

# Psychometric Properties and Invariance of the Communication Skills Questionnaire (HABICOM) in Peruvian University Students

Propiedades psicométricas e invarianza del Cuestionario Habilidades Comunicativas (HABICOM) en universitarios peruanos

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## Summary

The aim of the present study was to evaluate the psychometric properties and gender invariance of the Communication Skills Questionnaire (HABICOM). The sample consisted of 774 students from a state university in Arequipa. The factors were analyzed and confirmed as in the original study, obtaining satisfactory fit indices in its two subscales Personal Self-Perception ( $\chi^2 = 1977.683$ ,  $gl = 499$ ,  $p < .001$ ; CFI = .945; TLI: .939; RMSEA = .061; SRMR = .042) and Professional Importance ( $\chi^2 = 2534.513$ ,  $gl = 517$ ,  $p < .001$ ; CFI = .926; TLI = .919; RMSEA = .070; SRMR = .049) with adequate reliability indices on both subscales, for Personal Self-Perception ( $\alpha = .63$  and  $\alpha = .85$ ) and Professional Importance ( $\alpha = .91$  and  $\alpha = .77$ ) respectively. Gender invariance was adequate for the Personal Self-perception subscale; however, this did not occur for the Professional Importance subscale. The HABICOM questionnaire in general is adequate to measure communication skills in Peruvian university students.

**Keywords:** Communicative skills; Confirmatory factor analysis; Peruvian university students; Measurement invariance; Reliability.

## Resumen

El objetivo del presente estudio fue el evaluar las propiedades psicométricas e invarianza de género del cuestionario de Habilidades Comunicativas (HABICOM). La muestra estuvo conformada por 774 estudiantes de una universidad estatal de Arequipa. Se analizó y confirmó los factores al igual que el estudio original, obteniendo unos índices de ajuste satisfactorios en sus dos subescalas Autopercepción Personal ( $\chi^2 = 1977.683$ ,  $gl = 499$ ,  $p < .001$ ; CFI = .945; TLI: .939; RMSEA = .061; SRMR = .042) e Importancia Profesional ( $\chi^2 = 2534.513$ ,  $gl = 517$ ,  $p < .001$ ; CFI = .926; TLI = .919; RMSEA = .070; SRMR = .049) con adecuados índices de confiabilidad en ambas subescalas, para la Autopercepción Personal ( $\alpha = .63$  y  $\alpha = .85$ ) e Importancia Profesional ( $\alpha = .91$  y  $\alpha = .77$ ) respectivamente. La invarianza de género fue adecuada para la subescala Autopercepción Personal, sin embargo, esto no ocurrió para la subescala Importancia Profesional. El cuestionario HABICOM en general es adecuado para medir las habilidades comunicativas en estudiantes universitarios peruanos.

**Palabras claves:** Habilidades comunicativas; Análisis factorial confirmatorio; Universitarios peruanos; Invarianza de la medición; Confiabilidad.

## INTRODUCTION

Communication is essential for the proper interaction with another person or a group of people, as from the way we show our skills to express ourselves, difficulties may arise in different circumstances and be a constant. For that reason, communication skills are essential to socialize because they are within people's own abilities that are executed for communicative purposes and expressed in the behavior of different individuals. (O'Connor, 1999).

Communication skills show a relationship with self-confidence and a solid behavior in the professional area, being fundamental, as they are part of the soft skills (Viktorovna, et al., 2021).

Previous studies evidenced that a communication skills training program educated and trained university students, showing that it was an effective tool for improving communication skills in the short term (Hernández-Jorge & De la Rosa, 2018). Likewise, these skills are relevant to academic aspects and their acquisition occurs especially when promoted through feedback, more accurate evaluative judgments and regularization of the learning process (Valencia-Naranjo & Robles-Bello, 2022).

Studies on communication skills are a topic of interest in support careers, some oriented to the academic field, and an in-depth review on this can be seen in Hernández-Jorge & De la Rosa (2018).

The Communication Skills Questionnaire - HABICOM (Hernández-Jorge & De la Rosa, 2018) provides an adequate measure of these skills. This questionnaire contains two subscales: the Personal Self-Perception (PA) scale and the Professional Importance (PI) scale. Each scale is composed of 34 items, with a Likert-type response format, using five levels for each one, being (1 = I do not use it and 5 = I use it a lot) for the first scale and (1 = it is not important and 5 = it is very important) for the second one. The PA scale contains eight factors: Generating Motivation, Nonverbal Communication, Empathy, Emotional Expression, Oral Expression, Informative Transmission, Open Communication and Listening and the PI Scale contains five factors: Emotional and Affective Quality, Informative Transmission, Nonverbal Communication, Open and Honest Communication and Openness and Authenticity.

