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THE FACTORIAL STRUCTURE OF THE SUPERVISOR'S CORE COMPETENCIES SCALE

Madalena Cunha (a)*, João Duarte (b), Carlos Albuquerque (c)
*Corresponding author

(a) Instituto Politécnico de Viseu, CI&DETS, ESSV, Rua D. João Gomes Crisóstomo de Almeida, nº102 3500-843 Viseu, Portugal and Universidade do Minho, CIEC, Braga, Portugal, madalenacunhanunes@gmail.com
(b) Instituto Politécnico de Viseu, CI&DETS, ESSV, Rua D. João Gomes Crisóstomo de Almeida, nº102 3500-843 Viseu, Portugal, duarte.johnny@gmail.com
(c) Instituto Politécnico de Viseu, CI&DETS, ESSV, Rua D. João Gomes Crisóstomo de Almeida, nº102 3500-843 Viseu, Portugal and Universidade do Minho, CIEC, Braga, Portugal, cmalbuquerque@gmail.com

Abstract

Cunha & Albuquerque's (2017) Supervisor's Core Competencies Scale (SCoreCS) was designed to assess the ideal skills that college students expect their mentor teacher to master. The development of educational pedagogic and academic research in this field is of vital importance considering the lack of updated background knowledge of this topic. In view of this, the following question was raised: What is the Supervisor's Core Competencies Scale internal consistency quality? This study sought to evaluate the psychometric properties, namely the factorial structure and the internal consistency of the Supervisor's Core Competencies Scale. A cross - sectional study was conducted, after the Ethics Committee's approval. The internal consistency study and the confirmatory factor analysis of the SCoreCS were developed using a sample of 306 students (81.7% of them were women) with an average age of 21.15. The SCoreCS internal consistency study revealed the existence of three (3) factors/subscales: 1) Personal Factors (α=0.979); 2) Interpersonal/Communication Factors (α=0.946); and 3) Performance Factors (α=0.936). A Cronbach's alpha coefficient of 0.972 was found for the global 21-items SCoreCS. Female students value the supervisor's personal competencies more, while male students prefer the interpersonal competencies which revealed statistically significant differences. The youngest students (≤19) value all the different kinds of competencies which revealed statistically significant differences when compared to the other age groups. This research constitutes a first step in the study of the psychometric properties of the SCoreCS using a sample of the Portuguese population. The values of internal consistency in the different subscales and in the global score were found to be quite robust. The results suggest that the identification of personal, interpersonal/communicational and performance competencies should be considered in the assessment of the teachers' pedagogical practices. These findings will also foster the development of future research that will support a more contemporary pedagogical supervision in which innovation would be applied to college didactics.

Keywords: Factorial structure, competencies, teachers, supervision, mentor.

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Corresponding Author: Madalena Cunha
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1. Introduction

Supervision and its subsequent evaluation are currently used as control and reproduction mechanisms, rather than as strategies carried out to achieve the transformation of the actors and of the formative/educational procedures. Hence, the necessity for educational institutions and practice to develop a kind of research that will ensure, on the one hand, that the diagnosis of the competencies are actually being used in current educational practices and, on the other hand, shed light on the state of supervision didactics in terms of how it can enhance the process with the right kind of support, implementation, evaluation and monitoring. The mentor's role and competencies exhibited throughout this supervision process also demand special attention.

Competency can be defined as the acquisition of extensive and diversified knowledge and the capacity to know exactly how to apply such knowledge in any practical context (Esteves, 2009).

Competence does not refer directly to knowledge, nor to capacities, but rather to the appropriate, combined use of these resources (Boterf, 1994, cited in Silva, 2010).

The concept of mentor refers to a professional with extensive experience who guides, teaches, supports and advises a student with minimal to no experience at the beginning of his career and therefore will play an important role on a personal and professional level (Botti & Rego, 2007, p. 368). This process will foster an implicit, direct and durable relationship between two people. The supervisor will greatly contribute to his supervisees' success and to their professional, academic and personal development (Karkowska, 2015).

The mentor should possess competencies and duties, among other characteristics, that provide him with the capacities to meet the mentored students' needs. The mentor teacher must trust his knowledge and experiences and develop/strengthen these competencies by attending relevant training courses. He must also be able to maintain a close relationship with a qualified supervisor in order to support his own development and to periodically assess his capacities (Karkowska, 2015).

The relationship between mentor teacher and mentored student has to lead to an educational relationship that will be paved by great educational gains. To this end, the mentor must have supervisory competencies that will enable him to transform the teaching and learning process into a wide range of academic accomplishments that will be subsequently transferred to the daily teaching/work contexts (Cunha, 2017).

In healthcare, supervision is defined as a formal process of monitoring professional practice, aiming to promote autonomous decision-making processes, reinforcing the protection of the healthcare professional and the safety of medical interventions, through a continued reflection and a critical analysis of the clinical practice. Supervision, used with the right specificities, brings added value not only to the methods of induction and of transition to professional practice, but also to the transition and socialization instruments necessary to respond as efficiently as possible to new responsibilities (Ordem dos Enfermeiros, 2010).

Scientific literature reports that the role of the supervisor should include three preponderant requirements that will determine the supervisor's action and his own style of performance: his knowledge, his interpersonal skills and his technical competencies. The scientific literature identifies three supervisory styles: the non-directive, the collaborative and the directive. A non-directive supervisor

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praises his supervisees' perspectives and opinions; he knows how to encourage them and to help them clarify their ideas and feelings. The collaborative style attributes more importance to the communicational component that exists between him and his supervisees; he guides them and helps them solve problems. A supervisor of the directive type is more concerned with the discipline and with the guidance provided to the supervisees, establishing criteria and controlling their attitudes (Glickman, 1985; Alarcão & Tavares, 2003, cited by Pinto, 2013).

With this research on the psychometric quality of a scale aimed at measuring educational performances, we wanted to get teachers and students' opinion on the kind of supervision competencies that should be exhibited by a mentor teacher, so he can be able to provide the right educational interventions to achieve the objectives required by specific pedagogical contexts.

