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Psychometric validation of an organizational citizenship scale in Colombian university teachers

Mabel Ibarra Luna[1], Pablo Erazo-Muñoz[2], Braian López Ossa[1]
[1]Faculty of Health Sciences, Catholic University of Manizales, Manizales, Colombia
[2]Faculty of Law and Social Sciences, University of Caldas, Manizales, Colombia

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ABSTRACT

Many assessment scales used to study organizational citizenship behavior (OCB) in Latin American countries are adaptations of instruments developed in other cultural settings. In this regard, the objective of this study was to evaluate the structural validity and reliability of the organizational citizenship behavior scale for coworkers (ECCOCT) in Colombian university teachers. An exploratory factor analysis (EFA) with principal axis extraction and Oblimin rotation was used, followed by a confirmatory factor analysis (CFA) with robust maximum likelihood (MLR). Omega, average variance extracted (AVE), and heterotrait–monotrait ratio (HTMT) were calculated. Participants included 113 university teachers from the city of Manizales, Colombia. The EFA showed that of the five dimensions proposed by the theory, two accurately reflect OCB (OCB directed toward individuals (OCB-I) and OCB directed toward the organization (OCB-O)), explaining 64.2% of the variance. The two-dimensional model showed an excellent fit (χ^2/gl=1.24; comparative fit index (CFI)=.977; root mean square error of approximation (RMSEA)=.046). The reliability of the factors was ω=.90 and ω=.84. Convergent validity (AVE>.50) and discriminant validity (HTMT<.85) were corroborated. The ECCOCT in its two dimensions shows solid psychometric properties and constitutes a brief and valid instrument for assessing organizational citizenship in Latin American contexts.

Corresponding Author:

Mabel Ibarra Luna
Faculty of Health Sciences, Catholic University of Manizales
Carrera 23 No. 60–63, Postal Code 170001, Manizales, Colombia
Email: mibarra@ucm.edu.co

1. INTRODUCTION

The study of organizational citizenship behavior (OCB) in teachers has based its theoretical foundations mainly on conceptual frameworks developed in the field of general organizational behavior. In this context, researchers attempting to address OCB in teachers mostly refer to Organ's seminal work [1], who initially defined OCB as voluntary behaviors exhibited by employees that exceed basic job requirements [2]. He later redefined it as those behaviors that shape the social and psychological context in which the organization's main activities are carried out in the workplace [3]. Neves *et al.* [4] explain this new definition as behaviors that contribute directly or indirectly to organizational effectiveness and are not part of routine job functions, which denotes a commitment to the organization and its members by exceeding the typical expectations of formal job functions [5], and having a positive impact on the organization's performance, culture, and environment [6].

Given that OCB fosters a conducive work environment and contributes to the achievement of the Arias 2025 organizational objectives [7], it is highly relevant in various organizational and work contexts.

Universities, as complex organizations, are no exception. Currently, these institutions face significant challenges in maintaining their continuity and are under pressure to continuously improve and generate innovative services, which has intensified the work demands on teachers, who must increase their commitment and responsibility to generate better academic and research results [8], [9]. In this context, these organizational dynamics require those working in higher education to engage in behaviors that go beyond their formally established functions; for Akar [10] going beyond formal roles can improve efficiency and help achieve educational objectives. In particular, in teaching, these behaviors take on special relevance, given that their performance involves extracurricular activities, mutual collaboration, knowledge exchange, and sharing resources and best practices with others. In this way, OCB in teachers is demonstrated through helpful behaviors toward colleagues, supervisors, and students who need help, and by contributing to the institution through offering recommendations for changes, improvements, and suggestions [11].

In this regard, educational institutions, in order to ensure good performance and achieve their mission and vision, require the organizational commitment of their teachers, which is positively and significantly related to OCB [12]. Furthermore, this behavior significantly improves the quality and effectiveness of education, with strong correlations with job satisfaction, reduced turnover intentions, and work commitment [13]. In the study by Shie and Chang [14], OCB is also directly related to teachers' well-being. In educational organizations, teachers' OCB has become a strategic factor in improving school effectiveness and educational quality, so it must be a priority for their leaders if they want to survive and thrive in the era of globalization, characterized by continuous transformations in a dynamic and competitive environment [14], [15].

