

Attitude scale about professional ethics. A study of higher education teachers in Chile

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ABSTRACT

The objective of this research was to report the results of the application of the Attitude Scale about Professional Ethics, proposed by Hirsch, to a sample of higher education teachers in Chile and, based on this report, to perform an exploratory factor analysis to empirically verify the theoretical competencies that are part of this questionnaire. The research results showed that the scale presented high reliability, with a Cronbach's alpha value equal to 0.87. However, the exploratory factor analysis showed that the sample did not recognize the four theoretical competencies of the instrument. When analyzing each dimension separately, by means of factor analysis and reduction to one factor, the questions of the scale with the highest charges were identified. Among the research conclusions, it is suggested for future work to plan an experimental situation to adapt the scale from the theoretical construction, supported by an exploratory factor analysis.

Keywords: Attitude scale, Exploratory factor analysis, Higher education teachers, Professional Ethics, Theory of reasoned action.

1. INTRODUCTION

The training of a professional is not possible without ethical training [1]. For example, for [2] a holistic vision of education for engineering, education must incorporate the professional's ethical formation as one of its principal axes. Thus, to benefit society, professional ethics is a dimension that should be linked to the knowledge and training of engineers, [3]. Regarding professional ethics, there is a constant growth of research focused on its study. To mention just a few of them, it is possible to find research on the importance of professional ethics in Psychology [4], in scientific research [5], in Health Sciences [6], as well as in Engineering careers, such as Genetic Engineering [7], Industrial Engineering and Computer Engineering [8] and in Civil Engineering [9]. In the particular case of engineering, one of the reasons why the study of professional ethics has gained relevance in recent times is due to the new requirements demanded for this type of professionals, among which stand out the decision-making and the achievement of environmental ethics [10], among others.

One of the roles of higher education institutions is to contribute to train professionals who possess a vision and sense of ethics

reflected in actions such as solidarity, sense of justice and responsibility, among others [1]. However, in [1] it is pointed out that universities do not usually focus on the study of the ethical dimension in their professional training processes, ignoring its transversal nature. This situation generates consequences that go beyond educational spaces, since the formation of the ethical dimension constitutes a valuable resource in the construction of fairer and more equitable societies. In this sense, the development of instruments that allow quantitative measurement of professional ethics helps higher education institutions to strengthen their professional training processes. In this regard, the questionnaire developed by Ana Hirsch, called *Attitude Scale About Professional Ethics* [11], is a questionnaire used in different research studies to quantitatively measure aspects related to professional ethics. To mention some of those studies, we have what was done in [12], where research results on professional ethics from two Mexican universities were presented: Universidad Nacional Autónoma de México and Universidad Autónoma del Estado de Morelos. In [13], this questionnaire was used to study the configuration and main features of the professional ethics of the normal-school teacher in Mexico. In [14] the use of this questionnaire allowed a study of professional ethics in teacher training at Universidad Pedagógica Nacional and Universidad Nacional Autónoma de México. In [15] this scale was used to compare the attitudes on professional ethics held by students of two health schools of Universidad Nacional Mayor de San Marcos of Perú. In [3] this questionnaire enabled to collect data that made it possible to know the level of attitudes about professional ethics held by students at the Universidad Politécnica de Baja California.

Regarding the theoretical approach to the concept of professional ethics, used in the construction of the Hirsch questionnaire [11], it is important to mention that this concept is understood from the sociology of professions, where ethics is part of the professional identity of teachers and where both are linked. A characterization of the concept of professional ethics appears in [16].

Regarding the attitude scale about professional ethics, although it is true that its construction is well done based on the methodological aspects carried out in [11], it is necessary to perform a factor analysis to report evidence of the validity of this questionnaire. Such an analysis would make it possible to propose guidelines for strengthening this scale and, in this way, contribute to the generation of knowledge on professional ethics. For this purpose, the objective of this research is to report the

results of the application of the Attitude Scale about Professional Ethics, proposed by Hirsch [11], with professionals in Chile and, based on this report, to perform an exploratory factor analysis to empirically verify the theoretical competencies that are part of this questionnaire.

2. METHODOLOGY

The methodology used in this research was quantitative, since data collection was based on the implementation of a questionnaire, where a statistical analysis allowed determining behavioral patterns in the selected sample [17].

Participants

The sample considered in the study is a non-probabilistic sample. Specifically, it can be classified as a convenience sample, since each author sent an invitation to participate in the study to his or her contact networks. A total of 276 people who teach in higher education in Chile participated in the study. With an average age of 39.33 years (standard deviation 9.46), 68% were female and 32% were male. The average teaching experience, in years, is 13.66 with a standard deviation of 9.23. It should be noted that the choice of a sample made up of higher education teachers was due to the fact that the professional ethics of teachers is of great relevance in contributing to the development of the professional ethics of higher education students [18].