It also aims to raise teachers' awareness on the need to promote a kind of learning that will be more adapted to college students' bio psychosocial context.

2. Problem Statement

Cunha & Albuquerque's Supervisor's Core Competencies Scale (SCoreCS) (2017) was designed to assess the ideal skills that college students expect their mentor teacher to have mastered. The development of educational pedagogic and academic research in this field is of great importance considering the lack of updated background knowledge of this topic.

3. Research Questions

What is the internal consistency quality of the Supervisor's Core Competencies Scale?

4. Purpose of the Study

The purpose of this study is to evaluate the psychometric properties, namely the factorial structure and the internal consistency of the Supervisor's Core Competencies Scale (SCoreCS).

5. Research Methods

This cross-sectional study aims to assess the psychometric qualities of the Supervisor's Core Competencies Scale (SCoreCS), in order to assess the competencies that polytechnic higher education students think good mentor teachers should possess. The cross-sectional study obtained a favourable opinion (Nº 3/2017) issued by the Ethics Committee and is part of the project *"Supervisão e Mentorado no Ensino Superior: Dinâmicas de Sucesso (SuperES)"*, Reference: PROJ/CI&DETS/CGD/0005) - supervision and mentoring in Higher Education: Successful Dynamics- developed by the Escola Superior de Saúde de Viseu (Viseu's School of Public Health), a branch of the Polytechnic Institute of Viseu, Portugal.

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5.1. Participants

The non-probability sampling for convenience was formed by 306 higher education students attending a medical school. The majority of the participants were female (81.7%). The youngest participants were 18 and the eldest were 42 and the average age was 21.15 years (± 3.54 SD). Male participants were on average older (Mean = 22.28 years ± 4.21 SD) than women (Mean ± 3.32 SD) with statistically significant differences (z =-3,058; p = 0.002).

5.2. Data collection Tools

Data collection was carried out through the questionnaires protocol available online that include:

-a *"Sociodemographic Characterization and Pedagogical Context"* scale (Cunha, 2017), which includes sociodemographic items (age, gender) and other items related to the regularity of the pedagogical sessions (their ideal and real distribution), the venue where those pedagogical sessions are conducted, the duration of the pedagogical sessions and the importance of the assigning a mentor teacher to higher education students.

-the Supervisor's Core Competencies Scale (SCoreCS) (Cunha & Albuquerque, 2017) which aims to help assess the mentor teacher's competencies according to college students' perspectives.

5.2.1 Supervisor's Core Competencies Scale

The Supervisor's Core Competencies Scale (SCoreCS) (Cunha & Albuquerque, 2017) whose original version comprises 29 items and developed for college students, is a Likert-type construct whose aim was to assess the students' perceptions about the mentor teacher's competences.

The scale features three subscales: Core personal factors; Core interpersonal/Communication factors and core performance factors. The "Core personal Factors" subscale consists of 9 items (1, 2, 3, 4, 5, 6, 7, 8, 9), the "Core interpersonal/Communication factors" subscale presents 10 items (10, 11, 12, 13, 14, 15, 16, 17, 18, 19) and the "Core performance factors" subscale comprises 10 items (20, 21, 22, 23, 24, 25, 26, 27, 28, 29).

The items answers range from 1 to 5: 1 – "Strongly disagree"; 2-"Disagree"; 3 – "Neither agree nor disagree"; 4 – " Agree" and 5 – " Strongly agree".

5.2.2 The Fundamentals of the Psychometric Study

The Supervisor's Core Competencies Scale (SCoreCS) psychometric study is based on reliability and validity properties. These two constructs are two related measurement properties that play complementary roles. In fact, while reliability relates to the consistency or to the stability of a measure, validity is related to its veracity.

Reliability means that the measurement method is accurate and that it can be verified through the analysis of the internal consistency or of the homogeneity of the items and of their temporal stability. A measurement instrument is said to be reliable if it does not produce significantly different results when administered at different times to the same individual.

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A test or a measurement instrument is said to be valid if it can correctly translate what it aims to measure. In this assumption, reliability does not imply validity but is a requirement to evaluate validity which means that, to be valid, a measure should first be reliable (Marôco, 2014).

The reliability studies are obtained with the determination of a Cronbach's alpha coefficient and of the Split-half reliability coefficient which allows for proving whether one of the halves of the items from the scale is as consistent as the other half to measure the construct. The values of the Cronbach's alpha coefficient can range between 0 and 1, where the higher the coefficient, the better. To achieve a good internal consistency, the Cronbach's alpha must be above 0.80 (Marôco, 2014). The literature reviewed identifies the following reference values: above 0.9 (very good); 0.80-0.90 (good); 0.70-0.80 (average), 0.60-0.70 (reasonable), 0.50-0.60 (mediocre) and below 0.50 (unacceptable).

To study this scale, we tested its internal consistency, but also the tri-factorial solution that emerged from the theoretical constructs, through a confirmatory factorial analysis (CFA), using the AMOS 24 Software (Analysis of Moment Structures). This statistical procedure is used to confirm if the hypothesized factorial structure is adjusted for the sample data we intend to study.

We took into account, in the development of the CFA, the covariance matrix and the MLE (Maximum Likelihood Estimation) algorithm, a method used to estimate the parameters of a statistical model. The following Marôco's assumptions (2014) were sequentially taken into account:

-The study of the items' normality: using the asymmetry coefficient (Sk) and the kurtosis coefficient (k) and the multivariate coefficient of variation whose reference values are respectively < = 3.0, < = 7.0 and 5.0.

-The quality of the local adjustment of the model through the calculation of the lambda coefficients (λ) that will determine the factorial weights of the items and the determination of the individual reliability of the items (δ) with reference values of 0.50 and 0.25, respectively.

-Indicators of the quality of the global adjustment of the model: (a) ratio between the chi-square and the degree of freedom (x^2/GL), with appropriate values below or equal 5; (b) the root mean square residual (RMR) and Standardized root mean square residual (SRMR) have to be as low as possible, given that the adjustment is perfect when it equals 0; as for the Goodness Fit Index (GFI) and Comparative Fit Index (CFI), the recommended values should be above 0.90 to reflect a good adjustment; the Root mean Square Error of Approximation (RMSEA) shows the existence of a good adjustment when it ranges between 0.05 and 0.08 and very good when the index is below 0.05.