Therefore, this study will analyze the psychometric properties and gender invariance of the HABICOM questionnaire so that it is reliable and valid, using a sample of Peruvian university students.

## METHOD

### Type of Study

This research used an instrumental design, since the psychometric properties of an instrument were analyzed (Ato et al., 2013).

## Participants

A total of 794 university students with a mean age of 21.4 years and a standard deviation of 3.30, within a range of 18 to 38 years, were selected following inclusion criteria such as being over 18 years old, being a literate person and having agreed to fill out the respective questionnaire. The sample by gender was distributed as follows: 76.70% female and 23.30% male, which are aged between 18 and 38. Regarding the departments where the participants were from, 76.3% were from Arequipa, 11.9% from Puno, 6.2% from Cusco, 1.4% from Lima, 1.5% from Tacna, 1.4% from Moquegua, 0.3% from Madre de Dios, 0.5% from Apurimac and 0.5% from Junin, Piura, Cajamarca, Huanuco and Ayacucho.

## Instruments

Communication Skills Questionnaire or also known as HABICOM (Hernández-Jorge & De la Rosa, 2018). The questionnaire consists of 34 items, with two scales included, the Personal Self-Perception (PA) scale and the Professional Importance (PI) scale, the questionnaire has a Likert-type response format with five options, being for the first scale (1 = I do not use it and 5 = I use it a lot) and in the second scale (1 = it is not important and 5 = it is very important). The questionnaire has good internal consistency  $\alpha = .91$  and  $.94$  for the PA and PI scales respectively.

## Procedure

The instrument was first applied with the permission of the original authors, then the items were reviewed in order to verify some idioms that may possibly be contained in the items, this being essential to adapt the language to the Peruvian context, and four experts carried out this review, who made the following changes: (a) in order for the sample of women to identify with the item, "/a" was placed at the end of the word (items 17, 24, 26 and 31) and (b) some replacements or changes were made to the items, as shown in Table 1. Subsequently, the questionnaire was digitized in Google Forms so that it could be filled out online. The title of the questionnaire, informed consent, contacts of the research team, a description of the objective of the study, the respective anonymity and confidentiality of the data collected were included in the questionnaire.

## Data Analysis

In order to perform an optimal analysis, the R statistic version 4.0.5 (R Core Team, 2020) and its environment RStudio version 1.4.1106 (RStudio Team, 2020) were used. The Lavaan (Rosseeel, 2012) and semPlot (Epskamp et al., 2019) packages were used to perform the Confirmatory Factor Analysis (CFA). The estimation method and the adjustment indices used were: Robust Weighted Least Squares (WLSMV), the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), Tucker-Lewis Index (TLI) and the Standardized Ratio Mean Residual (SRMR). And for the proper evaluation of these indexes, the following criteria were taken into account, for the CFI and TLI, values  $\geq .90$  and  $\geq .95$  were considered an adequate fit and good fit, values less than  $\leq .08$  and  $\leq .05$  in the RMSEA were also established as correct and finally for the SRMR, values  $\leq .08$  and  $\leq .06$  were considered correct as well (Keith, 2015).

In the case of measurement invariance, the criteria for evaluating were set as follows:  $\Delta CFI \geq .010$  and  $\Delta RMSEA \geq .015$  (Chen, 2007; Svetina et al., 2019).

**Table 1.**  
*Modified Items*

Items	Version	
	Spain	Peru
2	I organize or structure a speech	I use a basic organization or structure
3	I transmit information that is not very dense.	I transmit information in a light manner
12	With you	With you
14	To be used as a starting point; I ask about these aspects, I talk to them about them, etc.	To be used as a starting point; I ask about these aspects, I talk to them about them, etc.
15	What is being discussed	What is being discussed
16	Appreciation	Appreciation
18	When talking	When talking to me
21	Similar experiences to what someone tell me to refute.	Experiences similar to what the person tells me, in order to refute.
23	I manifest my needs and emotions (displeasure, joy, satisfaction, anger...) in different situations, without generating	I manifest my own needs and emotions (displeasure, joy, satisfaction, anger...) in different situations, without generating
30	I maintain a relaxed feeling	I show a relaxed feeling

Source. Elaborated by the author.