Instrument

The attitude scale about professional ethics [11] is a questionnaire whose construction was based on the model of the theory of reasoned action [19]. For [11] this theory has a conception of the human being as a rational being that makes use of information to make judgments, evaluations and decisions. In addition, this theory has the ability to explain the relationship between social, cognitive, affective and behavioral factors in the formation and change of people's attitudes. The scale is composed of 55 items linked to four competencies related to professionalism: cognitive competence, social competence, ethical competence and affective-emotional competence. Cognitive competence refers to four themes: 1) knowledge, training, preparation and professional competence, 2) continuous training, 3) innovation and improvement, 4) technical knowledge and skills. Social competence refers to companionship and relationships, communication, knowing how to work in a team, being a hard worker. Ethical competence is made up of aspects such as: responsibility, honesty, professional and personal ethics, acting with the idea of rendering a service to society, respect and acting in accordance with moral principles and professional values. Finally, affective-emotional competence refers to identification with the profession and emotional capacity. The scale used in this questionnaire is Likert-type with 5 response options: Do not agree= 1, Slightly agree= 2, Agree= 3, Strongly agree= 4, Totally agree= 5.

Data collection

The Hirsch scale [11] was applied to the participants of this study through a Google Drive form. This form included an informed consent letter and a personal data processing statement.

3. ANALYSIS AND RESULTS

To meet the objective of this research, the results of the application of the questionnaire proposed by Hirsch [11] to higher education teachers will be reported, and from this, an

exploratory factor analysis will be performed to empirically verify the theoretical competencies that are part of this questionnaire.

Instrument reliability

Cronbach's alpha was used to measure the internal consistency of the scale. Guttman's Lambda 6 (λ_6) was also used. By inverting the items that by construction are in reverse scale (items 12, 13, 17, 19, 28, 29, 38, 40, 42, 44, 47, 49), we obtained a Cronbach's Alpha (standardized) equal to 0.87 and Guttman's Lambda 6 0.91. It should be noted that, when considering the original scale (without inverting the scale), items 13, 16, 19, 29, 40, 47 and 48 correlate negatively with the total scale (they do not correspond exactly to the inverse scales proposed by construction), and when inverting the scale in the indicated items, Cronbach's Alpha (standardized) equals 0.9 and Guttman's Lambda 6 equals 0.93.

Factor analysis

An exploratory factor analysis was performed to empirically verify the theoretical structure of the scale, i.e., the 4 competencies: cognitive and technical competencies; social competencies; ethical competencies; and affective-emotional competencies. Factor analysis is the technique par excellence for the development, validation and adaptation of instruments in psychology [20]. Factor analysis often differentiates between exploratory factor analysis, which aims to build theory, and confirmatory factor analysis, which aims to confirm the theory [21]. The following steps are taken into consideration for the analysis: i) Verify that the data matrix is factorizable, ii) Extract factor, iii) Determine the correct number of factors, iv) Rotate the factors, and v) Interpret the results.

Consistent with the steps described above, firstly, as a measure of sample adequacy, the Kaiser-Meyer-Olkin (KMO) test was used for the entire scale, whose value, in this case, is 0.8. This indicates that the matrix is appropriate for factor analysis. Additionally, Bartlett's sphericity test was applied (Bartlett = 4546.775, p-value = 0.000), which allowed us to affirm that the correlation matrix is significantly different from the identity matrix; that is, that the variables in the sample are sufficiently correlated among themselves to perform the factor analysis. Both tests provided evidence to consider the factor analysis adequate. Considering the Kaiser criterion [22], 17 factors were obtained with an eigenvalue greater than 1, which indicates that the theoretical structure of the test, i.e. the 4 competencies, was not verified in the sample. In other words, the participants did not interpret the scale according to the theoretical construction of the questionnaire. However, the scale undoubtedly represents a genuine contribution and, moreover, it is one of the few scales that exist to measure aspects of professional ethics. Therefore, in order to provide evidence for construct validity, a factor analysis was performed on each dimension (i.e., a factor analysis within the factors), which allowed us to observe whether the items are grouped according to the theoretical proposal. In all cases we worked with Pearson's correlation matrix. The extraction method was based on principal component analysis, and Varimax normalization with Kaiser was used as the rotation method (due to the low correlation).

Competence 1

This competence, called "cognitive competence", considers 13 items, grouped into subcategories: Knowledge, training, preparation and professional competence (items 1 and 5); Continuing education (items 8, 12, 15 and 19); Innovation and improvement (items 23, 27, 31, 35, 39 and 45); and Technical

competences (item 42). Table 1 shows the factors with the charges of each item. When all the items were considered, 5 factors were obtained, which explained 59% of the variance. Here we proceeded to eliminate the item with the highest charges in the last factor, until we obtained a single dimension. Specifically, items 1, 5, 15, 19, 23, 31 and 42 were eliminated. Table 1 shows the charges obtained in a single factor.

