

Contextual Adaptation and Psychometric Evaluation of the Healthcare Professional Humanization Scale for Undergraduate Nursing Students: The HUMAS-E Study

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Abstract

Background

The Healthcare Professional Humanization Scale (HUMAS) was developed for nursing professionals, but some items presume autonomous practice and extensive clinical experience. This study aimed to contextually adapt HUMAS for undergraduate nursing students and examine the psychometric properties of the resulting HUMAS-E.

Methods

The adaptation included review by 15 nursing students, assessment by a multidisciplinary committee of six experts, and pretesting with 10 additional students. The psychometric evaluation included 344 Spanish undergraduate nursing students. Item performance, internal consistency, convergent and discriminant evidence, and structural validity were examined. Confirmatory factor analyses were based on polychoric correlations and diagonally weighted least squares estimation.

Results

The correlated five-factor model showed adequate fit: $\chi^2(142) = 273.22$, $p < 0.001$; CFI = 0.989; TLI = 0.987; RMSEA = 0.052, 90% CI [0.043, 0.061]; and SRMR = 0.066. Standardized factor loadings ranged from 0.474 to 0.954. Ordinal alpha ranged from 0.822 to 0.934, and composite reliability ranged from 0.821 to 0.935. Average variance extracted exceeded .50 for four dimensions and was 0.489 for Affection. Item 19 showed the lowest loading, although its corrected item-total correlation remained acceptable.

Conclusions

HUMAS-E retained the original five-factor configuration and showed preliminary evidence of structural validity and internal consistency. Dimensional scores should be prioritized because Affection behaved comparatively differently and widespread ceiling effects may limit discrimination among students with high scores. Further studies should examine measurement invariance, external validity, temporal stability, and responsiveness.

Introduction

Humanization is an essential component of nursing care quality and requires recognizing each patient as a whole person whose physical, emotional, social, and ethical needs extend beyond the technical management of a health condition. Humanized care therefore combines clinical competence with interpersonal sensitivity, communication, empathy, and the ability to establish meaningful therapeutic

relationships [1–4]. However, the increasing technological complexity of healthcare environments may shift attention toward procedures and measurable outcomes, reducing the space available for the relational and emotional dimensions of care [5].

These competencies do not begin to develop only after entry into professional practice. They also take shape during undergraduate education, when nursing students acquire technical knowledge and skills while developing the attitudes, values, and relational approaches that contribute to their professional identity. Although nursing education increasingly recognizes the importance of relational competencies, differences remain in how these competencies are defined, incorporated into curricula, and assessed compared with technical skills [6]. Students' experiences with patients, families, healthcare professionals, and faculty members may influence how they understand nursing care and the kind of professionals they seek to become [7, 8].

Clinical placements represent a particularly important stage in this process. Students must learn to care for people experiencing vulnerability, suffering, and uncertainty while working within professional structures in which their autonomy remains limited. Qualitative studies indicate that nursing students may experience tensions between technical demands and the human dimension of care, particularly in complex clinical environments [9–11]. These experiences may promote learning and professional development but may also generate insecurity and make it more difficult to establish therapeutic relationships when appropriate supervision and educational support are not available.

Empathy, emotional understanding, and self-efficacy therefore occupy a central position in nursing education. Studies involving nursing students have identified associations among humanization, empathy, positive mental health, and self-compassion, suggesting that emotional well-being and relational competencies are connected with the development of humanized care [12, 13]. Relational difficulties may become particularly evident when students care for people with cognitive impairment, stigmatized health conditions, or complex emotional needs [14, 15]. This evidence supports the explicit and progressive integration of humanization throughout undergraduate nursing education.

Educational strategies based on clinical simulation, simulated nursing consultations, narrative photography, poetry, and reflective learning have been used to strengthen these competencies [16–18]. Approaches centered on student empowerment, strengths-based nursing, and the formal integration of humanization into educational programs have also been proposed [19, 20]. Evaluating students' humanization-related competencies requires instruments that can identify dimensional profiles and potential educational needs. Evidence from the assessment of other constructs, including moral sensitivity and attitudes toward childbirth, also highlights the importance of examining measurement properties specifically in the populations in which an instrument will be used [21, 22].

Among the available instruments, the Healthcare Professional Humanization Scale (HUMAS) was developed specifically to assess humanization among nursing professionals. The original study, conducted by Pérez-Fuentes et al. [3] with 338 Spanish nurses, defined humanization as a multidimensional construct comprising five related factors: Affection, Self-efficacy, Emotional

Understanding, Optimistic Disposition, and Sociability. HUMAS consists of 19 items with five response categories and showed an adequate factorial structure and internal consistency. Subsequent studies have associated its dimensions with empathy, emotional intelligence, moral sensitivity, prosocial behavior, communication styles, and burnout, supporting the relevance of these components to the understanding of humanized nursing care [4, 5, 23]. An Italian adaptation also retained the 19 items and five-factor structure, providing additional evidence of the applicability of the theoretical model in a different linguistic and cultural context [24].

HUMAS has previously been administered to nursing students to examine its associations with empathy and communication skills [13, 25]. However, these studies used the professional version as a measure of humanization and did not evaluate a version specifically adapted to the student role. Consequently, the extent to which the theoretical structure and item functioning of HUMAS are preserved when its content is adapted to undergraduate nursing education remains unclear.

Directly administering an instrument developed for professionals may be problematic when its items assume autonomous decision-making, employment responsibilities, or extensive clinical experience. Nursing students remain in a supervised educational stage and differ considerably in their exposure to clinical practice. Expressions referring to independent professional practice may therefore not have the same meaning for students across academic years. A contextual adaptation of HUMAS was needed to preserve the original construct, five-dimensional structure, and scoring system while aligning item wording with students' academic activities, supervised clinical placements, and expected level of competence.