Although research on OCB has made significant progress in understanding organizational dynamics, challenges remain in the conceptualization, measurement, and applicability of instruments due to a lack of consensus on the nature and dimensions of the construct. As a result, OCB instruments with different dimensional structures can be found [4]. On the other hand, recent systematic reviews show that, of the studies conducted in the service sector, education occupies the leading position, particularly at the primary and secondary levels; however, they find very few studies on OCB at the university level [16], [17]. This is a necessity, given that universities are characterized by unique organizational challenges and limitations. Another relevant finding is the high concentration of research on OCB in specific countries—mainly the United States, China, and Israel—with North America, Asia, and the Middle East leading scientific production in this field. In contrast, countries in Africa and Latin America are significantly less represented in research on this construct [16], [18].

The convergence of these gaps highlights a need in the Latin American educational context, where differences in OCB could manifest themselves given specific cultural, institutional, and labor characteristics. However, rigorous measurement of OCB in the region is limited and, in Colombia in particular, no instrument has been identified to assess this behavior in university teachers. Therefore, this research focuses on examining the structural validity and reliability of the organizational citizenship behavior scale for coworkers (ECCOCT) in a sample of Colombian university teachers. To this end, we propose: i) to contrast the original five-dimensional structure (altruism, conscientiousness, civic participation, sportsmanship, and courtesy) with bifactorial models supported in the literature; ii) to estimate the internal consistency and convergent/discriminant validity of the resulting version; and iii) to discuss the theoretical and practical implications of the findings for faculty management and research in higher education.

2. METHOD

2.1. Design

This study is quantitative and cross-sectional in nature and was conducted at a higher education institution in the city of Manizales, Colombia. The sample size was calculated based on statistical power [19]. The following exclusion criteria were established: teachers with less than one year of affiliation with the institution, teachers with service contracts, and professors with part-time contracts. These criteria were defined in order to ensure that participants had sufficient institutional experience and a stable employment relationship, thus ensuring adequate exposure to the organizational culture and dynamics to manifest consolidated OCB.

As a result, the sample consisted of 113 university teachers from different faculties—humanities, health sciences, administration, engineering, and architecture—who correctly completed the instrument. Following the recommended methodological guidelines for the validation of instruments in the social sciences, and considering that 100 or more observations are recommended for exploratory factor analysis (EFA) to obtain reliable results [19], the sample size meets this criterion. The sample in this study consisted of 55.3% women and 44.7% men. The age range was 26 to 64 years, with a mean of 43 years (SD=10.3). In terms of educational level, 54% had postgraduate training (master's or doctorate), while the rest had

vocational training and specialization. The length of service at the institution ranged from 1 to 30 years, with a mean of 9.7 years (SD=6.8). Total teaching experience was a mean of 16.4 years (SD=9.2). In terms of contract type, 60% had permanent contracts and 40% had fixed-term contracts.

2.2. Instrument

The ECCOCT, developed and validated by Rodríguez-Montalbán *et al.* [20], was used in a sample of 934 Puerto Rican employees. The OCB is a 15-item self-report instrument that assesses five dimensions of voluntary prosocial behaviors at work, based on Organ [21] conceptualization: altruism, sportsmanship, civic virtue, conscientiousness, and courtesy. Each dimension is measured with three items that are answered on a 6-point Likert scale (1=strongly disagree to 6=strongly agree). The authors reported adequate psychometric properties, with Cronbach's alpha coefficients between .73 and .79, and good fit indices in confirmatory factor analysis (CFA) (comparative fit index (CFI)=.94, root mean square error of approximation (RMSEA)=.07). For the present study, the original 15-item version was used, adapting only the contextual reference from "employees" to "teachers."

2.3. Procedure

Data collection was carried out between June and October 2023, using an online form distributed via institutional email. This included informed consent, which outlined the study's objective and the anonymous and confidential treatment of data for academic purposes only, as well as emphasizing voluntary participation and the right to withdraw from the study at any time and for any reason. It also included the items of the instrument and sociodemographic and work-related questions such as age, gender, educational level, length of service in the organization, teaching experience, and type of contract. The study was authorized in advance by the university administration and approved by the institution's ethics committee.

2.4. Data analysis

EFA and CFA were performed. First, using JASP software (latest version available), EFA was performed using the principal axis extraction method with Oblimin rotation. Parallel analysis was used to determine the number of factors. Next, CFA was performed using R software (version 4.5.2) with the lavaan package [22], employing the robust maximum likelihood (MLR) estimator on the covariance matrix.

To assess construct validity, the following fit indices were examined: Chi-square (χ^2), CFI, Tucker-Lewis index (TLI), RMSEA, and standardized root mean square residual (SRMR). In addition, the reliability of the factors was calculated using the omega coefficient (ω). No modifications were made using error correlation, respecting the theoretical structure proposed by the parallel analysis.