- Composite Reliability (CR)-for the study of the internal consistency of the items included in each factor. This measure is quite similar to Cronbach's alpha and suggests values above 0.70.

-Convergent validity -to determine whether or not the items that reflect a certain factor are strongly saturated in that factor. Values above 0.50 are suggested

-Discriminant validity was assessed by comparing the Convergent Validity for each factor with the Pearson coefficient of determination (R-squared) between factors. We assumed that discriminant validity exists when the convergent validity for each factor is higher than the R-squared between factors.

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6. Findings

6.1. Supervisor's Core Competencies Scale (SCoreCS) - Original 29-item version

The reliability and validity study followed the procedures suggested by experts: it started with the calculation of statistics (mean and standard deviations) and of the correlations obtained between each item and the global value (Table 1).

The results showed that only three of the items had scores between (1) one and five (5). In most of the items, the scores ranged between 2 and 5, with mean values ranging between 3 and 5, which indicates high mean indices. In fact, the mean indices show a fluctuation between 4.69 (items 3 and 6) "be fair./Respect for the person as a whole/for the supervisee's identity" and 4.56 (item 1) "Respect for the profession's ethical and deontological matrix".

The correlation coefficients are quite high, standing above 07.40. According to the Cronbach's alpha coefficient, the items are "very good", ranging from $\alpha = 0.976$ in item 1, 3, 4, 5, 6, 7, 8 and 9 to $\alpha = 0.975$ in item 2 "Be honest". Cronbach's alpha value, for the global value, was 0.977, which demonstrates a very good internal consistency.

We also analysed the normality of the items through the use of asymmetry and kurtosis indexes and we could conclude that they present a normal distribution: the absolute asymmetry values ranged between 0300 and 1,394 and the kurtosis values between 0.024 and 3,428 with a 4.848 multivariate coefficient of variation. Those values suggest that they are within the reference values.

Table 01. Internal Consistency of the Supervisor's Core Competencies Scale items

Nº Item	Items	Mean	SD	r/ total item	α without item
1	Respect for the profession's ethical and deontological matrix;	4.56	0.548	0.776	0.976
2	Be honest;	4.66	0.500	0.821	0.975
3	Be fair;	4.69	0.496	0.810	0.976
4	Safety;	4.61	0.540	0.768	0.976
5	Confidence;	4.63	0.534	0.772	0.976
6	Respect for the person as a whole/for the supervisee's identity;	4.69	0.492	0.805	0.976
7	Respect for the supervisee's values;	4.66	0.514	0.784	0.976
8	Respect for the supervisee's educational level/ stage;	4.63	0.530	0.784	0.976
9	Ability to manage consistently in an effective and appropriate way;	4.61	0.520	0.806	0.976
10	Good interpersonal relationships;	4.58	0.538	0.756	0.976
11	Emotional self-control	4.50	0.568	0.742	0.976
12	Facilitate relations among peers;	4.52	0.538	0.819	0.975
13	Promote self-efficacy/self-esteem and self-regulation	4.59	0.511	0.817	0.975
14	Promote a positive identity for himself, facilitating the process of affirmation;	4.56	0.548	0.786	0.976
15	Maintain effective verbal and non-verbal communication	4.54	0.572	0.742	0.976
16	Ability to pay attention and to listen;	4.61	0.514	0.823	0.975
17	Ability to understand	4.62	0.506	0.811	0.976
18	Show an appropriate attitude and give adequate response;	4.60	0.516	0.823	0.975
19	Ability to ask questions;	4.51	0.551	0.792	0.976
20	Reflect on critical thinking, judgments and the decision-making process according to the standards and guidelines of the profession;	4.43	0.569	0.818	0.975
21	Have a professional performance based on conceptual/theoretical/empirical evidence;	4.42	0.574	0.783	0.976
22	Be a reflexive and proactive member;	4.46	0.573	0.762	0.976
23	Scientific evidence;	4.36	0.612	0.717	0.976
24	Theoretical models;	4.32	0.612	0.739	0.976
25	Encourage the improvement of the professional language using progressive levels of scientific betterment;	4.38	0.549	0.805	0.976
26	Act as a "role model";	4.09	0.880	0.369	0.980

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27	Promote the development of a professional identity (suitability for the profession);	4.41	0.550	0.818	0.975
28	Facilitate collegiality/socialization habits among co-workers;	4.43	0.559	0.822	0.975
29	Help the supervisee define his or her values, while respecting the profession's ethical and deontological matrix;	4.43	0.541	0.781	0.976
	Cronbach's global alpha Coefficient				**0.977**

All the items presented correlations with the general factor above 0.20, so we submitted the 29 items to a confirmatory factorial analysis using for this purpose a varimax orthogonal rotation method and the scree plot test to determinate the factors presenting values above 1 that should be retained.

The KMO test revealed a 0.962 value and Bartlett's test for sphericity showed significant differences (x2 = 10722, 130; p = 0.000). These results suggest that we can go on with the validation process. The common factor variances are above 0.40 for all the items but item 26 that got a 0,373 value. We decided to keep the item nonetheless.

We could extract three factors which together account for 75.26% of the total variance.

The first factor/subscale entitled "Core personal competencies", accounts for 63.42% of the total variance and contained nine (9) items (1,2, 3, 4, 5, 6, 7, 8 and 9);

The second factor/subscale entitled "Core interpersonal/communication competencies", explains 7.81% and includes ten (10) Items (20,21,22,23,24,25,26,27,28 and 29

The third factor/subscale named "Core performance competencies", explains 4.025% and integrates 10 (10) Items (10,11,12,13,14,15,16,17,18 and 19).

The trifactorial structure was then subjected to confirmatory factor analysis. Table 2 presents the trajectories of the different items and the corresponding factors, as well as the critical ratios and the lambda coefficients. Based on the results obtained, we could determine that all items are statistically significant to their respective factor. The lambda coefficients indicate factor saturation values that are all above 0.50 except for item 26 that reached a 0.455 coefficient and will therefore be excluded.