Accordingly, this study aimed to contextually adapt the Healthcare Professional Humanization Scale for Spanish undergraduate nursing students and examine the psychometric properties of the resulting version, designated HUMAS-E. Specifically, the study evaluated item performance, structural validity, internal consistency, and internal convergent and discriminant evidence. It also explored the stability of the five-factor configuration between students in the initial and advanced stages of undergraduate nursing education.

Methods

2.1. Study design

An instrumental, observational, cross-sectional study was conducted to adapt the Healthcare Professional Humanization Scale (HUMAS) to the educational and clinical context of undergraduate nursing students and examine the psychometric properties of the resulting version, designated HUMAS-E. The study was conducted in two stages. The first stage comprised contextual adaptation of the items, review by nursing students and a multidisciplinary expert committee, and assessment of item comprehensibility. The second stage consisted of the psychometric evaluation of the 19-item adapted version in students enrolled in the four academic years of undergraduate nursing programs.

The study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology recommendations for cross-sectional studies [26]. The methodological approach also considered the COSMIN principles applicable to the evaluation of measurement properties [27, 28].

2.2. Contextual adaptation, content validity and comprehensibility assessment

The adaptation process was designed to preserve the definition of the construct, the five-dimensional structure, and the scoring system of the original HUMAS while modifying expressions that presumed autonomous professional practice or extensive clinical experience. Because both the original and adapted versions were written in Spanish and administered in Spain, the process was considered a contextual and population-specific adaptation rather than a cross-cultural adaptation.

A structured review was conducted with 15 undergraduate nursing students selected through purposive quota sampling according to academic year. The group comprised three first-year, three second-year, five third-year, and four fourth-year students, thereby incorporating perspectives from students with different levels of academic preparation and clinical exposure. Participants evaluated item comprehensibility, relevance, contextual appropriateness, and familiarity of the wording, as well as the clarity of the instructions and response categories. They were also asked to identify ambiguous expressions and propose alternative wording when an item did not adequately reflect the student role. References to autonomous professional practice were subsequently reformulated to address academic activities, supervised clinical placements, and competencies appropriate to undergraduate education. The modifications primarily concerned linguistic and contextual aspects, although the situational frame of several items was broadened to accommodate differences in clinical exposure. The intended theoretical content and assignment of each item to the five original HUMAS dimensions were maintained throughout the adaptation process.

The proposed modifications were subsequently reviewed by a multidisciplinary committee of six experts, comprising three nurses with experience in university education, two psychologists, and one researcher involved in the original HUMAS study. The committee assessed the relevance, clarity, conceptual coherence, and appropriateness of each item for the target population, as well as its correspondence with the original theoretical dimension. Most modifications involved linguistic or contextual changes intended to remove assumptions of autonomous professional practice. In several items, particularly those belonging to Affection, the situational frame was broadened to allow students with different levels of clinical exposure to respond. Decisions were reached by consensus, prioritizing preservation of the intended item meaning and avoiding changes that could alter the construct being measured. Because the experts did not provide independent standardized ratings, quantitative content validity indices were not calculated. The process therefore provided qualitative evidence of content validity. The item-by-item correspondence between the original HUMAS and HUMAS-E is presented in Supplementary Table S1.

The preliminary version was subsequently pretested with 10 nursing students who had not participated in the earlier review. The pretest examined item comprehension, clarity of the instructions and response categories, presence of ambiguous terms, ease of completion, and completion time. Participants were also invited to report any difficulty in relating the item content to their academic or supervised clinical experience. Feedback from this stage informed the final linguistic and formatting adjustments. These students were not included in the psychometric sample.

2.3. Participants and sampling

The study population comprised students enrolled in the four academic years of undergraduate nursing programs at public and private Spanish universities. Participants were recruited using nonprobability convenience sampling. Students were eligible if they were at least 18 years old, were enrolled in an undergraduate nursing program during the data collection period, were able to understand the questionnaire in Spanish, and voluntarily provided electronic informed consent. Questionnaires were excluded when they contained no valid HUMAS-E responses or insufficient information to evaluate the 19 items.

A total of 345 questionnaires were initially recorded. After data integrity was reviewed, one record containing no responses to the HUMAS-E items was excluded. The final analytical sample comprised 344 students, all of whom had complete responses to the 19 items. Participants from all four academic years and from both public and private universities were represented.

Data were collected through Microsoft Forms between February and May 2026. The questionnaire link was distributed through WhatsApp groups of undergraduate nursing students. Before accessing the questionnaire, participants received information about the study objectives and procedures, the voluntary and anonymous nature of participation, the confidential treatment of the data, and their right to discontinue participation without consequence. Electronic informed consent was obtained before questionnaire completion.

No simulation-based a priori sample size calculation was performed. The final sample of 344 participants represented approximately 18 participants per indicator and was considered adequate for estimating the prespecified model of 19 ordinal indicators distributed across five correlated factors. Sample adequacy was evaluated in relation to model complexity, the number of indicators per factor, response distributions, and the magnitude of the observed factor loadings. Analyses conducted separately by educational stage were treated as exploratory because the initial-years group comprised only 103 participants.

2.4. Instruments

2.4.1. Sociodemographic and academic variables

Information was collected on sex, age, type of university, academic year, degree program, and autonomous community. Age was recorded in completed years. University type was classified as public or private, and academic year was categorized from the first to the fourth year of the nursing program. The degree program question was used to verify that respondents belonged to the target population.

The academic questions asked participants to indicate whether they attended a public or private university, their current academic year, and the degree program in which they were enrolled. These questions were not part of HUMAS-E and were not included in its scoring or psychometric evaluation.

2.4.2. Healthcare Professional Humanization Scale

The original HUMAS was developed to assess humanization among nursing professionals. It comprises 19 items distributed across five dimensions: Optimistic Disposition, Sociability, Emotional Understanding, Self-efficacy, and Affection. Items are answered using a five-point Likert scale ranging from 1, “never,” to 5, “always.”

Optimistic Disposition comprises Items 1–3; Sociability, Items 4–6; Emotional Understanding, Items 7–9; Self-efficacy, Items 10–14; and Affection, Items 15–19. The final five items are negatively worded and require reverse scoring. Dimension scores are calculated as the mean of the corresponding items, with higher values indicating a more favorable level of the assessed humanization-related characteristic.

