

## Adjustment and validation of an instrument to measure procrastination in University students

## Ajuste y validación de un instrumento para medir la procrastinación en estudiantes Universitarios

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### Abstract

This research work aimed study the psychometric proprieties about procrastination questionnaire resume and adjusted in the adapted scale of Tuckman and the version of the scale time management (TM), for this study it was used a quantitative methodology with a student population of 234 (129 women's and 105 mans) of the first grade in the science information, administrative economic and education faculties, to make respective analysis to questionnaire item's, it was obtained higher values of 0.30 in the corrected homogeneity, evidencing the significance in each reactive in the measurement of the variables, for the exploratory factorial analysis found with the proposal of four factors, to make confirmatory factorial analysis adjustment indices were obtained GFI = .836; AGFI = .778; CFI = .797; TLI = .756 y NFI = .730, at the same time, submit an Alpha of Cronbach coefficient of 0.893 and McDonald Omega of 0.896 , contributing reliability necessary the instrument, arrived at the conclusion with the instrument is suitable for the application in the region universities.

**University procrastination, Measurement instrument, Adjustment index**

### Resumen

En este trabajo de investigación se tuvo como objetivo estudiar las propiedades psicométricas del cuestionario de procrastinación universitaria retomado y ajustado en la escala adaptada de Tuckman y la versión de la escala de gestión de tiempo (GT), para este estudio se utilizó una metodología de carácter cuantitativo con una población de 234 estudiantes (129 mujeres y 105 hombres) de los primeros semestres de las facultades de ciencias de la información, económico administrativas y educación, al realizar el análisis respectivo a los ítems del cuestionario, se obtuvo valores mayores de 0.30 en el de homogeneidad corregida, evidenciando la significatividad de cada reactivo en la medición de las variables, para el análisis factorial exploratorio se halló con la propuesta de cuatro factores, al realizar el análisis factorial confirmatorio se obtuvieron los índices de ajuste GFI = .836; AGFI = .778; CFI = .797; TLI = .756 y NFI = .730, a su vez, presento un coeficiente de Alfa de Cronbach de 0.893 y un Omega de Mcdonald de 0.896, aportando la confiabilidad necesaria al instrumento, llegando a la conclusión de que el instrumento es apto para su aplicación en universidades de la región.

**Procrastinación universitaria, Instrumento de medición, Índice de ajuste**

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## Introduction

Procrastination has now become common in the university student community. Procrastination is also known as procrastination and has had serious consequences on student performance. Procrastination can be classified as active and passive. In active procrastination the student has the ability to procrastinate activities in such a way that satisfactory results can be achieved. On the other hand, passive procrastination is based on postponing activities to the last minute, so that in most cases the activities lack quality and relevance (Suárez & Feliciano-García, 2020).

In general, university students who constantly delay their tasks have as a main characteristic promises of future fulfilment, avoid guilt, especially in activities that require greater effort (Ramos-Galarza et al., 2017), and are habitually inclined to consume time using the internet to carry out pleasurable activities with minimal effort (Hidalgo-Fuentes, 2022).

It should be noted that information and communication technologies have a direct impact on procrastination, such as the addiction to social networks that causes 80.9% of students to postpone tasks in order to stay connected (Yana-Salluca et al., 2022), which reflects a lack of good self-control.

On the other hand, the university is also responsible for procrastination, which causes low student academic performance. The university's under-resourced pedagogical programmes lead to a lack of commitment and inefficiency in the training processes (Gómez-Cano et al., 2023). Therefore, procrastination also translates into attrition and the generation of costs. In developed countries such as the United States, student desertion translates into approximately nine billion dollars (Garzón Umerenkova & Gil Flores, 2016), without taking into account the family's economic investment.

In the literature there are proposals for theoretical models related to the study of procrastination such as Garzón Umerenkova & Gil Flores (2016), this model is based on five components that integrate: context, conditions, antecedents, strategies and consequences. These components are directly linked, as students practice it often and some even take it to the extreme.

There are currently several instruments that help to detect different levels of procrastination, but they need to be adapted to the needs and context of the student population such as the Tuckman procrastination scale (Özer et al., 2013),

The creation and reuse of operationally determined instruments that show adequate consistency properties in internal and external validity is very useful within the university context and especially when applied to populations with different characteristics for the comparison of results (Pozuelos Estrada et al., 2020). (Suárez & Feliciano-García, 2020) used the new scale of active procrastination divided into four dimensions with 16 items, which was used in the Faculty of Education of La Laguna. With this scale, information about students' perceptions and behaviours was collected from a highly reliable instrument.