Table 02. Trajectories, Critical Ratios and Lambda coefficients

Trajectories			Estimate	S.E.	C.R.	P	λ
crc6	<---	CRCF1	1.000				.930
crc2	<---	CRCF1	1.020	.033	30.773	***	.933
crc3	<---	CRCF1	1.005	.033	30.145	***	.927
crc7	<---	CRCF1	.998	.038	26.569	***	.888
crc4	<---	CRCF1	.999	043	23.001	***	.847
crc5	<---	CRCF1	.998	.042	23.613	***	.856
crc8	<---	CRCF1	.982	.042	23.296	***	.849
crc9	<---	CRCF1	.963	.042	23.140	***	.848
crc1	<---	CRCF1	.950	.048	19.818	***	.794
crc24	<---	CRCF2	1.000				.837
crc23	<---	CRCF2	.948	.055	17.161	***	.793
crc25	<---	CRCF2	.964	.046	20.967	***	.900
crc27	<---	CRCF2	.977	.046	21.336	***	.910
crc21	<---	CRCF2	.983	.049	20.052	***	.877
crc28	<---	CRCF2	.985	.047	20.992	***	,903
crc22	<---	CRCF2	.894	.052	17.213	***	.799
crc29	<---	CRCF2	.908	.047	19.187	***	.860
crc20	<---	CRCF2	.934	.050	18.593	***	.840

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Trajectories			Estimate	S.E.	C.R.	P	λ
crc26	<---	CRCF2	.782	.094	8.331	***	.455
crc18	<---	CRCF3	1.000				.907
crc15	<---	CRCF3	.989	,.050	19.884	***	.808
crc14	<---	CRCF3	.976	.047	20.925	***	.834
crc13	<---	CRCF3	.942	.042	22.524	***	.861
crc12	<---	CRCF3	.975	.045	21.692	***	.848
crc19	<---	CRCF3	.958	.048	20.022	***	.813
crc16	<---	CRCF3	.974	.040	24,534	***	,886
crc17	<---	CRCF3	.951	.039	24.093	***	.879
crc11	<---	CRCF3	.918	.053	17.214	***	.756
crc10	<---	CRCF3	.896	.049	18.267	***	.779

The trifactorial hypothesized model is considered in Figure 1 that exhibits the items grouped according to their different factors, their factorials weights and individual reliability. As mentioned before, the only item that shows a saturation below 0.50 and a 0.21 individual reliability is item 26 from factor 2/subscale 2. The global adjustment quality of the first model proved appropriate as far as internal consistency (x2/gl = 4.236), RMR = 0.016 and SRMR = 0.048 are concerned and inadequate for the remaining indexes: GFI = 0.695, CFI = 0.870, RMSEA = .0.111.

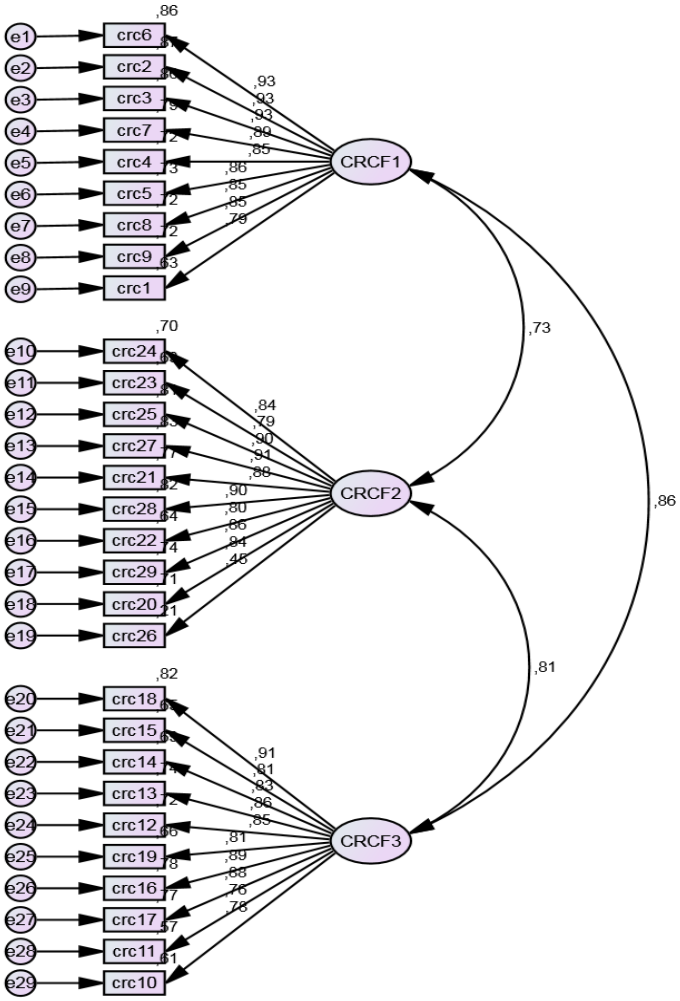

Figure 01. Initial model with all its items

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Corresponding Author: Madalena Cunha
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The model was refined with the exclusion of the inadequate item and using the modification indices made available by the programme. Figure 2 represents the final model. Multicollinearity problems, in factor1/subscale 1, led to the exclusion of items 6 and 8, in factor 2/ subscale 2; the same happened to item 27 and to items 14.17 and 18 in factor 3/subscale 3. The remaining items showed factorial weights above 0.70 and an individual reliability above 0.60. The global adjustment indexes are now appropriate: (x2/gl = 2.779; CFI = 0.951; RMSEA = 0,076; RMR = 0.011 and SRMR = 0,036. The GFI (= 0.863) values are still quite modest.