2.4.3. Student-adapted version of HUMAS

HUMAS-E retained the five dimensions of the original instrument: Optimistic Disposition, Sociability, Emotional Understanding, Self-efficacy, and Affection. In accordance with the original HUMAS terminology, Affection refers to the emotional impact experienced in healthcare-related situations rather than to expressions of fondness or interpersonal warmth. Because its five items describe distress, nervousness, anxiety, guilt, and emotional involvement, Items 15–19 were reverse-scored. Higher scores therefore indicated lower emotional disruption and greater perceived capacity to manage the emotional demands of care-related situations. Dimension scores were calculated as the mean of their corresponding items, retaining the original 1–5 metric.

Items referring to professional performance were reformulated to address academic activities, supervised clinical placements, or healthcare situations appropriate to the student’s educational level. In several Affection items, the situational frame was broadened to allow responses from students with limited or varying clinical exposure. These adaptations were intended to preserve the theoretical content and dimensional assignment of the original items while removing assumptions of autonomous

professional practice. The correspondence between the original and adapted wording, together with the rationale for each modification, is presented in Supplementary Table S1.

Optimistic Disposition comprised Items 1–3; Sociability, Items 4–6; Emotional Understanding, Items 7–9; Self-efficacy, Items 10–14; and Affection, Items 15–19. Items 15–19 remained negatively worded and were reverse-scored using the transformation $6-x$. Higher scores therefore represented more favorable results across all dimensions.

The complete Spanish HUMAS-E and its item-by-item correspondence with the original HUMAS are provided in Supplementary Table S1. The English descriptions included in that table are intended solely to explain the adaptation process and should not be considered a validated English-language version of HUMAS-E.

2.5. Data analysis

All statistical analyses were conducted in Python 3.12.13. Data management and descriptive analyses were performed using pandas 2.2.3 and NumPy 1.26.4. Confirmatory factor analyses were conducted using semopy 2.3.11, and complementary statistical calculations were performed using SciPy 1.11.4. All statistical tests were two-sided, with the significance level set at .05. Because the HUMAS-E items were measured on an ordered five-category response scale, analyses of the factorial structure and internal consistency were based on polychoric correlations and estimation procedures appropriate for ordinal indicators.

The database was initially examined for duplicate records, incomplete questionnaires, and item responses outside the expected range. One record containing no valid HUMAS-E responses was excluded. The remaining 344 participants had complete responses to all 19 items.

Categorical variables were summarized using frequencies and percentages. Age was described using the mean, standard deviation, median, interquartile range, and observed range. Item performance was examined through response distributions, means, standard deviations, medians, skewness, kurtosis, and the percentages of responses in the lowest and highest categories. Floor and ceiling effects were considered present when at least 15% of participants selected the minimum or maximum response category, respectively. Corrected item-total correlations were calculated between each item and the remaining items within its theoretical dimension.

Structural validity was examined using confirmatory factor analysis. The primary model reproduced the original HUMAS structure, with 19 items loading onto five correlated factors: Optimistic Disposition, Sociability, Emotional Understanding, Self-efficacy, and Affection. The analysis was based on a polychoric correlation matrix and diagonally weighted least squares estimation, as implemented in semopy. The reported chi-square statistic, standard errors, and fit indices correspond to the DWLS

implementation used in the analysis and were not based on a separate mean- and variance-adjusted robust correction.

Model fit was evaluated using the chi-square statistic, the chi-square-to-degrees-of-freedom ratio, the Comparative Fit Index, the Tucker-Lewis Index, the Root Mean Square Error of Approximation with its 90% confidence interval, and the Standardized Root Mean Square Residual. These indices were interpreted jointly and as approximate criteria rather than as absolute decision rules. No residual correlations were introduced on the sole basis of modification indices.

A higher-order model was additionally evaluated in which the five first-order dimensions loaded onto a general humanization factor. The correlated five-factor and higher-order models were evaluated according to their theoretical coherence, overall fit, standardized loadings, and interpretability. Because the original correlated five-factor model showed adequate fit, no exploratory factor analysis or data-driven respecification of the factorial structure was performed.

Internal consistency was estimated separately for each dimension. Ordinal coefficient alpha was calculated from the corresponding polychoric item-correlation matrix. Composite reliability and average variance extracted were derived from the standardized factor loadings and residual variances of the CFA model. Discriminant evidence was examined using latent factor correlations, the heterotrait–monotrait ratio calculated from the polychoric item correlations, and the Fornell–Larcker comparison. These indicators were interpreted jointly rather than as independent or definitive tests of validity.

Because Item 19 showed the lowest standardized factor loading and corrected item-total correlation, a sensitivity analysis was conducted after removing this item. The internal consistency and average variance extracted of Affection and the fit of the resulting 18-item factorial model were compared with those of the complete 19-item version. The decision to retain or remove the item was based jointly on its content, corrected item-total correlation, factorial loading, effect on internal consistency, model fit, and correspondence with the original HUMAS.

The structural stability of the five-factor model was also explored across educational stages. First- and second-year students were combined into an initial-years group, whereas third- and fourth-year students formed an advanced-years group. The model was estimated separately in both groups, and its factorial configuration was evaluated using model fit indices, standardized loadings, and factor congruence coefficients. Because of the limited size of the initial-years group and instability in its polychoric correlation matrix, full metric and scalar invariance models were not estimated. These analyses were therefore interpreted as exploratory evidence of configural stability rather than as confirmation of measurement invariance.

2.6. Ethical considerations

The study protocol was approved by the Research Ethics Committee of Universidad Alfonso X el Sabio (Ref. 2022_03/131) and by the Biosecurity and Bioethics Committee of Universidad de Extremadura (Ref. 1426; January 22, 2026). The study was conducted in accordance with the Declaration of Helsinki and Regulation (EU) 2016/679 on the protection of personal data.