The sequential use of EFA and CFA on the same sample, while not ideal, was necessitated by practical constraints in accessing the target population of university teachers with permanent contracts and sufficient institutional tenure. This approach follows the exploratory-confirmatory continuum recommended by several authors [23], [24] when sample division is not feasible. To minimize capitalization on chance: i) we used theoretically driven criteria for factor retention (parallel analysis); ii) did not modify the CFA model based on modification indices; and iii) conducted comprehensive validity analyses (average variance extracted (AVE), heterotrait–monotrait ratio (HTMT)) to corroborate the factor structure. Nevertheless, we acknowledge this as a limitation that warrants cross-validation in future studies with independent samples.

3. RESULTS AND DISCUSSION

3.1. Exploratory factor analysis

To examine the structural validity of the ECCOCT scale, an EFA was performed using the principal axis factoring method with Oblimin, given that correlation between factors was assumed. The analysis was performed using JASP software. According to the Kaiser-Meyer-Olkin index ((KMO)=.888), the sample adequacy was satisfactory, and Bartlett's sphericity test was significant ($\chi^2(36)=635.309$, $p<.001$), which demonstrates that the data in this study came from a multivariate population and were suitable for factor analysis. The parallel analysis and eigenvalues suggest the retention of two factors, whose values were higher than those obtained in the simulated data: the first factor obtained an eigenvalue of 4.901 and the second of .643, both above the corresponding threshold of the simulation (.834 and .331, respectively). Figure 1 shows the parallel analysis graph used for the factor retention decision.

The two extracted factors together explained 64.2% of the total variance (Factor 1=34.6%, Factor 2=29.7%). Based on item content and theoretical alignment with Williams and Anderson [25] OCB taxonomy, Factor 1 was identified as OCB directed toward individuals (OCB-I), comprising behaviors that benefit specific coworkers and students (items O2, O3, O4, and O5). Factor 2 was identified as OCB directed toward the organization (OCB-O), including behaviors that benefit the institution as a whole (items O7, O8, O9, O12, and O14). Factor loadings ranged from 0.466 to 0.884, which is adequate for interpretation

as presented in Table 1. In terms of internal consistency, omega for the factors was .90 (OCB-I) and .84 (OCB-O), indicating good to excellent reliability.

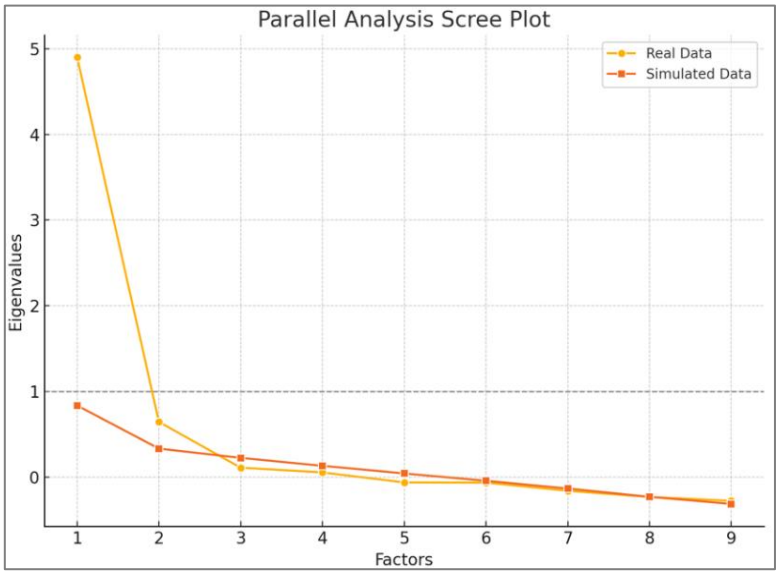

Figure 1. Scree plot of the parallel analysis

Table 1. Rotated factor loadings of the ECCOCT items

Items	Factor loadings			
	Item code	Factor 1	Factor 2	Uniqueness
I willingly give my time to help colleagues	O3	.884		.310
I help colleagues who have been absent	O2	.870		.276
I share materials and resources with colleagues	O5	.805		.216
I help colleagues with their workload	O4	.594		.330
My coworkers check important dates at my workplace before taking time off	O14		.814	.456
My coworkers finish their work even when there are interruptions	O12		.764	.434
My colleagues represent our organization well wherever they are	O7		.633	.437
My colleagues collaborate on every new project in this organization	O8		.619	.332
My colleagues work their best because this organization deserves it	O9		.466	.427

Note: Applied rotation method is Oblimin.