Table 1. Charges obtained on a single factor for competence 1.

Item	Charges
8	.653
12	.632
27	.556
35	.691
39	.524
45	.603

Competence 2

This competence, called "social competence", considers 9 items, grouped in subcategories: Companionship and relationships (items 2 and 9); Communication (items 13, 16 and 20); Knowing how to work in a team (items 24 and 28); Being a worker (items 32 and 36). Table 2 shows the factors with the charges of each item. When all the items were considered, 4 factors were obtained, which explained 61% of the variance. Here we proceeded to eliminate the item with the highest charges in the last factor, until we obtained a single dimension. Specifically, items 13, 16, 28 and 32 were eliminated. Table 2 shows the charges obtained in a single factor.

Table 2. Charges obtained on a single factor for competence 2.

Item	Charges
2	.531
9	.653
20	.691
24	.603
36	.632

Competence 3

This competence called "ethical competence", considers 23 items, grouped in subcategories: Responsibility (items 3, 6 and 10); Honesty (items 17 and 21); Professional and personal ethics (items 25, 29, 33 and 37); Acting with the idea of providing the best service to society (items 40, 43, 46, 48, 50, 52); Respect (items 4 and 54); Acting subject to moral values and professional values (items 44, 47, 49, 51, 53, 55). When all the items were considered, 6 factors were obtained, which explained 54% of the variance. Here we proceeded to eliminate the item with the highest charges in the last factor, until we obtained a single dimension. Specifically, items 3, 4, 6, 10, 17, 21, 29, 37, 40, 47, 48 and 53 were eliminated. Table 3 shows the charges obtained in a single factor.

Table 3. Charges obtained on a single factor for competence 3.

Item	Charges
25	.385
33	.529
43	.563
44	.500
46	.540
49	.746
50	.747
51	.778
52	.579
54	.610
55	.595

Competence 4

This competence, called "affective-emotional competence", considers 10 items, grouped in subcategories: a) Identifying with the profession (items 7, 11, 14 and 18); and Emotional capacity (items 22, 26, 30, 34, 38 and 41). When all the items were considered, 3 factors were obtained, which explained 47% of the variance. Here we proceeded to eliminate the item with the highest charges in the last factor, until we obtained a single dimension. Specifically, items 7, 26, 38 and 41 were eliminated. Table 4 shows the charges obtained in a single factor.

Table 4. Charges obtained on a single factor for competence 4.

Item	Charges
11	.637
14	.536
18	.634
22	.409
30	.684
34	.590

4. DISCUSSIONS AND CONCLUSIONS

Although it is true that [11] presented an appropriate methodological structure for the construction of the *Attitude Scale About Professional Ethics*, no analytical techniques were used in this research to provide evidence of the construct validity of the questionnaire. Based on this, the results of this research are important, since the exploratory factor analysis reported in this work allows us to provide empirical evidence in this regard with higher education teachers in Chile. In this sense, the results presented in this research allow us to know a reduced reality. For that reason, it is suggested to carry out this type of research to different types of professional profiles, using this questionnaire and working on its validity and reliability, so that such research contributes to the study of professional ethics.

People often question their professional identity at different stages of their lives. One of the causes of this, according to [23], is the acceleration of scientific and technological changes, among other aspects. In this sense, for [24], universities have the opportunity to promote the construction of professional identity and, in this, employ professional ethics, which is consistent with what was established by [25], where professional identity is linked to the concept of professional ethics used in the construction of the attitude scale about professional ethics.

Therefore, studies such as those conducted in this research are a way to carry out studies related to professional identity.

This research aims to contribute both to the strengthening of the questionnaire conducted in [11] and to the generation of knowledge on professional ethics. At the same time, it has the purpose of providing educational institutions with theoretical references to measure the valuation of professional ethics in higher education teachers, as well as to identify those competencies (cognitive, social, ethical and affective-emotional) that are more valued by them.

Research such as the one carried out in this work contributes to strengthening the training of different types of professionals, since it provides higher education institutions with theoretical and methodological references to measure, in a quantitative manner, aspects related to professional ethics, which is important to promote and strengthen in any type of professional. In the particular case of this research, the contribution to the educational community was to provide mechanisms to study aspects related to professional ethics using the questionnaire constructed by Hirsch [11] and, based on this, to discuss mechanisms to strengthen aspects of professional ethics in higher education teachers in Chile, with the purpose of developing tasks that are part of their professional work.

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