Participation was voluntary and anonymous. Before accessing the questionnaire, students received information about the study objectives and procedures, data confidentiality, and their right to withdraw without consequence. Electronic informed consent was obtained before questionnaire completion. Data were securely stored and used exclusively for research purposes.

Results

3.1. Participant characteristics

A total of 345 questionnaires were initially recorded. After data integrity was reviewed, one record was excluded because it contained no valid responses to the instrument. The final analytical sample comprised 344 students, all of whom had complete responses for the 19 HUMAS-E items.

The mean age was 23.36 years ($SD = 6.82$), with a median of 21 years and a range of 18–55 years. Most participants were women (74.7%), attended public universities (62.5%), and were enrolled in the fourth year of the nursing program (46.2%) (Table 1). Students from all four academic years were represented. Most participants were studying in Andalusia (46.8%) or the Community of Madrid (43.0%), whereas each of the remaining autonomous communities accounted for less than 5% of the sample (Table 1)

Table 1
Sociodemographic and academic characteristics of the sample

Characteristic	mean (SD)	median (IQR)	range
Age,	23.36 (6.82)	21.00 (20.00–23.00)	18–55
	n		%
Sex			
	Women	257	74.7
	Men	87	25.3
Type of university			
	Public	215	62.5
	Private	129	37.5
Academic year			
	First year	37	10.8
	Second year	66	19.2
	Third year	82	23.8
	Fourth year	159	46.2

3.2. Item analysis

Items 15–19 were reverse-scored using the transformation $6 - x$, so that higher scores consistently represented a more favorable result across all dimensions. After recoding, item means ranged from 3.05 for Item 17 to 4.54 for Item 6. The highest scores were observed for Sociability, whose three items had medians of 5 and means ranging from 4.48 to 4.54 (Table 2).

No floor effects were identified based on the predefined criterion of at least 15% of responses in the lowest category. By contrast, 18 of the 19 items had at least 15% of responses in the highest category. Ceiling effects were particularly marked for Items 4, 5, and 6, for which the most favorable response was selected by 57.8%, 59.6%, and 64.5% of participants, respectively. Item 17 was the only item that did not meet the predefined criterion for a ceiling effect.

Skewness values ranged from -1.46 to 0.03 , and kurtosis values ranged from -0.75 to 1.96 . Although the distributions were generally concentrated in the upper response categories, no extreme univariate skewness or kurtosis values were identified.

Corrected item-total correlations, calculated against the remaining items within each theoretical dimension, ranged from 0.479 to 0.838 and exceeded 0.30 for all items. The highest corrected item-total

correlation was observed for Item 5, whereas the lowest corresponded to Item 19. Standardized factor loadings and item-level explained variance from the CFA are also presented in Table 2.

Table 2
Descriptive item statistics and standardized CFA results for HUMAS-e

Item	Dimension	Mean (SD)	Ceiling, %	Corrected r_{it}	CFA loading	R ²
1	OD	4.04 (1.01)	41.3	0.673	0.898	0.806
2	OD	3.78 (0.98)	24.4	0.707	0.784	0.615
3	OD	3.74 (1.03)	23.8	0.661	0.768	0.590
4	SOC	4.48 (0.70)	57.8	0.727	0.832	0.692
5	SOC	4.50 (0.69)	59.6	0.838	0.939	0.882
6	SOC	4.54 (0.69)	64.5	0.745	0.954	0.909
7	EU	3.65 (0.93)	18.6	0.673	0.877	0.770
8	EU	3.53 (0.96)	16.3	0.711	0.849	0.721
9	EU	3.41 (1.05)	15.1	0.664	0.726	0.527
10	SE	3.78 (0.89)	22.1	0.584	0.709	0.502
11	SE	3.99 (0.92)	30.5	0.690	0.868	0.753
12	SE	3.91 (0.88)	27.6	0.652	0.710	0.504
13	SE	3.49 (1.02)	16.3	0.626	0.697	0.485
14	SE	4.03 (0.84)	32.0	0.655	0.790	0.624
15*	AF	3.38 (1.06)	15.7	0.552	0.599	0.359

Note. SD, standard deviation; corrected r_{it} , correlation between each item and the sum of the remaining items within its theoretical dimension; CFA loading, standardized factor loading; R^2 , proportion of item variance explained by its corresponding latent factor. OD, Optimistic Disposition; SOC, Sociability; EU, Emotional Understanding; SE, Self-efficacy; AF, Affection. Items 15–19 were reverse-scored using 6 – x.

Item	Dimension	Mean (SD)	Ceiling, %	Corrected rit	CFA loading	R2
1	OD	4.04 (1.01)	41.3	0.673	0.898	0.806
2	OD	3.78 (0.98)	24.4	0.707	0.784	0.615
16*	AF	3.48 (1.10)	18.0	0.608	0.699	0.488
17*	AF	3.05 (1.03)	7.6	0.648	0.808	0.652
18*	AF	3.41 (1.14)	18.9	0.575	0.847	0.718
19*	AF	3.54 (1.05)	19.8	0.479	0.474	0.225

Note. SD, standard deviation; corrected r_{it} , correlation between each item and the sum of the remaining items within its theoretical dimension; CFA loading, standardized factor loading; R^2 , proportion of item variance explained by its corresponding latent factor. OD, Optimistic Disposition; SOC, Sociability; EU, Emotional Understanding; SE, Self-efficacy; AF, Affection. Items 15–19 were reverse-scored using 6 –x.

3.3. Structural validity

The internal structure of HUMAS-E was examined through confirmatory factor analysis of the original correlated five-factor model, comprising Optimistic Disposition, Sociability, Emotional Understanding, Self-efficacy, and Affection. Given the ordinal response format, the model was estimated using diagonally weighted least squares based on a polychoric correlation matrix.