This paper is organised as follows: In the Methodology section the steps that were carried out are explained. The Results section shows the results obtained in both the exploratory and confirmatory analyses. Finally, the conclusions of the work are provided.

## Methodology

For this research, a quantitative, correlational and cross-sectional study was carried out with a pilot sample of 234 university students. This sample was made up of 45% women and 55% men, students from the Universidad Autónoma del Carmen located in Ciudad del Carmen, Campeche. The students are in their first semester and belong to the faculties of Information Sciences, Educational Sciences, as well as the Faculty of Economics and Administration. The sample is representative for both exploratory and confirmatory analysis. (Gravini Donado et al., 2021).

The purpose of the research work was explained to the students and the confidentiality of the information was guaranteed. In this work, the instrument proposed by Roblero (2020) was used. Table 1 shows the dimensions of the instrument, which is composed of 34 items and whose responses use the Likert scale, which evaluates each item in the range of 1 to 5, being 1 (strongly disagree) to 5 (strongly agree).

Dimensions	Ítems
Objectives and priorities	1,2,3,4,5,6,7,8,9,10,11,12
Management Elements	13,14,15,16,17,18,19
Disorganisation	20,21,22,23,24,25,26
Control	27,28,29,30,31,32,33,34

**Table 1** Dimensions of the instrument

Source: Own Creation

## Results

For the validation of the instrument, the IBM SPSS software version 25 was used. The reliability of each of the dimensions was evaluated, as well as the reliability of the entire instrument through Cronbach's alpha (Bastarrachea Rodríguez *et al.*, 2023). Table 2 shows the number of items in each dimension, as well as their reliability. Dimension D1 refers to objectives and priorities; dimension D2 refers to management items; dimension D3 to disorganisation; dimension D4 to control; and DT refers to the total of the instrument.

Reliability statistics	
Cronbach's alpha	N of elements
D1 .836	12
D2 .751	7
D3 .621	7
D4 .737	9
DT .910	34

**Table 2** Reliability analysis

Source: Own Creation

According to the results of the reliability analysis (Gravini Donado *et al.*, 2021), the exploratory structural analysis (EFA) was performed, which allows the generation of theoretical model structures considering the number of factors and the relationship between them (González-Peiteado *et al.*, 2017). Table 3 shows that in the KMO and Bartlett test, 0.853 was obtained in the Kaiser-Meyer measure. The criterion for selecting the items was that which had a factor loading greater than 0.30 using the parallel analysis selection method (Inman *et al.*, 2020).

Kaiser-Meyer-Olkin measure of sampling adequacy		.853
Bartlett's test of sphericity	Aprox. Chi-cuadrado	2839.050
	gl	561
	Sig.	.000

**Table 3** KMO and Bartlett's test

Source: Own Creation

## Exploratory factor analysis

The factor analysis showed that the items are grouped into four factors (see Table 4), items 9, 17, 18 and 34 were eliminated as they did not present a significant factor load. (Vázquez González *et al.*, 2021a).

	D1	D2	D3	D4
Item_4	0.621			
Item_6	0.609			
Item_8	0.584			
Item_11	0.582			
Item_15	0.576			
Item_19	0.538			
Item_29	0.501			
Item_7	0.474		0.352	
Item_1	0.450		0.304	
Item_26	0.330		0.310	
Item_5	0.318			
Item_32	0.423			
Item_24		0.720		
Item_21		0.696		
Item_10		0.647		
Item_14		0.600		
Item_27		0.354		
Item_13		0.486		
Item_2		0.386		
Item_28		0.525		
Item_23			0.655	
Item_25			0.645	
Item_22			0.578	
Item_31			0.430	
Item_30			0.426	
Item_33		0.340	0.389	
Item_12				0.791
Item_3				0.444
Item_20			0.354	0.447
Item_16	0.362			0.412

**Table 4** Rotated Factor Matrix

Source: Own Creation

A four-dimensional solution was obtained that provides a reliable interpretation of the factors. Table 5 shows the reallocation of the items to each of the dimensions.

Dimensions	Ítems
Goal setting and prioritisation	4,6,8,11,15,19,29,7,1,26,5,32
Disorganisation, underestimation and distractions	24,21,10,14,27,13,2,28
Setting and controlling activities	23,25,22,31,30,33
Lack of planning and time procrastination	12,3,20,16

**Table 5** Dimensions resulting from the exploratory analysis

Source: Own Creation

The four dimensions present a significant positive correlation between them (Aguilar-Estevea *et al.*, 2021), shown in the Pearson correlation matrix between the factors ranging from 0.599 to 0.653. (González-Peiteado *et al.*, 2017) indicates that if students set clear goals and control their activities they can avoid bad disorganisation and occupy their idle time productively (see Table 6).