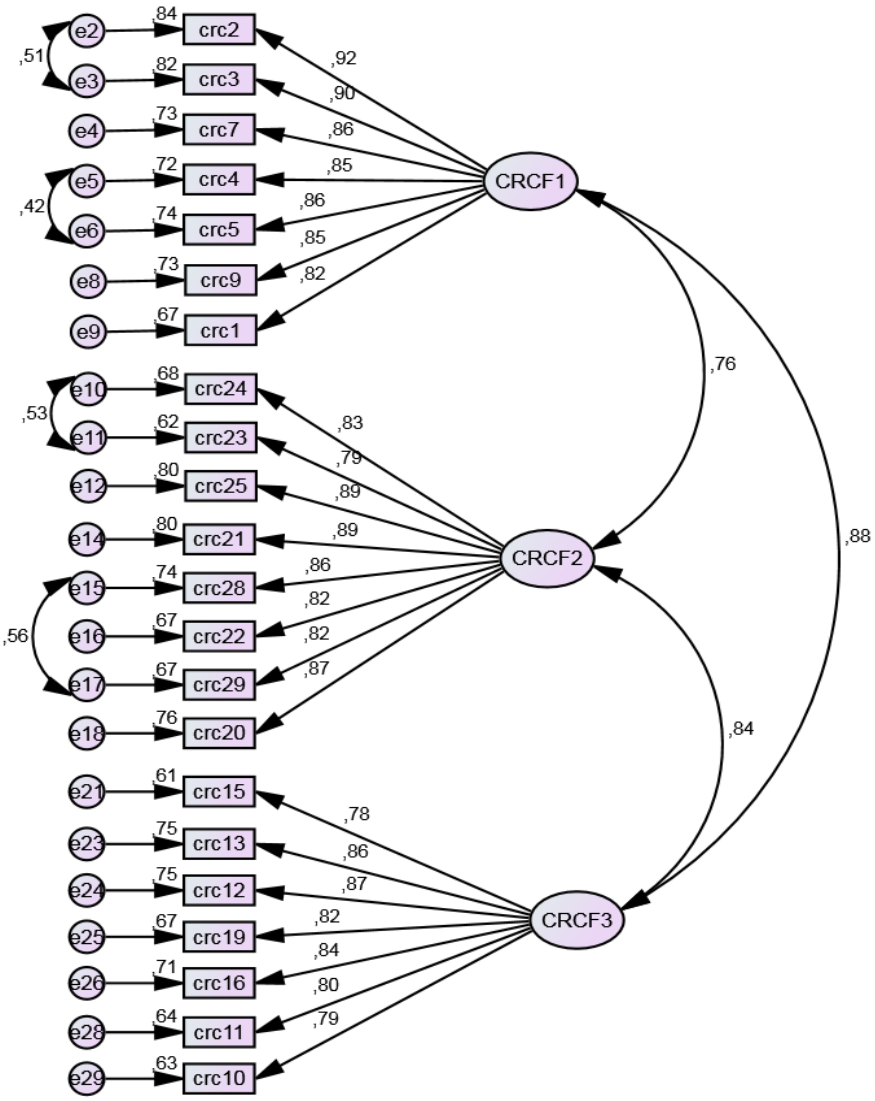

Figure 02. Model after using modifications indices

The high correlative values that exist between the three factors/three subscales suggest a hierarchical structure with a second order factor that was named "Supervisor's Core Competencies". Figure 3 shows that correlations between the global factor (CRCF4) and its subscales are high and range between 0.85 (CRCF4 vs CRCF2), with a 72.0% explained variance, and 0.98 (CRCF4 vs CRCF3) with a 96.0% explained variance. The adjusted Goodness of Fit Indices experienced slight variations which led to the improvement of some of the indices.

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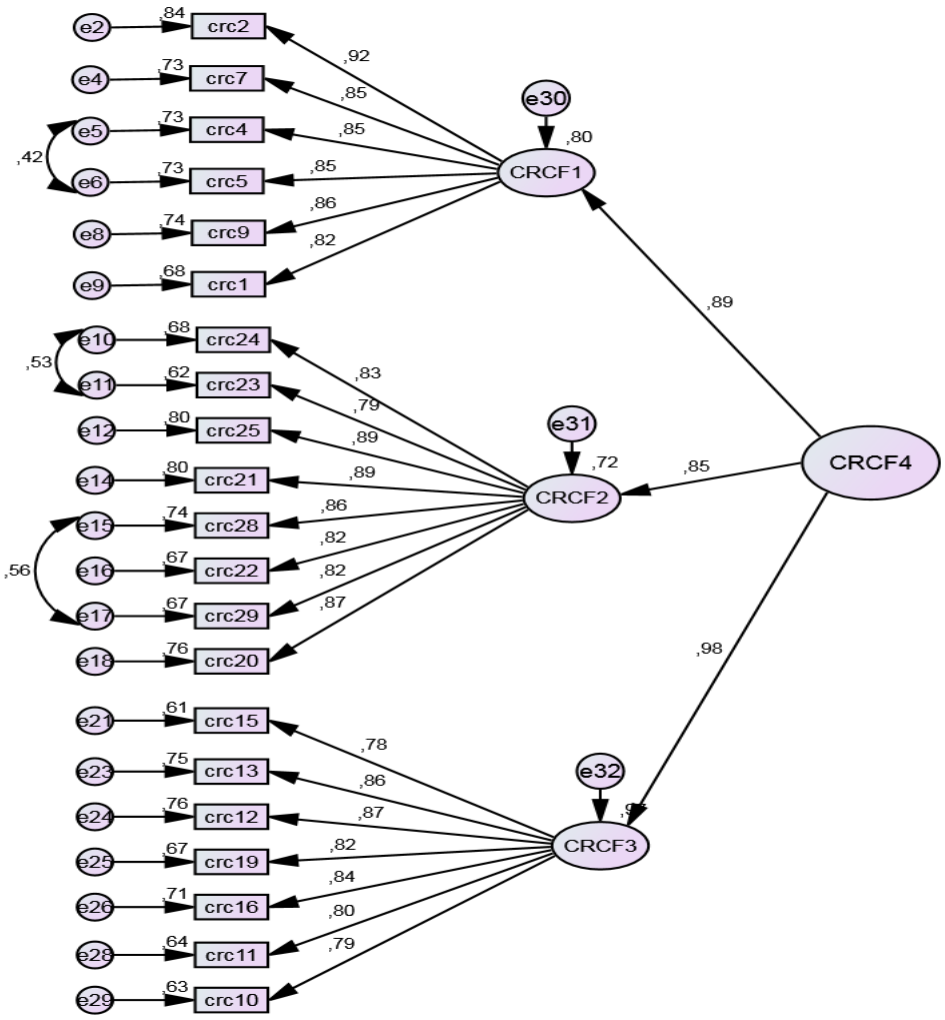