The correlated five-factor model showed adequate fit: $\chi^2(142) = 273.22$, $p < 0.001$; $\chi^2/df = 1.924$; CFI = 0.989; TLI = 0.987; RMSEA = 0.052, 90% CI [0.043, 0.061]; and SRMR = 0.066. Although the chi-square test was statistically significant, the incremental and residual-based fit indices supported the correspondence between the observed data and the original theoretical structure.

A higher-order model in which the five dimensions loaded onto a general humanization factor was also evaluated. This model showed an overall acceptable fit: $\chi^2(147) = 329.19$, $p < 0.001$; $\chi^2/df = 2.239$; CFI = 0.985; TLI = 0.982; RMSEA = 0.060, 90% CI [0.051, 0.069]; and SRMR = 0.074. However, all fit indices were slightly less favorable than those obtained for the correlated five-factor model (Table 3).

Table 3
Fit indices for the evaluated HUMAS-E factorial models

Model	χ^2 (df)	χ^2/df	CFI	TLI	SRMR	RMSEA estimate	90% CI lower	90% CI upper
Correlated five-factor model	273.22 (142)	1.924	0.989	0.987	0.066	0.052	0.043	0.061
Higher-order general factor model	329.19 (147)	2.239	0.985	0.982	0.074	0.060	0.051	0.069
<i>Note.</i> df, degrees of freedom; CFI, Comparative Fit Index; TLI, Tucker–Lewis Index; SRMR, Standardized Root Mean Square Residual; RMSEA, Root Mean Square Error of Approximation; CI, confidence interval. The chi-square test was statistically significant at $p < 0.001$ for both models.								

All standardized factor loadings in the correlated five-factor model were positive, statistically significant, and in the expected direction. Loadings ranged from 0.474 to 0.954, with 17 of the 19 items exceeding 0.60. The lowest loadings were observed for Items 15 and 19 within Affection, with values of 0.599 and 0.474, respectively. The highest loadings were observed for Sociability, ranging from 0.832 to 0.954. The standardized factor loadings and latent correlations are shown in Fig. 1.

In the higher-order model, standardized loadings on the general factor were high for Self-efficacy ($\lambda = 0.926$), Optimistic Disposition ($\lambda = 0.853$), Sociability ($\lambda = 0.846$), and Emotional Understanding ($\lambda = 0.740$). Affection had a substantially lower loading ($\lambda = 0.274$), indicating that the general factor explained approximately 7.5% of its variance. The correlated five-factor model was therefore retained as the primary representation of the HUMAS-E structure.

3.4. Internal consistency and internal validity evidence

All five dimensions showed adequate internal consistency. Ordinal alpha ranged from 0.822 for Affection to 0.934 for Sociability, whereas composite reliability ranged from 0.821 to 0.935. The similarity between the two sets of estimates indicated that the conclusions regarding internal consistency were consistent across the methods used.

Average variance extracted was above 0.50 for Optimistic Disposition, Sociability, Emotional Understanding, and Self-efficacy. Affection had an AVE of 0.489, slightly below the conventional reference value of 0.50. However, its composite reliability coefficient exceeded 0.80, supporting adequate internal consistency.

Latent correlations ranged from 0.048 to 0.813. Optimistic Disposition, Sociability, Emotional Understanding, and Self-efficacy showed moderate to strong positive associations. The highest correlation was observed between Optimistic Disposition and Self-efficacy. Affection was more weakly related to the remaining dimensions and was not significantly associated with Emotional Understanding, $r = 0.048$, $p = 0.445$.

HTMT values ranged from 0.099 to 0.824 and remained below the conservative threshold of 0.85. The highest value was observed between Optimistic Disposition and Self-efficacy. The Fornell-Larcker criterion was met for four of the five dimensions. For Self-efficacy, the square root of the AVE was lower than its correlation with Optimistic Disposition and slightly lower than its correlation with Sociability. Overall, these findings provided generally favorable, although not unequivocal, internal discriminant evidence. The HTMT results supported differentiation among the dimensions, whereas the Fornell–Larcker comparison indicated relevant overlap involving Self-efficacy (Table 4).

Table 4

Internal consistency, average variance extracted, latent correlations, and HTMT values for HUMAS-E.

Dimension	Ordinal α	CR	AVE	1	2	3	4	5
1. Optimistic Disposition	0.856	0.859	0.671	0.819	0.704	0.592	0.824	0.309
2. Sociability	0.934	0.935	0.828	0.699	0.910	0.658	0.768	0.236
3. Emotional Understanding	0.859	0.860	0.672	0.597	0.660	0.820	0.689	0.099
4. Self-efficacy	0.869	0.870	0.574	0.813	0.770	0.685	0.758	0.269
5. Affection	0.822	0.821	0.489	0.314	0.236	0.048	0.275	0.699
<i>Note. α, ordinal alpha; CR, composite reliability; AVE, average variance extracted. The square root of the AVE is shown in bold on the diagonal. Latent correlations are presented below the diagonal, and HTMT values are presented above the diagonal. The correlation between Emotional Understanding and Affection was not statistically significant ($p = 0.445$); all other latent correlations were statistically significant.</i>								

3.5. Complementary analyses

Because Item 19 had the lowest factor loading and corrected item-total correlation, a sensitivity analysis was conducted to evaluate the effect of removing it. The item was reverse-scored before all analyses; therefore, its comparatively weaker performance could not be attributed to an incorrect scoring direction.

With all five original items retained, Affection had an ordinal alpha of 0.822, a composite reliability of 0.821, and an AVE of 0.489. After Item 19 was removed and the 18-item model was fully re-estimated, ordinal alpha decreased to 0.813, composite reliability decreased slightly to 0.816, and AVE increased to 0.530. The 18-item model retained adequate and nearly equivalent fit: $\chi^2(125) = 245.42$, $p < 0.001$; CFI = 0.990; TLI = 0.987; RMSEA = 0.053, 90% CI [0.043, 0.063]; and SRMR = 0.065.