3.1.1. Item elimination criteria

Six items (O1, O6, O10, O11, O13, and O15) were eliminated following a systematic evaluation based on five psychometric and theoretical criteria: i) factor loadings below .40, indicating insufficient contribution to the latent construct [26]; ii) cross-loadings greater than .40 on multiple factors, suggesting poor discriminant validity [27], [28]; iii) communalities below .40, indicating that the item shares minimal variance with other items [26]; iv) theoretical redundancy, where item content was substantially similar to retained items [28]; and v) contribution to model fit improvement, assessed through incremental CFA comparisons [29]. Table 2 presents the detailed justification for each eliminated item.

Table 2. Item elimination justification

Item	Content	Factor 1	Factor 2	Communality	Primary reason for elimination
O1	Coworkers willing to help	-.051	.952	.855	Redundant with O2/O3 (help/cooperation)
O6	Employees respect norms	.484	.167	.354	Cross-loading/does not discriminate between factors
O10	Comply without materials	.647	.141	.542	Low loading/very specific content
O11	Work overtime	.737	-.155	.437	Low loading/less relevant in academic context
O13	Report absences in advance	.616	.147	.504	Low loading/less relevant in academic context
O15	Inform absences beforehand	.785	.005	.620	Very specific content/less relevant in academic context

Note. Factor loadings derived from EFA with Oblimin rotation. Items were eliminated based on criteria outlined in section 3.1.1.

Specifically, O1 was removed due to theoretical redundancy with O2 and O3 (all measuring helping behaviors); O6 exhibited cross-loadings (.484 on Factor 1, .167 on Factor 2) and low communality (.354); O10 and O11 showed factor loadings below the .40 threshold and were less relevant to the academic context; and O13 and O15 were both eliminated despite O15 showing stronger psychometric properties (loading=.785 vs .616) because: i) both measure highly specific content (reporting absences) that is less relevant in university settings where faculty have greater scheduling autonomy; ii) neither item clearly aligned with the OCB-I or OCB-O theoretical framework; and iii) their removal resulted in a more parsimonious instrument without loss of construct breadth. The final 9-item solution demonstrated superior fit indices across all criteria (see comparison in section 3.2).

3.2. Confirmatory factor analysis

Subsequently, a CFA was performed to evaluate the fit of the two-factor model identified in the EFA. The analysis was carried out using R software (version 4.5.2) with the lavaan package, using the MLR estimator, which is suitable for Likert scales with non-normal distribution. In CFA, a non-significant chi-square test ($p>.05$) indicates acceptable model fit, as it suggests that the observed covariance matrix does not differ significantly from the model-implied covariance matrix. The two-factor model showed an excellent fit, with indices supporting its structural validity: $\chi^2(26)=32.145$, $p=.188$; CFI=.977; TLI=.968; RMSEA=.046 [90% CI: .000–.079]; and SRMR=.056, as shown in Figure 2. These values exceed the recommended ranges for considering an excellent fit [30].

The standardized factor loadings were all significant and greater than .40, indicating that the items have adequate weight in the factors to which they belong, as seen in Table 3. Consistent with theoretical expectations, OCB-I groups behaviors involving direct instrumental support and collaborative performance toward individuals (items O2, O3, O4, and O5): while OCB-O groups behaviors related to institutional advocacy, organizational participation, and civic virtue (items O7, O8, O9, O12, and O14).

