for the application of methodological innovation. 32.-I feel satisfied with the work carried out by my mentor.

TABLE III RELIABILITY OF THE QUESTIONNAIRE	
Cronbach's alpha coefficient	
Convergence	0,908
Advice and Guidance	0,948
Interpersonal bond	0,971
Reflection	0,962
Integrity-Model	0,966
Unidimensionality	0,991

As regards the Factor Analysis, it should be pointed out that the existence of a single factor, while not proving the interpretation of the unidimensionality of the construct as measured by the instrument, nevertheless supports this hypothesis. In light of this situation, we decided to assess the intensity of the relationship between the different dimensions, as well as each one's relationship with the global mentoring dimension. The Exploratory Factor Analysis revealed a trend towards a very strong primary factor that included the majority of all items on the scale. The correlations between the dimensions were, in general, over 0,90. In other words, between them, the dimensions accounted for over 80% of the variance and in many cases (correlations of over 0,95), this figure was over 90%.

Consequently, a tentative Confirmatory Factor Analysis was conducted to determine the fit of the proposed five-dimensional model in comparison with that of the unidimensional one. The results indicate that mentoring can be considered either a unidimensional or multidimensional

capacity or faculty. Nevertheless, in the end we believe it is preferable to distinguish between the different dimensions, since this is justified by existing theory and the relationship between the dimensions and other variables (length of service, discipline, sex, etc.) has yet to be analyzed. Due to the 10 to 20% specificity level or the fact that part of each dimension is not shared with the others, there may be slight variations in the relationships which exist between each dimension and the aforementioned criterion variables.

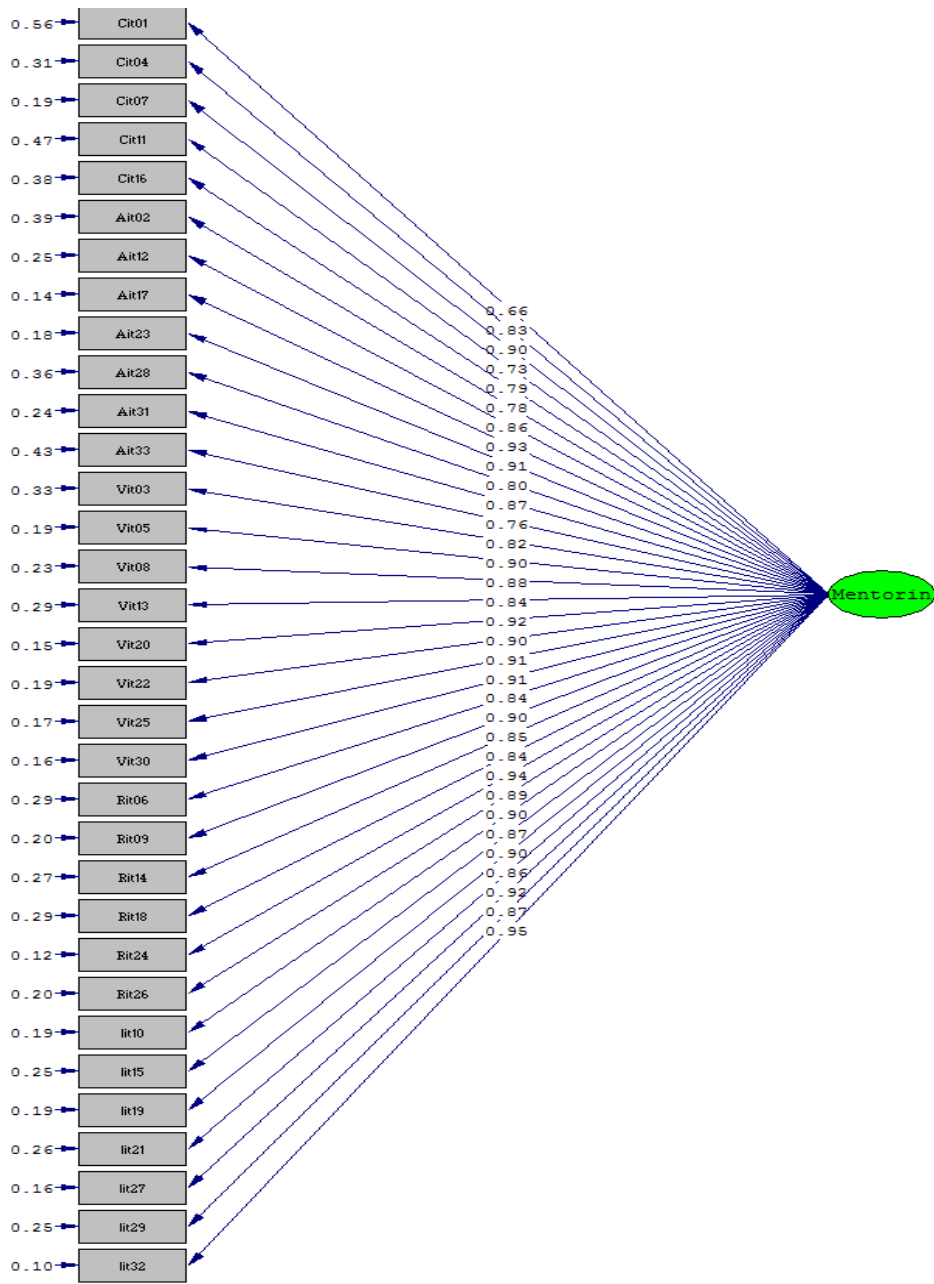
The results revealed no normality problems as regards the distributions of the dependent variables, and no equivalence problems were observed in the variability of the groups compared. Therefore, we can conclude that the Mentoring questionnaire is structured around five dimensions and has a high internal consistency.

In sum, the instrument was found to have excellent internal consistency in both the questionnaire as a whole and in each individual dimension. The reliability values found attest to the internal consistency of the items in each dimension, and in the questionnaire as a whole, thus confirming the judgment of the group of experts regarding content validity. Furthermore, the confirmatory factor analysis confirmed the questionnaire's adequate validity, with high goodness of fit indexes.

IV. CONCLUSION

The study found satisfactory psychometric results that testify to the quality of the research carried out. This tool can therefore be used for studying of the mentoring in the

professional development of faculty members.



Chi-Square=1816.29, df=495, P-value=0.00000, RMSEA=0.165

Fig. 1 Multidimensional and Unidimensional Structure

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