Removing Item 19 increased the AVE of Affection but did not improve its internal consistency or produce a meaningful improvement in overall model fit. Considering its theoretical content, acceptable corrected item-total correlation, correspondence with the original HUMAS, and contribution to content coverage, Item 19 was retained. Complete results are provided in Supplementary Table S2.

The structural stability of HUMAS-E was also examined exploratorily by comparing students in the initial academic years, first and second years ($n = 103$), with those in the advanced academic years, third and fourth years ($n = 241$). The correlated five-factor model showed acceptable fit in the initial-years group, with CFI = 0.974, TLI = 0.968, RMSEA = 0.062, and SRMR = 0.094, and adequate fit in the advanced-years group, with CFI = 0.993, TLI = 0.992, RMSEA = 0.047, and SRMR = 0.068.

Factor congruence coefficients exceeded 0.95 for all five dimensions, supporting a similar overall factorial configuration across educational stages. Congruence was highest for Sociability and lowest for Affection. The largest differences in standardized loadings were observed for Items 15 and 19. Given the limited size of the initial-year group and the numerical instability of its polychoric correlation matrix, these findings were interpreted as exploratory evidence of similarity in the factorial configuration rather than evidence of metric or scalar invariance. Complete results are provided in Supplementary Table S3.

Discussion

The present study adapted the Healthcare Professional Humanization Scale to the educational and clinical context of Spanish undergraduate nursing students and examined the psychometric properties of the resulting HUMAS-E. The findings provide evidence supporting the original correlated five-factor structure, comprising Optimistic Disposition, Sociability, Emotional Understanding, Self-efficacy, and Affection. The adapted items showed adequate internal relationships with their corresponding dimensions, and all five dimensions demonstrated satisfactory internal consistency. Nevertheless, the results also identified relevant characteristics to consider when interpreting HUMAS-E scores, particularly the widespread ceiling effects, the partial overlap among some dimensions, and the comparatively distinct behavior of Affection.

The correlated five-factor model showed a good overall fit and reproduced the theoretical organization proposed for the original HUMAS. This finding supports the idea that humanization should not be understood as a single interpersonal attribute, but as a multidimensional construct integrating relational, emotional, motivational, and perceived competence-related components. The preservation of this structure is consistent with the original validation conducted in Spanish nursing professionals and with the subsequent Italian adaptation, both of which retained the 19 items distributed across five related dimensions [3, 24]. The present results extend this evidence to undergraduate nursing education and suggest that the theoretical content of HUMAS remains meaningful once references to autonomous professional practice are adapted to students' academic and clinical experiences.

This finding is particularly relevant because previous studies have administered HUMAS to nursing students without first examining whether its structure remains stable after adaptation to the student role. These studies identified associations between humanization, empathy, communication skills, prior training, and clinical experience, supporting the relevance of the construct within nursing education [13, 25]. However, using a scale validated in professionals does not necessarily demonstrate that its items and dimensions operate equivalently in students. HUMAS-E addresses this methodological limitation by

retaining the conceptual structure of the original scale while adapting expressions that presumed professional autonomy or consolidated clinical experience. The qualitative review involving students from all four academic years and the subsequent expert assessment were intended to preserve the theoretical meaning of the items while improving their contextual appropriateness. Nevertheless, some adaptations broadened the situational frame of the original items, particularly within Affection, and their conceptual equivalence should continue to be examined alongside the psychometric evidence.

The comparison of the evaluated factorial models also provides information about how HUMAS-E scores should be interpreted. Although the higher-order model showed acceptable fit, the correlated five-factor model performed slightly better, and Affection had a substantially weaker relationship with the general humanization factor than the other dimensions. These findings do not exclude the existence of a broader humanization construct, but they indicate that the five dimensions are not equally represented by a single general score. Optimistic Disposition, Sociability, Emotional Understanding, and Self-efficacy were strongly related to the general factor, whereas Affection retained a more differentiated position. Until additional evidence supports the interpretation of a general HUMAS-E factor, dimensional scores should be considered the primary scoring approach. Any global score should be treated as exploratory and should not replace examination of the five-dimensional profile.

The differentiated behavior of Affection deserves particular consideration. This dimension showed adequate internal consistency, but its average variance extracted was slightly below the conventional reference value, and its associations with the remaining dimensions were weak. In particular, its correlation with Emotional Understanding was not statistically significant. Items 15 and 19 also showed the lowest loadings within the full model, although their corrected item-total correlations remained acceptable. These findings suggest that Affection may capture aspects of emotional regulation or vulnerability that are not equivalent to recognizing and understanding the emotions of others. Previous research has similarly shown that the emotional components involved in humanized care are not interchangeable. Cognitive empathy, emotional regulation, moral sensitivity, and prosocial behavior may contribute differently to the development of humanized nursing care [4, 5, 12]. Consequently, the weaker association of Affection with the other dimensions should not automatically be interpreted as evidence that the dimension is irrelevant. It may instead reflect a theoretically meaningful distinction between understanding emotions and regulating one's own emotional responses.

The sensitivity analysis supported the decision to retain Item 19. Although its removal increased the average variance extracted for Affection, it did not produce a consistent improvement in internal consistency or overall model fit. Moreover, retaining the item preserves the content coverage and correspondence of HUMAS-E with the original instrument. Item deletion should not be determined by a single loading or reliability coefficient, particularly when the item represents a relevant component of the theoretical construct. Nevertheless, the behavior of Items 15 and 19 should be re-examined in future studies using independent samples. Cognitive interviews focused specifically on the interpretation of the negatively worded items could also help determine whether their lower loadings reflect their theoretical

content, their reversed formulation, or how students understand emotional regulation within clinical training.

The item analysis identified no relevant floor effects, but ceiling effects were observed in 18 of the 19 items. These effects were especially pronounced for Sociability, for which more than half of the participants selected the most favorable response for all three items. Although the Sociability items showed high standardized loadings and internal consistency, the concentration of responses in the highest category represents a separate distributional limitation and may reduce discrimination among students with favorable self-perceptions. High scores may reflect the importance assigned to interpersonal openness and communication within nursing identity, but they may also be influenced by socially desirable responding. Therefore, high self-reported scores should not be interpreted automatically as evidence of fully developed humanization competencies.