Figure 03. Final second order model

The global adjusted Goodness of Fit Indices clearly contributed to the overall improvement following the inclusion of the modifications that were suggested and the exclusion of the items. GFI, despite experiencing a slight improvement, is the only value that is still too low (Table 3)

Table 03. Quality indices of the adjustment of all the models

Model	x^2/gl	*GFI*	*CFI*	*RMSEA*	*RMR*	*SRMR*
Model 1 – Initial Model	4.730	0.695	0.870	0.111	0.016	0.048
Model3 with modification indices and items that were eliminated	2.779	0.863	0.951	0.076	0.011	0.036
Second order Model	2.747	0.872	0.952	0.076	0.011	0.035

Finally, we studied the Composite Reliability and Convergent Validity. According to the Internal Consistency indexes, it was clear that all three factors/subscales exhibit good consistency and good convergent validity indexes. The AVE values show the factors' Convergent Validity since they are above reference values. The stratified composite reliability (0.981) and the convergent validity (0.712) for the global scale are good. Discriminant validity is evident between all factors but couldn't be established for the relationship between Factor 1 vs. factor 3 (table 4).

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Table 04. Composite Reliability, Average Variance and Discriminant Validity

Supervisor's Core Competencies Scale (SCoreCS) Factors/Subscales	*CR*	*AVE*	Discriminant Validity	
			F2	F3
F1- Personal factors	0.944	0.739	0.577	0.774
F2 –Performance factors	0.953	0.718		0.705
F3 – Interpersonal/communication factors	0.937	0.681		

Stratified Cr = 0.981 AVE = 0.712

The study of the internal consistency of the Supervisor's Core Competencies Scale (SCoreCS) revealed, as it has already been mentioned, the existence of three (3) factors/subscales. With the psychometric study we analysed the internal consistency of the 21 remaining items that are part of the scale (Table 5).

For the "Core personal competencies" subscale, we consider that items 2 and 7 "Be honest" and "Respect for the supervisee's values" were, according to the mean values obtained, the most favourable items and that the least favourable item was item 1 "Respect for the profession's ethical and deontological matrix". The Cronbach's alpha coefficients obtained in the 6 items that ranged from (α = 0.930) in item 2 " Be honest" to (α = 0.958) in item 1 "Respect for the profession's ethical and deontological matrix" indicate a reasonable internal consistency, with a total alpha of 0.979. The highest correlation value is found in item 2 (r = 0.887) and the lowest correlation is found in item 1 (r = 0.783). The Cronbach's alpha for the whole Core personal competencies subscale was 0.979.

As for the "Core interpersonal/communication factors" subscale, the most favourable item, in average, is item 16 "Ability to pay attention and to listen". However, the results show that the average values and the respective standard deviations obtained are well-centred according to the specifications. The Cronbach's alpha coefficients of the 7 items included in this subscale and that range between (α = 0.922) in item 12 "Facilitate relations among peers" and (α = 0.930) in items 10 and 15 "Good interpersonal relationships " and "Maintains effective verbal and non-verbal communication" reveal a good internal consistency, with a Cronbach's alpha for the whole subscale of α = 0.946. The highest correlation value is found in item 12 (r = 0.838) and the item that has the lowest correlation value is item 10 (r = 0.757). Cronbach's alpha for the global Core interpersonal/communication factors subscale was 0.946.

As far as the "Core performance factors" subscale was concerned, the best mean value is found in item 22 "Be a reflexive and proactive member" with a 4.52 mean value and the lowest mean value was found for item 24 "Theoretical models", with a 4.32 value. The Cronbach' alpha coefficients in this subscale range between (α = 0.946) in items 21 and 25 "Have a professional performance based on conceptual/theoretical/ empirical evidence" and "Encourage the improvement of the professional language using progressive levels of scientific betterment" and (α = 0.851) in items 22 and 23 "Be a reflexive and proactive member" and "Scientific evidence". There was a (α = 0.936) Cronbach's alpha coefficient for this whole subscale. These values suggest that there is a good internal consistency. The highest correlative value obtained is found in item 25 (r = 0.873) and the lowest value is found for item 22 (r = 0.792). The Cronbach's alpha for the global Core performance factors subscale was 0.936.

Globally, the 21-item Supervisor's Core Competencies Scale (SCoreCS) obtained a 0.972 Cronbach's alpha value.

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Corresponding Author: Madalena Cunha
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