## RESULTS

### Descriptive Analysis of the Items

Table 2 shows the means; standard deviations; skewness and kurtosis of the HABICOM questionnaire items. Item 29 has a higher mean score ( $M = 4.08$ ) and item 21 has the lowest one ( $M = 3.17$ ). The variability of each of the items does not show a great dispersion. Likewise, it is observed in the skewness and kurtosis that no item of the questionnaire presents values greater than 1.

### Confirmatory Factor Analysis (CFA)

The CFA analyzed each subscale, obtaining satisfactory fit indices, as previously established. With respect to the standardized factor loadings, their saturations show values between .57 (item 21) and .86 (item 13) for the PS subscale. Asimismo, para la subescala IP los valores oscilaron entre .55 (ítem 21) y .86 (ítem 13), estas se pueden visualizar en la Tabla 3. Las correlaciones entre los factores de ambas subescalas se pueden visualizar en el [Anexo complementario](#).

### Reliability Analysis

The internal consistency was adequate for the factors of the two subscales, with alphas ranging from .63 to .85 for the PS subscale and with alphas ranging from .75 to .91 for the PI. The information on the internal consistency of each factor can be seen in Table 3, Table 4 and Table 5.

**Table 2.**  
Descriptive statistics of the *HABICOM* items

Items	N	M	DE	Asymmetry	Kurtosis
01	794	3.55	.78	-.37	.63
02	794	3.55	.74	-.42	.50
03	794	3.47	.78	-.27	.13
04	794	3.56	.80	-.28	.06
05	794	3.65	.81	-.26	.08
06	794	3.79	.73	-.31	.17
07	794	3.76	.79	-.35	.14
08	794	3.59	.79	-.17	-.05
09	794	3.68	.85	-.44	.20
10	794	3.66	.85	-.29	-.07
11	794	3.68	.85	-.38	.01
12	794	3.57	.91	-.29	-.21
13	794	3.58	.81	-.12	-.16
14	794	3.58	.79	-.20	.09
15	794	3.58	.77	-.21	.20
16	794	3.78	.81	-.40	.22
17	794	3.40	.86	-.33	.09
18	794	3.91	.81	-.45	.08
19	794	3.63	.80	-.26	.11
20	794	3.56	.84	-.23	-.08
21	794	3.17	.82	-.21	.20
22	794	3.38	.85	-.32	-.14
23	794	3.39	.84	-.26	.01
24	794	3.67	.84	-.40	.08
25	794	3.78	.81	-.51	.51
26	794	3.74	.80	-.46	.42
27	794	4.01	.74	-.45	.29
28	794	3.90	.75	-.41	.44
29	794	4.08	.73	-.56	.64
30	794	3.84	.78	-.48	.45
31	794	3.85	.73	-.31	.28
32	794	3.42	.84	-.12	-.27
33	794	3.98	.76	-.58	.88
34	794	3.65	.80	-.36	.32

*N* = Total sample, *M* = Media, *DS* = Standard Deviation, *Asi* = Asymmetry, *Cur* = Kurtosis.  
*Source.* Elaborated by the author.

## Gender Invariance

To perform the invariance, the dimensionality of the questionnaire was evaluated to see if it was equivalent according to gender. Table 6 shows the results obtained, where the PS subscale reached the scalar level correctly (this level being required to compare scores between men and women),

reaching the residual or strict level. However, in the PI subscale it was not possible to obtain optimal results, the modification indexes were consulted in order to make the necessary changes, but as can be seen in the  $\Delta$ CFI metric level, this exceeds what was established.

**Table 3.**

*Standardized factor loadings of the PS Subscale*

Item	Factors							
	Generate motivation	Nonverbal communication	Empathy	Emotional expression	Oral expression	Information transmission	Open communication	Listening
14	.73							
15	.78							
16	.79							
17	.66							
25	.75							
26	.86							
9		.76						
10		.73						
11		.72						
12		.66						
13		.86						
27			.86					
28			.84					
29			.77					
33			.82					
22				.74				
23				.79				
24				.84				
5					.71			
6					.75			
7					.84			
8					.80			
1						.79		
2						.76		
3						.58		
4						.78		
21							.57	
30							.75	
31							.78	
32							.56	
34							.76	
18								.60
19								.69
20								.67
$\alpha$	.85	.81	.84	.77	.81	.76	.76	.63

Source. Elaborated by the author.