The ceiling effects also have implications for the potential use of HUMAS-E in educational evaluation. An instrument concentrated in the upper response categories may adequately identify students with comparatively lower scores but may be less sensitive to improvements after training among those who already report favorable perceptions. This issue is relevant because simulation, reflective learning, narrative photography, and communication-based training have been proposed as strategies for strengthening empathy and humanization-related competencies in nursing students [16–18]. HUMAS-E may support exploratory assessment of dimensional profiles at the group level, but its responsiveness to change should be examined prospectively before it is used to identify educational needs or as an outcome measure for educational interventions.

The associations among Optimistic Disposition, Sociability, Emotional Understanding, and Self-efficacy were generally moderate to strong. The greatest overlap was observed between Optimistic Disposition and Self-efficacy, which is theoretically plausible because confidence in managing academic and clinical situations may be related to a more positive appraisal of challenging experiences. Some overlap was also observed between Self-efficacy and Sociability. However, HTMT values remained below the predefined criterion, and the correlated five-factor model showed good fit, supporting the retention of the dimensions as related but distinguishable components. This distinction is educationally relevant because students may present different patterns of strengths and needs even when their overall level of humanization appears similar. For example, a student may report high sociability but lower emotional understanding or perceived self-efficacy. A single total score would conceal these potentially useful differences.

The exploratory comparison between students in the initial and advanced academic years provided preliminary support for a similar factorial configuration across educational stages. Factor congruence was high for all dimensions, although the model performed better in the advanced-year group and the largest loading differences again involved Affection. These results suggest that students from different stages may organize the construct in a broadly comparable manner. However, the limited size of the initial-year group and the instability of its polychoric correlation matrix prevented a full assessment of

metric and scalar invariance. Consequently, the present findings do not demonstrate that HUMAS-E scores can yet be directly compared across academic stages or interpreted as evidence of progression throughout the degree. Larger and more balanced samples are required before differences between courses can be attributed to educational development rather than to measurement or cohort effects.

From an educational perspective, HUMAS-E provides a structured approach to the exploratory assessment of self-reported characteristics related to humanized care. At the group level, dimensional profiles may help generate hypotheses about areas in which students report greater or lesser preparedness. However, the present study did not establish criterion validity, responsiveness, or thresholds for interpreting individual scores. HUMAS-E should therefore not be used as a diagnostic instrument, as a measure of objectively demonstrated clinical competence, or as the basis for high-stakes decisions about individual students. Its potential contribution to curriculum evaluation or educational planning requires confirmation through studies incorporating external measures and longitudinal designs.

Several limitations should be considered. First, convenience sampling and the distribution of the questionnaire through student WhatsApp groups prevented calculation of an eligible denominator and response rate. The concentration of participants in Andalusia and the Community of Madrid further limits sample representativeness. Second, fourth-year students were overrepresented, whereas the number of first-year students was comparatively small. This imbalance restricted the evaluation of measurement invariance and limits conclusions about differences across academic years. Third, HUMAS-E is a self-report measure and may be affected by socially desirable responding, particularly because humanization and sociability are highly valued within nursing education. Fourth, although the adaptation process incorporated students and a multidisciplinary expert committee, standardized independent expert ratings were not collected and quantitative content validity indices were not calculated. Some adaptations, particularly within Affection, broadened or modified the situational and emotional content of the original items. Fifth, the factorial model was evaluated in a single sample without independent cross-validation. Sixth, the cross-sectional design did not provide evidence of temporal stability or responsiveness. Finally, no external measure was included to evaluate associations with empathy, communication skills, moral sensitivity, emotional regulation, social desirability, or observed clinical performance.

Despite these limitations, the study has relevant strengths. The adaptation was based on input from students representing all four academic years and was subsequently reviewed by a multidisciplinary expert committee. The psychometric analysis also respected the ordinal nature of the response categories and combined item-level evidence, confirmatory factor analysis, internal consistency estimates, convergent and discriminant evidence, and sensitivity analyses. Importantly, items were not removed solely to maximize reliability or model fit, preserving the theoretical and content correspondence with the original HUMAS.

Overall, the findings support HUMAS-E as a multidimensional instrument for assessing humanization-related characteristics in Spanish undergraduate nursing students. Its five-factor structure was consistent with the original theoretical model, and all dimensions showed adequate internal consistency. However, the differentiated behavior of Affection and the widespread ceiling effects indicate that dimensional interpretation should be prioritized and that further evidence is required before using a global score or comparing scores across academic years. Future multicenter longitudinal studies should examine measurement invariance, external validity, temporal stability, and responsiveness to educational interventions.

Conclusions

The present study provides preliminary evidence supporting the contextual adaptation of the Healthcare Professional Humanization Scale for Spanish undergraduate nursing students. HUMAS-E retained the original 19 items and reproduced a structure comprising five correlated dimensions: Optimistic Disposition, Sociability, Emotional Understanding, Self-efficacy, and Affection. Item performance was generally adequate, and all dimensions showed satisfactory internal consistency.

HUMAS-E may support exploratory, group-level examination of self-reported dimensional profiles related to humanized care. However, its use to identify educational needs or evaluate interventions requires additional evidence of external validity and responsiveness. The comparatively distinct behavior of Affection and the widespread ceiling effects, particularly in Sociability, indicate that dimensional scores should be prioritized. Any global score should be interpreted as exploratory, and the instrument may have limited ability to differentiate among students with high scores.

The factorial configuration was broadly similar between initial- and advanced-year students, although the available evidence was insufficient to establish measurement invariance or support direct score comparisons across academic years. Further multicenter and longitudinal studies with more balanced samples are needed to examine temporal stability, external validity, measurement invariance, and responsiveness to change. Within these limitations, HUMAS-E is a theoretically grounded instrument with preliminary evidence supporting its structural validity and internal consistency in Spanish undergraduate nursing students.