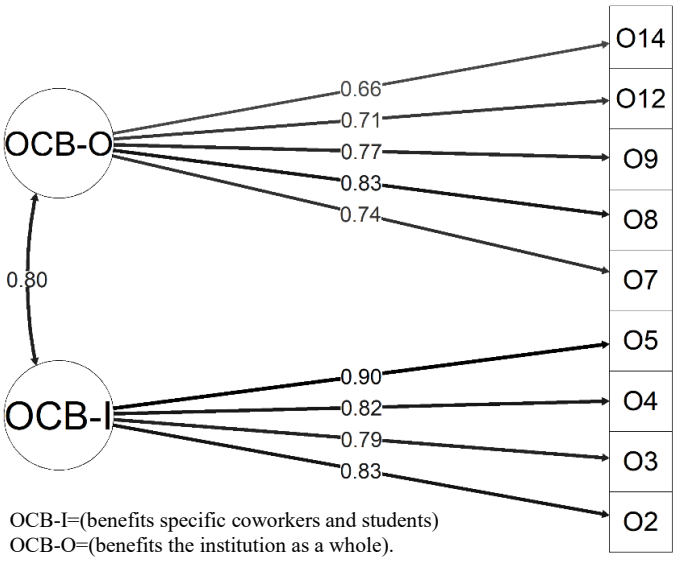

Figure 2. Confirmatory factor model diagram

Table 3. Standardized factor loadings of the CFA for the 9 items

Measurement model								
Latent	Observed	Estimate	SE	95% CI		β	z	p
				Lower	Upper			
OCB-I	O2	1.000	.0000	1.000	1.00	.833		
	O3	1.102	.1195	.868	1.34	.786	9.22	<.001
	O4	.827	.0953	.640	1.01	.820	8.68	<.001
	O5	.949	.0935	.766	1.13	.902	10.16	<.001
OCB-O	O7	1.000	.0000	1.000	1.00	.738		
	O8	1.355	.1525	1.056	1.65	.831	8.89	<.001
	O9	1.183	.1300	.928	1.44	.769	9.10	<.001
	O12	1.305	.1721	.968	1.64	.713	7.58	<.001
	O14	1.339	.1842	.978	1.70	.656	7.27	<.001

Note. SE=standard error; CI=confidence interval; β=standardized factor loading, z= z-statistic; p= p-value.

The correlation between the two factors was positive and strong (r=.795, p<.001). The strong correlation between OCB-I and OCB-O is theoretically consistent with the conceptualization of OCB as related but distinguishable dimensions. This finding aligns with Williams and Anderson [25] original framework, where behaviors directed toward individuals and the organization represent complementary facets of organizational citizenship. Importantly, despite this strong relationship, the factors demonstrate adequate discriminant validity (HTMT=.772<.85), supporting the theoretical and empirical distinctiveness of the two dimensions.

3.2.1. Convergent and discriminant validity

Convergent validity was assessed using the AVE, which should exceed .50 to indicate that the construct explains more than half of the variance of its indicators [31]. Both factors demonstrated adequate convergent validity: OCB-I (AVE=.699) and OCB-O (AVE=.553), indicating that the items within each factor share substantial common variance. Discriminant validity was evaluated using the HTMT, a criterion considered superior to traditional approaches [32]. Values below .85 indicate that constructs are sufficiently distinct. The HTMT between OCB-I and OCB-O was .772, well below the conservative threshold, confirming that the two factors, while correlated, represent distinguishable dimensions of OCB. Table 4 summarizes the validity indices.

Table 4. Convergent and discriminant validity

Metric	Value	Criterion	Interpretation
AVE OCB-I	.699	≥.50	Excellent
AVE OCB-O	.553	≥.50	Good
HTMT (OCB-I vs OCB-O)	.772	<.85	Excellent

The results of the validation of the ECCOCT in Colombian university teachers confirm that OCB are grouped into two main domains: OCB-O with five items and OCB-I with four items, which are the most relevant in the academic field. This convergence corroborates the proposal by Williams and Anderson [25], who established the classic distinction between behaviors directed at people (OCB-I) and the organization (OCB-O), this structure has also been confirmed in subsequent studies and widely used in the literature [4], [33]. These authors were able to empirically demonstrate that this two-factor structure is not only theoretically valid but also presents differentiated correlations. Regarding discriminant and convergent validity, the original study used CFA, which revealed differentiated eigenvalues and distinct explained variances for each factor, providing robust evidence of the discriminant validity between OCB-I, OCB-O, and intra-role behaviors (IRB). Consistently, this pattern is replicated in this study conducted in the Colombian academic context, where OCB-I shows behaviors toward specific individuals, such as sharing knowledge with students or helping colleagues with workloads, while OCB-O represents behaviors that benefit the institution in general, such as promoting the institutional image or participating in committees.

This two-factor validation finds additional support in the findings of other studies that have used scales widely recognized in the literature. Such as that of Lee and Allen [34], who validated a 16-item instrument that also distinguishes between OCB-I and OCB-O, in this case in healthcare professionals, confirming differentiated loads for behaviors toward individuals and toward the organization. Beyond the factorial structure, these authors identified different predictors by type of OCB, finding a crucial predictive pattern: work affect was more strongly associated than work cognitions with OCB-I, while work cognitions were more strongly correlated than work affect with OCB-O [34]. This predictive differentiation supports the findings obtained with the ECCOCT, where OCB-I could be more influenced by positive affective states toward colleagues and students, while OCB-O would respond more to cognitive evaluations of institutional policies and working conditions. In fact, there may be other variables that have not been studied that have different relationships with the two dimensions, which could be masked if only the general scale is used. In this sense, this distinction between OCB-I and OCB-O provides greater conceptual clarity for research [33].