Factor	Pearson correlation			
	1	2	3	4
Setting goals and priorities	1			
Disorganisation, underestimation and distractions	.642**	1		
Setting and controlling activities	.648**	.653**	1	
Lack of planning and time procrastination	.643**	.602**	.599**	1

**Table 6** Correlation analysis of dimensions  
Source: Own Creation

**Confirmatory factor analysis**

The instrument was re-applied to a homogeneous sample, and a consecutive numbering was assigned to each of the items for a better organisation of the information in order to carry out the confirmatory analysis (Morcillo-Martínez *et al.*, 2021). This analysis was carried out with Amos version 25 software by correlating the four dimensions.

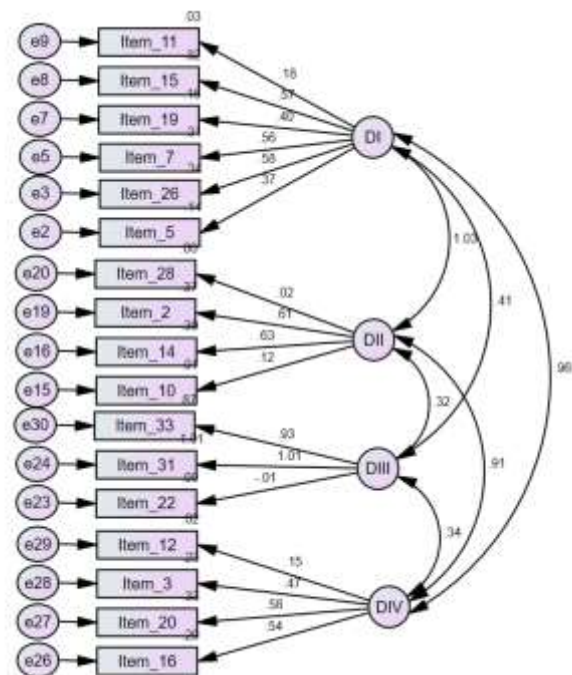
The indices used were: global goodness of fit (GFI), adjusted global fit (AGFI), geometric square root residual (SRMR), comparative fit index (CFI), Tucker-Lewis incremental (TLI), normalised fit (NFI). It was also intended that the root mean squared error of approximation (RMSEA) should be in the range 0.05 - 0.08. Table 7 shows the values for each of the indices. The fit indices were correlated with the items with the highest values in each dimension, which brought the model closer to the expected absolute fit.

Adjustment index	Expected	Initial Model	Final Model
GFI	0.80-1	.706	.836
AGFI	0.80-1	.658	.778
SRMR	0	.133	.112
RMSEA	<0.05-0.08	.093	.094
CFI	0.80-1	.639	.797
TLI	0.80-1	.607	.756
NFI	0.80-1	.546	.730

**Table 7** Expected adjustment index  
Source: Own Creation

According to the deletion of the items, an increase in the levels recommended by the literature is observed within each of the fit indices (Bollen & Long, 1992), mentioning that the GFI above 0.8 is optimal, in turn, (Bentler & Bonett, 1980) mention that the NFI is close to 0.8 also strengthens the indices of the model.

In Figure 1 it is possible to observe that the factor loadings that, according to the standardised values saturate significantly between a minimum value of 0.18 for item 11, and a maximum of 0.58 for item 26 of the dimension setting goals and priorities, for the dimension disorganisation and underestimation of distracters the loadings are item 28 with .02 and item 14 with 0.63; the third dimension establishing and controlling activities item 22 with -.01 to 1.01 in item 31, closing with lack of planning and procrastination with 0.15 and 0.58 in items 12 and 20.



**Figure 1** Correlation of dimensions  
Source: Own Creation

After the adjustments made, the final indicators are satisfactory as can be seen in Table 8, which shows a mean of more than 3 and a reliability of the instrument of more than 0.7. These results indicate the reasonable fit of the data and the model.

Scale Reliability Statistics				
	Media	DE	Cronbach's alpha	McDonald's $\omega$
D1	3.62	0.524	0.758	0.780
D2	3.44	0.536	0.744	0.751
D3	3.44	0.602	0.748	0.806
D4	3.24	0.633	0.709	0.719
DT	3.48	0.481	0.893	0.896

**Table 8** Reliability of the corrected instrument

Source: Own Creation

The results of the reliability analysis of the four dimensions show a high level of reliability in both Cronbach's alpha and McDonald's Omega (Bastarrachea Rodríguez *et al.*, 2023), therefore, it is considered that the instrument has consistent and reliable values which are above .70.