Abbreviations

HUMAS
Healthcare Professional Humanization Scale
HUMAS-E
Student-adapted version of HUMAS
CFA
Confirmatory Factor Analysis
DWLS

Diagonally Weighted Least Squares
CFI
Comparative Fit Index
TLI
Tucker-Lewis Index
RMSEA
Root Mean Square Error of Approximation
SRMR
Standardized Root Mean Square Residual
CI
Confidence Interval
AVE
Average Variance Extracted
HTMT
Heterotrait-Monotrait Ratio
COSMIN
Consensus-based Standards for the selection of health Measurement INstruments
STROBE
Strengthening the Reporting of Observational Studies in Epidemiology
SD
Standard Deviation
IQR
Interquartile Range
OD
Optimistic Disposition
SOC
Sociability
EU
Emotional Understanding
SE
Self-efficacy
AF
Affection.

Declarations

Ethics approval and consent to participate

The study protocol was approved by the Research Ethics Committee of Universidad Alfonso X el Sabio (Ref. 2022_03/131) and by the Biosecurity and Bioethics Committee of Universidad de Extremadura (Ref. 1426; January 22, 2026). The study was conducted in accordance with the Declaration of Helsinki and

Regulation (EU) 2016/679 on the protection of personal data. All participants provided electronic informed consent before questionnaire completion.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Author Contribution

IHP contributed to the conceptualization and design of the study, methodology, formal analysis, and review and editing of the manuscript. RCDLC contributed to data collection and preparation of the original draft. MDCPF and MDMMJ contributed to formal analysis and review and editing of the manuscript. LMGN contributed to the investigation and formal analysis. CRN contributed to formal analysis and preparation of the original draft. AGN and SMCS contributed to the methodology. MASC contributed to the investigation. GMG contributed to the investigation and preparation of the original draft. All authors read and approved the final manuscript.

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Data Availability

The de-identified dataset and Python analysis code generated and analyzed during the current study are available from the corresponding author upon reasonable request.

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Figures

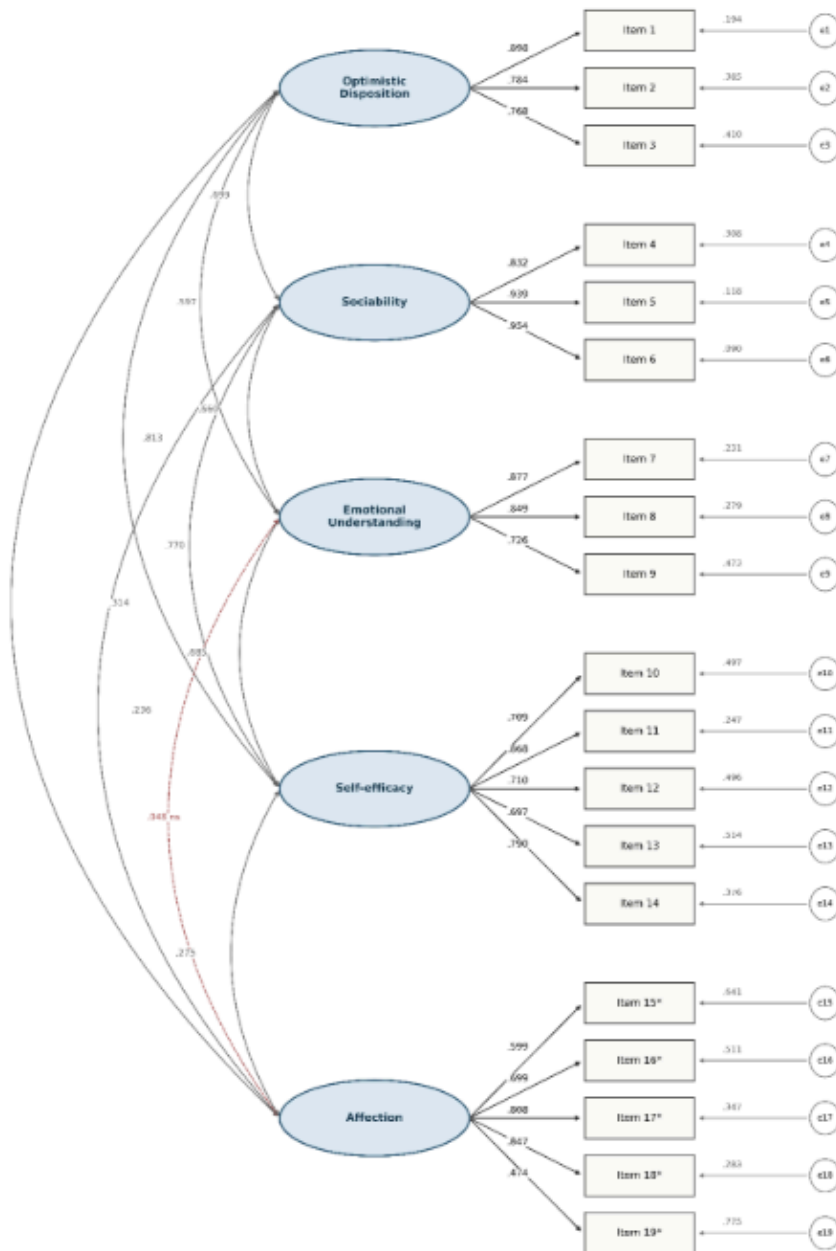


Figure 1

Confirmatory factor model of the 19-item HUMAS-E with five correlated dimensions. Standardized factor loadings and latent correlations are shown. Items 15–19 were reverse-scored. All freely estimated factor loadings were statistically significant at $p < .001$. The correlation between Emotional Understanding and Affection was not statistically significant ($p = .445$). Model fit: $\chi^2(142) = 273.22$, $p < 0.001$; $\chi^2/df = 1.924$; CFI = 0.989; TLI = 0.987; RMSEA = 0.052, 90% CI [0.043, 0.061]; SRMR = 0.066.

Supplementary Files

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