**Table 4.**  
*Standardized factor loadings of the PI Subscale*

Items	Factors				
	Emotional and affective quality	Information transmission	Nonverbal communication	Open and sincere communication	Openness and authenticity
14	.71				
15	.76				
16	.77				
17	.64				
18	.56				
19	.64				
20	.63				
21	.55				
24	.73				
25	.73				
26	.83				
27	.79				
28	.77				
29	.71				
33	.75				
1		.74			
2		.71			
3		.54			
4		.73			
5		.68			
6		.72			
7		.80			
8		.76			
9			.76		
10			.73		
11			.72		
12			.66		
13			.86		
30				.76	
31				.79	
32				.56	
34				.76	
22					.81
23					.86
<i>a</i>	.91	.85	.81	.75	.77

Source. Elaborated by the author.

**Table 5.**  
*Results of the Confirmatory Factor Analysis*

Scales (Factors)	$\chi^2$ (df)	RMSEA	CFI	SRMR	TLI
AP (8)	1977.683 (499)	.061	.945	.042	.939
IP (5)	2534.513 (517)	.070	.926	.049	.919

$\chi^2$  = chi-square; *df* = degrees of freedom; RMSEA = root mean square error of approximation; CFI = comparative fit index; SRMR = Standardized root mean square residual; TLI = Tucker-Lewis Index

Source. Elaborated by the author.

**Table 6.**  
*Gender Invariance Results*

Scale	$\chi^2$ robust (df)	CFI	RMSEA	Model comparison	$\Delta$ CFI	$\Delta$ RMSEA
Scale PA						
M1	1163.732 (998)	.939	.030			
M2	1173.345 (1024)	.945	.028	M2 vs M1	.006	-.002
M3	1201.938 (1050)	.944	.028	M3 vs M2	-.001	0
M4	1236.928 (1084)	.944	.028	M4 vs M3	0	0
Scale PI						
M1	1262.027 (1034)	.916	.035			
M2	1236.349 (1063)	.936	.030	M2 vs M1	.02	-.005
M3	1272.274 (1092)	.934	.030	M3 vs M2	-.002	0
M4	1304.892 (1126)	.934	.030	M4 vs M3	0	0

M1 = Configural invariance; M2 = Metric invariance; M3 = Scalar invariance; M4 = Residual invariance;  $\chi^2$  = chi-square; df = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation;  $\Delta$ CFI = increase in the comparative fit index;  $\Delta$ RMSEA = increase of the mean square error approximation.

Source. Elaborated by the author.

## DISCUSSION

In psychology, interpersonal communication is relevant because it is inherent to the person. It is a resource that facilitates interaction with others, allowing an adequate social development.

For Hernández-Jorge & De la Rosa (2018), with respect to the communication skills variable, few studies referring to this variable in university students have been found. However, in the study conducted by (Tejera & Cardoso, 2015) in Cuba mention that communication skills in the academic environment contribute to the achievement of better academic results, relationships with others (teachers, peers and family), in physical, mental, functional and subjective health as well as in their development in society. In the study conducted by Hernández-Jorge & De la Rosa (2018), regarding the use of communication skills, it was found that, university students obtained acceptable scores in most of the factors studied. This means then that communication skills are perceived by students as acceptable, being the empathic attitude the one that stands out over the expression of emotions which is found in a lower degree.

The HABICOM questionnaire has not been validated in the Peruvian population. Therefore, our study had two objectives: to evaluate the psychometric properties and gender invariance of the questionnaire. In general, the questionnaire showed adequate psychometric properties, since the indices obtained are within the established range, and reliability was confirmed.

No studies on communicative skills using the HABICOM have been found in our setting. That is why our research has been oriented to the analysis of the psychometric properties and invariance.

During the validation process, no significant problems were found, since consensus was satisfactorily reached during the review of the items by the experts. The CFA of each subscale

showed satisfactory results, showing consistency with the multidimensional structure proposed in the original study (Hernández-Jorge y De la Rosa, 2018).

Unlike Valencia-Naranjo & Robles-Bello (2022) who reduced through CFA the HABICOM scale to 26 items in 7 factors (eliminating the Informative Transmission factor), but only for the PS subscale and not for the other subscale, these results in general show that studies on the HABICOM should be analyzed with other samples, since both the results of Valencia-Naranjo & Robles-Bello (2022) and those of this study are favorable, with specific emphasis on the PI subscale, since what was shown in this study can make way for their own analyses.

Referring to the above, the invariance in the PS subscale did not show problems, unlike the PI subscale, since in the latter it was not possible to establish a satisfactory invariance, which calls for further research to explain it. Being the first time that the gender invariance of this questionnaire has been performed, it is necessary to carry out other studies in different populations and considering other sociodemographic variables in order to make a deeper analysis of the structure of this subscale.