## Discussion

The aim of the present study was to adapt and validate the time management instrument used by Roblero for university students. In the present work it was observed that the confirmatory and exploratory analysis showed variations according to the population of application. The final instrument contains only 30 items compared to 34 items in the base instrument (Roblero, 2020).

The sample of 234 students presented is smaller than Robledo's sample of 289 students and therefore had a smaller impact on reliability. The expected indices of GFI at .836 and CFI at .797 are very close to .8 when the standards recommended by Bollen and Long should reach .9 as the optimal point (Bolleng & Long, 1992). The results obtained for Cronbach's alpha and McDonald's omega reinforce the reliability of the instrument, as they are both above .8.

In relation to Zambrano's study, the sample was 194 students in which the CIPA+ questionnaire was used, giving rise to new factors obtained from the confirmatory analysis of the four that the original instrument had, and no correlation could be observed in the dimensions (Vázquez González *et al.*, 2021). In this study, no new factors were generated, but a significant correlation between the dimensions was observed.

For the case of (Suarez & Feliciano-García, 2020) they used the new scale of active procrastination applied to a sample of 330 students, the reliability with a fit index of RMSR =.05; GFI=.92, with an internal consistency between .70 and .83 divided into four dimensions with 16 items, which guides the construction of an effective instrument, it is required to analyze whether the analyses carried out are adapted to the conditions of the student population of the university.

The construction of instruments has been adapted to the needs of the university population under study by means of techniques such as confirmatory and exploratory analysis. All these validations differ according to the environment in which the students develop. With the study carried out, the factorial reliability found by Roblero was low, and one of the main factors was that the analysis was worked on in different careers (Roblero, 2020), the construction of this instrument took a similar methodology, in which the expected index factor had to be adjusted to 0.8 in order to adapt the instrument.

In the case of correlations, the dimensions of the instrument of (Roblero, 2020) are only related in two factors, while the results of the analysis of this instrument show that the four factors establish a high correlation, therefore, this means that the greater the control and establishment of precise objectives, the more procrastination and disorganisation times can be reduced.

The adequacy and validity of the instrument's constructor is complicated because the factors that encompass the student population present diverse variants, therefore, (Vázquez González *et al.*, 2021) mentions that it is fundamental to submit to a validity process for the construction of instruments that can generate a support of the attributes that are evaluated.

In turn, the study presented the same difficulties as that of (Yupanqui-Lorenzo *et al.*, 2023) in the collection of data, as it was shared electronically and it was not possible to control for bias. Therefore, rigidity in the validation and construction of instruments is necessary.

## Conclusions

This paper validated an existing instrument in the literature to measure procrastination. Validity was assessed through exploratory and confirmatory factor analysis. The reliability of the instrument was assessed with internal consistency measures through Cronbach's alpha and McDonald's omega. According to the results of the reliability analysis of each of the dimensions, it is shown that the instrument has consistent and reliable values above .70. The result of the analysis is suitable for future research in which specific characteristics and context of students from the southern part of the country are required, given the nature of the study..