Table 05. Internal consistency of the Supervisor's Core Competencies Scale items

Nº Item	Items	Mean	SD	r/ total item	r^2	α without item
	Core personal factors	**Global Alpha**				**0.979**
1	Respect for the profession's ethical and deontological matrix;	4.56	0.548	0.783	0.625	0.942
2	Be honest;	4.66	0.500	0.887	0.794	0.930
4	Safety;	4.61	0.540	0.853	0.766	0.933
5	Confidence;	4.63	0.534	0.853	0,769	0.933
7	Respect for the supervisee's values;	4.66	0.514	0.811	0.687	0.938
9	Ability to manage consistently in an effective and appropriate way;	4.61	0.520	0.823	0.683	0.937
	Core interpersonal/communication factors	**Global Alpha**				**0.946**
10	Good interpersonal relationships;	4.58	0.538	0.757	0.593	0.930
11	Emotional self-control;	4.50	0.568	0.781	0.644	0.928
12	Facilitate relations among peers;	4.52	0.538	0.838	0.720	0.922
13	Promote self-efficacy/self-esteem and self-regulation;	4.59	0.511	0.826	0.708	0.924
15	Ability to maintain effective verbal and non-verbal communication;	4.54	0.572	0.760	0.628	0.930
16	Ability to pay attention and to listen;	4.61	0.514	0.808	.	0.925
19	Ability to ask questions;	4.51	0.551	0.788	0.634	0.927
	Core performance factors	**Global Alpha**				**0.936**
20	Reflect on critical thinking, judgements and the decision-making process according to the standards and guidelines of the profession	4.43	0.569	0.824	0.714	0.949
21	Have a professional performance based on conceptual/theoretical/ empirical evidence.;	4.42	0.574	0.865	0.771	0.946
22	Be a reflexive and proactive member;	4.46	0.573	0.792	0.646	0.951
23	Scientific evidence;	4.36	0.612	0.796	0.737	0.951
24	Theoretical models;	4.32	0.612	0.841	0.775	0.948
25	Encourage the improvement of the professional language using progressive levels of scientific betterment;	4.38	0.549	0.873	0.779	0.946
28	Facilitate collegiality/socialization among co-workers;	4.43	0.559	0.851	0.818	0.947
29	Help the supervisee define his/her values while respecting the profession's ethical and deontological matrix .	4.43	0.541	0.805	0.783	0.950
Global	**Cronbach's global alpha coefficient**	**0.972**				
	Guttman Split Half	**First half – 0.955**				
21 items		**Second half – 0.956**				

The convergent/divergent validity between the items and the corresponding factors is shown in table 6. The results reveal the existence of convergent and divergent validity as we witness the existence of higher correlative values between the items and the factors to which they belong.

Table 06. Convergent/divergent Validity of the Supervisor's Core Competencies Scale items

Nº Item	Items	Personal factors Core	Interpersonal /communication factors Core	Performance factors Core	Core Total
1	Respect for the profession's ethical and deontological matrix;	0.853*	0.731*	0.663*	0.800*
2	Be honest;	0.922*	0.761*	0.655*	0.828*
4	Safety;	0.901*	0.710*	0.605*	0.782*
5	Confidence;	0.900*	0.710*	0.607*	0.783*
7	Respect for the supervisee's values;	0.868*	0.722*	0.631*	0.788*
9	Ability to manage consistently in an effective and appropriate way;	0.878*	0.753*	0.664*	0.815*
10	Good interpersonal relationships;	0.724*	0.824*	0.616*	0.773*
11	Emotional self-control;	0.655*	0.845*	0.641*	0.770*
12	Facilitate relations among peers;	0.720*	0.884*	0.717*	0.836*
13	Promote self-efficacy/self-esteem and self-regulation;	0.748*	0.873*	0.684*	0.827*
15	Maintain effective verbal and non-verbal communication ;	0.639*	0.829*	0.640*	0.760*
16	Ability to pay attention and to know how to listen;	0.760*	0.860*	0.678*	0.823*
19	Ability to ask questions;	0.675*	0.848*	0.727*	0.815*

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Corresponding Author: Madalena Cunha
Selection and peer-review under responsibility of the Organizing Committee of the conference
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20	Reflect on critical thinking, judgements and on the decision-making process according to the standards and guidelines of the profession;	0.673*	0.761*	0.867*	0.844*
21	Have a professional performance based on conceptual/theoretical/empirical evidence;	0.654*	0.662*	0.899*	0.817*
22	Be a reflexive and proactive member;	0.626*	0.692*	0.842*	0.795*
23	Scientific evidence;	0.562*	0.630*	0.848*	0.757*
24	Theoretical models;	0.578*	0.627*	0.883*	0.776*
25	Encourage the improvement of the professional language using progressive levels of scientific betterment	0.634*	0.718*	0.904*	0.833*
28	Facilitate collegiality/socialization habits among co-workers;	0.664*	0.727*	0.887*	0.838*
29	Help the supervisee define his/her values while respecting the profession's ethical and deontological matrix;	0.632*	0.695*	0.850*	0.801*

Legend: * $p > 0.05$

To conclude the psychometric study we designed table 7 that shows the Pearson's correlation matrix between the three factors/subscales and the global value of the Supervisor's Core Competencies Scale (SCoreCS). The assessment carried out shows that the coefficients obtained are positive and statistically significant, ranging between 0.718 for the Core interpersonal/communication competencies, which explains a positive correlation, and 0.939 for the Core global factors, thus proving a very strong correlation. According to the global factor, correlations are higher when they obtain percentages of explained variance above 35%.

Table 07. Pearson's Correlation between the Supervisor's Core Competencies Scale

Supervisor's Core Competencies Scale Subscales	Core personal factors	Core intrapersonal / communication factors	Core performance factors
Core personal factors	-		
Core intrapersonal / communication factors	0.718	-	
Core performance factors	0.824	0.788	-
Global SCoreCS factors	**0.901**	**0.925**	**0.939**

6.2. Supervisor's Core Competencies Scale (SCoreCS) - 21-item final version), versus gender and age

The statistical analysis of the scores obtained for the Supervisor's Core Competencies Scale (SCoreCS) global value reveals that, taking into account the total sample, there was a fluctuation between a minimum of 2.33 "Disagree '" and a maximum of 5 "Strongly agree ", with an average of 4.51.

In the Core Personal Factors subscale, the values varied between a minimum of 2 and a maximum of 5, obtaining a 4.62 (± 0.46 sd) mean score.

The Core Interpersonal/Communication Factors subscale provided values ranging between a minimum of 2 and a maximum of 5, with a 4.55 (± 0.76 sd) mean value. For the Core Performance Factors subscale, the values varied between a minimum of 2 and a maximum of 5, with a 4.34 (± 0.50 sd) mean value (Table 8).