With respect to reliability, adequate coefficients were obtained, as shown by the factors of the PS subscale, with values between  $\alpha = .63$  y  $\alpha = .85$ , similar to the Valencia-Naranjo & Robles-Bello study (2022)  $\alpha = .635$  and  $\alpha = .791$ . And for the PI subscale, the resulting alpha coefficients ranged between  $\alpha = .75$  and  $\alpha = .91$ .

This study allows the use of the HABICOM questionnaire in Peruvian university students, considering that it shows reliable and valid measures; however, this research is not free of limitations, which should be taken into account for other studies: 1) Non-random sampling does not allow for replicability of results, 2) These results are considered acceptable, due to the relatively large sample size, however, this should be analyzed more rigorously with other samples and 3) The psychometric analysis performed could be considered as another limitation, since other evidence of validity was not considered, so this should be considered for future research, specifically the evidence of validity with other constructs.

In conclusion, this research shows that the HABICOM questionnaire is an adequate instrument to study communicative skills of university students in our environment. This questionnaire is a valid test with a multifactorial structure and adequate reliability indexes. Therefore, it constitutes a contribution to be used in empirical, instrumental or theoretical research.

**Authorship contributions:** Oscar C. Puma: conducted the methodological design and statistical analysis of the data. Yenny Y. Asillo: conducted data collection, introduction, discussion and general review. Amparo P. Mendoza: conducted data collection, introduction, discussion and general review. Sulema J. Adriazola: conducted data collection, introduction, discussion and general review.

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## REFERENCES

- Ato, M., López-García, J. J., & Benavente, A. (2013). Un sistema de clasificación de los diseños de investigación en psicología. *Anales de Psicología / Annals of Psychology*, 29(3), 1038–1059. <https://doi.org/10.6018/analesps.29.3.178511>
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, 14(3), 464–504. <https://doi.org/10.1080/10705510701301834>
- Epskamp, S., Stuber, S., Nak, J., Veenman, M., & Jorgensen, T. D. (2019). *semPlot: Path Diagrams and Visual Analysis of Various SEM Packages' Output (1.1.2)* [Computer software]. <https://CRAN.R-project.org/package=semPlot>
- Hernández-Jorge, C., & De la Rosa, C. M. (2018). Habilidades comunicativas en estudiantes de carreras de apoyo frente a estudiantes de otras carreras. *Apuntes De Psicología*, 35(2), 93–104. Recuperado a partir de <https://www.apuntesdepsicologia.es/index.php/revista/article/view/663>
- Keith, T. Z. (2015). *Multiple Regression and Beyond: An Introduction to Multiple Regression and Structural Equation Modeling* (2da ed.). Routledge/Taylor & Francis Group. <https://www.routledge.com/Multiple-Regression-and-Beyond-An-Introduction-to-Multiple-Regression-and/Keith/p/book/9781138061446>
- O'Connor, J. (1999). *PNL para Formadores*. Ediciones Urano.
- R Core Team. (2020). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.r-project.org/>
- Rosseel, Y. (2012). Lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software*, 48(1), 1–36. <https://doi.org/10.18637/jss.v048.i02>
- RStudio Team. (2020). *RStudio: Integrated Development Environment for R*. RStudio, PBC, Boston, MA. <https://rstudio.com/>
- Svetina, D., Rutkowski, L., & Rutkowski, D. (2019). Multiple-Group Invariance with Categorical Outcomes Using Updated Guidelines: An Illustration Using M plus and the lavaan/semTools Packages. *Structural Equation Modeling: A Multidisciplinary Journal*, 27(1), 111–130. <https://doi.org/10.1080/10705511.2019.1602776>
- Tejera, J. F., & Cardoso, M. A. (2015). Tratamiento de las habilidades comunicativas en el contexto universitario. *Revista Universidad y Sociedad*, 7(2), 168–172. <https://bit.ly/2EAr9YO>
- Valencia-Naranjo, N., & Robles-Bello, M. A. (2022). Habilidades comunicativas y de relación en la educación superior de disciplinas dirigidas al asesoramiento. *RIED-Revista Iberoamericana De Educación a Distancia*, 25(1), 323–341. <https://doi.org/10.5944/ried.25.1.31327>

Viktorovna, N., Aleksandrovna, E., Viktorovich, A., & Alexandrovna, N. (2021). Social Partnership: The Development of Soft Skills In Young People In Regions. *Propósitos Y Representaciones*, 9(SPE3), e1274. <https://doi.org/10.20511/pyr2021.v9nSPE3.1274>