## References

- Aguilar-Esteva, V., Juárez-Hernández, L. G., & Acosta-Banda, A. (2021). Validez de Constructo y Confiabilidad de un Instrumento para Evaluar la Integración del Enfoque Socioformativo en las Prácticas Docentes en Instituciones de Educación Superior en México. *Revista Fuentes*, 2(23), 178–189. <https://doi.org/10.12795/revistafuentes.2021.12.905>.
- Bastarrachea Rodríguez, P. C., Domínguez Castillo, J. G., Vega Cauich, J. I., & Ortega Maldonado, Á. (2023). Diseño y validación de un instrumento para medir la competencia digital en estudiantes de educación primaria. *PUBLICACIONES*, 53(1), 225–245. <https://doi.org/10.30827/publicaciones.v53i1.28059>.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588–606. <https://doi.org/10.1037/0033-2909.88.3.588>.
- Bollen, K. A., & Long, J. S. (1992). Tests for Structural Equation Models. *Sociological Methods & Research*, 21(2), 123–131. <https://doi.org/10.1177/0049124192021002001>.
- Garzón Umerenkova, A., & Gil Flores, J. (2016). El papel de la procrastinación académica como factor de la deserción universitaria. *Revista Complutense de Educación*, 28(1), 307–324. [https://doi.org/10.5209/rev\\_RCED.2017.v28.n1.49682](https://doi.org/10.5209/rev_RCED.2017.v28.n1.49682).
- González-Peiteado, M., Pino-Juste, M., & Penado-Abilleira, M. (2017). Estudio de la satisfacción percibida por los estudiantes de la UNED con su vida universitaria. *RIED. Revista Iberoamericana de Educación a Distancia*, 20(1), 243. <https://doi.org/10.5944/ried.20.1.16377>.
- Gravini Donado, M. L., Mercado-Peñaloza, M., & Domínguez-Lara, S. (2021). College Adaptation Among Colombian Freshmen Students: Internal Structure of the Student Adaptation to College Questionnaire (SACQ). *Journal of New Approaches in Educational Research*, 10(2), 251. <https://doi.org/10.7821/naer.2021.7.657>.
- Hidalgo-Fuentes, S. (2022). Uso problemático de Internet y procrastinación en estudiantes: un meta-análisis. *European Journal of Education and Psychology*, 1–18. <https://doi.org/10.32457/ejep.v15i1.1815>.
- Morcillo-Martínez, A., Infantes-Paniagua, Á., García-Notario, A., & Contreras-Jordán, O. R. (2021). Validación de la Versión Española de la Escala de Compromiso Académico para Educación Primaria. *RELIEVE - Revista Electrónica de Investigación y Evaluación Educativa*, 27(2). <https://doi.org/10.30827/relieve.v27i2.22769>.
- Özer, B. U., Saçkes, M., & Tuckman, B. W. (2013). Psychometric Properties of the Tuckman Procrastination Scale in a Turkish Sample. *Psychological Reports*, 113(3), 874–884. <https://doi.org/10.2466/03.20.PR0.113x28z7>.
- Pozuelos Estrada, F. J., García Prieto, F. J., & Conde Vélez, S. (2020). Evaluar prácticas innovadoras en la enseñanza universitaria. Validación de instrumento. *Educación XX1*, 24(1). <https://doi.org/10.5944/educxx1.26300>.
- Ramos-Galarza, Carlos, Jadán-Guerrero, Janio, Paredes-Núñez, Lorena, Bolaños-Pasquel, Mónica, & Gómez-García, Antonio. (2017). Procrastinación, adicción al internet y rendimiento académico de estudiantes universitarios ecuatorianos. *Estudios pedagógicos (Valdivia)*, 43(3), 275–289. <https://dx.doi.org/10.4067/S0718-07052017000300016>.

Roblero, G. (2020). Validación de cuestionario sobre gestión del tiempo en universitarios mexicanos. *Revista Electrónica de Investigación Educativa*, 22, 1–11. <https://doi.org/10.24320/redie.2020.22.e01.2136>.

Gómez Cano, C. A., Sánchez Castillo, V., & Santana González, Y. (2023). Factores que inciden en la procrastinación académica de los estudiantes de educación superior en Colombia. *Universidad y Sociedad*, 15(4), 421-431. <https://rus.ucf.edu.cu/index.php/rus/article/view/3995/3913>.

Suárez, A., & Feliciano-García, L. (2020). Influencia del perfil de procrastinación activa en el rendimiento académico del alumnado de Ciencias de la Educación. *Bordón. Revista de Pedagogía*, 72(3). <https://doi.org/10.13042/Bordon.2020.73642>.

Vázquez González, G. C., Jiménez Macías, I. U., & Juárez Hernández, L. G. (2021). Construct validity analysis of the questionnaire “Knowledge Management for educational innovation in universities”. *Revista Fuentes*, 3(23), 329–340. <https://doi.org/10.12795/revistafuentes.2021.12361>.

Yana-Salluca, M., Adco-Valeriano, D. Y., Alanoca-Gutierrez, R., & Casa-Coila, M. D. (2022). Adicción a las redes sociales y la procrastinación académica en adolescentes peruanos en tiempos de coronavirus Covid-19. *Revista Electrónica Interuniversitaria de Formación Del Profesorado*, 25(2), 129–143. <https://doi.org/10.6018/reifop.513311>.

Yupanqui-Lorenzo, D. E., Olivera-Carhuaz, E. S., Pulido-Capurro, V., & Reynaga Alponete, A. A. (2023). Efecto de la autoeficacia y eutrés en la procrastinación: un análisis multigrupo. *Revista Fuentes*, 48–58. <https://doi.org/10.12795/revistafuentes.2023.21318>.