Table 08. Statistics regarding the Supervisor's Core Competencies Scale

Supervisor's Core Competencies Scale (SCoreCS)	Min	Max	M	S.D.	CV (%)	Sk/error	K/error
Core Personal Factors	2	5	4.62	0.46	9.95	-8.92	7.33
Core Interpersonal / Communication Factors	3	5	4.55	0.46	10.10	-3.92	-3.40
Core Performance Factors	2	5	4.34	0.50	11.52	-2.69	1.48
Global SCoreCS **Score**	**2.33**	**5**	**4.51**	**0.44**	**9.75**	**-5.00**	**2.44**

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Corresponding Author: Madalena Cunha
Selection and peer-review under responsibility of the Organizing Committee of the conference
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The analysis of the Supervisor's Core Competencies Scale (SCoreCS) valuation, influenced by the respondents' gender, was conducted through the Mann-Whitney U test. The analysis shows that the mean values for the global score and for the personal and for the performance factors are higher when the respondents are women. Male respondents grant a higher value to the supervisor's interpersonal and communication factors. Statistically significant differences in relation to gender are found in the core personal factors (P = 0.046) and in the core interpersonal /communication factors (p = 0.044) (table 9).

Table 09. Results of the Mann – Whitney U Test of the Supervisor's Core Competencies Scale in relation to gender

Gender	Male	Female	z	p
Supervisor's Core Competencies Scale (SCoreCS)	**Average Ordination**	**Average Ordination**		
Core Personal Factors	133.54	157.97	-1.997	**0.046**
Core interpersonal/Communication Factors	155.82	132.80	-2.016	**0.044**
Core Performance Factors	139.93	156.54	-1.318	0.187
Global SCoreCS	**134.78**	**157.69**	**-1.780**	**0.075**

A variance analysis was carried out to evaluate the scores variability of the supervisor's core competencies according to the higher education students' age group. It was found that students under the age of 19 valued the supervisor's personal competencies (mean=4.75 ± 0.37). The values of F are explanatory and show that there are statistically significant differences when different age groups are involved. This happens for all subscales, except for the core Performance Factors subscale (p = 0.071). We applied Turkey's post-hoc test and it proved that these differences are evident among students who are under 19 and between 20 and 21 and in the responses, they gave to the Core Interpersonal/communication subscale and when we look at the Scale global score. For the Core Personal Factors and the Core interpersonal/communication Factors subscales, there are still significant differences between the younger students and the older ones. (Table 10)

Table 10. Results of the variance analysis of the Supervisor's Core Competencies Scale in relation to age groups

Age groups	<= 19		20-21		>=22		F	p	Turkey Test (p)		
Supervisor's Core Competencies Scale (SCoreCS)	**M**	**sd**	**M**	**sd**	**M**	**sd**			**1/2**	**1/3**	**2/3**
Core Personal Factors	4.75	0.37	4.55	0.49	4.55	0.49	6.144	0.002	0.005	0.11	1.00
Core Interpersonal/ communication Factors	4.66	0.41	4.48	0.47	4.51	0.47	4.53	0.011	0.11	0.082	0.856
Core Performance Factors	4.48	0.48	4.33	0.51	4.40	0.48	2.67	0.071	0.056	0.505	0.55
Global SCoreCS	**4.62**	**0.39**	**4.44**	**0.45**	**4.48**	**0.45**	**4.67**	**0.010**	**0.009**	**0.090**	**0.797**

7. Conclusion

The study of the psychometric qualities of the Supervisor's Core Competencies Scale (SCoreCS) shows that the values of internal consistency in the three subscales and in the global score are robust. However, some limitations for the psychometric analysis were detected: the size of the sampling with 306 participants (when compared to population of Portuguese higher education students) and the predominance of young participants (Mean age = 21.15 years). It is essential that future studies analyse

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Corresponding Author: Madalena Cunha
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the relationship between the variables currently studied so that those results can be compared to those obtained from other samples of the Portuguese population.

Social desirability was not a controlled factor, and this may have influenced the answers obtained, since the construct included moments in which participants would resort to auto-responses. It would also be interesting to replicate this factorial study using broader, foreign and more balanced samples in terms of age and academic fields, in which the social desirability variable would be controlled.

The discussion of the empirical results obtained from studies already published shows that higher education students value the different supervisor's personal factors. These results are in agreement with the supervisory styles presented by Glickman's (1985) and Alarcão and Tavares (2007) as cited by Pinto (2013), when they refer that interpersonal competencies should be a pillar that supervision action should value. The role of the supervisor must contemplate three preponderant requirements that will determine the action and the style of the supervisor's performance: knowledge, interpersonal skills and technical skills. Similarly, Costa (2012) argues that the mentor should possess personal features that would provide students with new knowledge, new skills/competencies, behaviours and attitudes. The results of this study support the importance of assigning a mentor teacher in higher education.

This conclusion is also expressed in the study by Botti and Rego (2007), which mentions that the mentor plays an important role at the students' personal and professional level.

This research constitutes the first step in the evaluation of the psychometric quality of the Supervisor's Core Competencies Scale (SCoreCS), based on a sample of the Portuguese population. The study proves that the internal consistency values in the three different subscales and in the global score are strong. The SCoreCS revealed the existence of three (3) factors/subscales: 1 – Core Personal Factors ($\alpha = 0.979$); 2 – Core Interpersonal/communication Factors ($\alpha = 0.946$) and 3-Core Performance Factors ($\alpha = 0.936$). The Cronbach's alpha value found for the global SCoreCS was 0.972. The results clearly suggest that the identification of personal, interpersonal/communication and performance competencies evidenced by the supervisor should be considered during the assessment of the teachers' pedagogical practices. They also seem foster the development of future research that will support pedagogical supervision and in which innovation will play an important role.

The empirical results prove the following:

-Higher education students consider that the mentor teacher's most important features are his core personal factors, and value above all, his ethics and the way he interacts with the others.

-Female students' value more the mentor's personal competencies, while male students prefer his interpersonal competencies which revealed statistically significant differences. Younger students (≤19) value any type of competencies showing statistically significant differences when compared to other age groups.

As a contribution to the pedagogical practice carried out in higher education, the results show that it is of crucial importance that we identify the impact that the mentor teacher's existence has on the students' failure/school dropout rate. This knowledge is vital since it fosters the development and implementation of pedagogical strategies that will promote students' academic success and that will surely contribute to the development of academic practices that will foster a more personal and student-focused pedagogical relationship that has become more relevant in modern didactics.

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