Additionally, Coleman and Borman [35] developed an integrated model of citizenship performance that identified three main categories that vary depending on the beneficiary: interpersonal citizenship performance (benefits members of the organization), organizational citizenship performance (benefits the organization), and job/task conscientiousness (benefits the job/task). Although the re-specified ECCOCT does not include this third dimension, the results of this study replicate the underlying logic in its two beneficiary constructs, where “OCB-I” benefits specific individuals (students, colleagues) and “OCB-O” benefits the educational institution in general. According to these authors, there is probably no single optimal way to define OCB, and the similarities between the models are more notable than the differences [35].

In contrast to a recent psychometric validation of an OCB scale conducted by Neves *et al.* [4] in various organizational contexts, which concluded that a unidimensional structure was more appropriate for general work environments, the findings of the present study suggest that the educational context may require differentiated conceptualizations of citizenship behaviors given its institutional and mission-specific characteristics.

The meta-analysis conducted by Podsakoff *et al.* [36] provides robust empirical evidence for the conceptual distinction between OCB-I and OCB-O. The authors confirm that although the OCB-I and OCB-O dimensions are strongly correlated, they still share less than 57% of their variance. This evidence supports the discriminant validity between the two constructs, demonstrating that although they are related, they represent distinct dimensions of OCB. This predictive differentiation also supports the findings obtained in this study with the ECCOCT in the academic context.

The convergence with previous research underscores that OCB-I and OCB-O constitute the pillars of organizational citizenship among university faculty and reinforces the usefulness of assessing these behaviors with a brief, valid, and reliable instrument. On the other hand, although there are several established scales for measuring OCB, OCB-I, or OCB-O, it is necessary to test and adapt instruments that are tailored to each particular context and organization [16]. In this regard, the 9-item scale presented here: OCB-O with 5 items, and OCB-I with 4 items, demonstrates good psychometric properties and construct validity in the university context. This feature is an advantage for researchers interested in studying OCB in higher education within complex research designs, where the use of extensive instruments is not feasible, such as longitudinal studies or those that use multiple sources of information. It also minimizes the risk of participant attrition and associated cost overruns [37], [38].

The two-dimensional ECCOCT can be used as an early indicator of cohesion and job well-being, facilitating decision-making about organizational climate and faculty retention. According to Hermanto and Srimulyani [39] the literature has shown that OCB-I can significantly improve teacher performance, increase coworker productivity, help save organizational resources, and improve mood, morale, and cohesion, as well as foster good relationships with coworkers and thus minimize group conflicts. On the other hand, OCB-O encourages responsible and reliable behavior by completing work on time, the ability to take risks, and the propensity for workers to apply all their experience, talents, and strengths to the workplace, which contributes to the growth of the educational institution and affects student performance in educational services [39].

Accordingly, having a tool that measures OCB-I and OCB-O in the Latin American educational context contributes to management, since its measurement contributes to the design of organizational interventions aimed at promoting civic behaviors that favor the quality and effectiveness of education, as they are correlated with teachers' well-being and job satisfaction, as well as their commitment to their work [13]. It is important that this becomes a priority for university leaders if they wish to survive in a dynamic and competitive environment [14], [15], highlighting the potential advantages of promoting OCB to improve employee well-being and organizational success [6].

4. CONCLUSION

The study confirms that the ECCOCT, when applied to Colombian university teachers, fits a two-dimensional integrated model. This structure, consistent with the traditional OCB-I/OCB-O distinction, explains 64.2% of the variance and exhibits excellent fit indices (CFI=.977, RMSEA=.046), high internal consistency (ω=.90 and .84), and adequate convergent (AVE>.50) and discriminant validity (HTMT=.772<.85). The findings offer a brief instrument that minimizes the burden on participants without sacrificing the rigor and precision associated with the reduction from five to two dimensions. The replication of the two-factor solution in a Latin American context supports the generalization of the OCB-I/OCB-O taxonomy. The re-specified ECCOCT allows for the evaluation of key prosocial behaviors in teachers that affect staff cohesion, well-being, and retention, facilitating decision-making in teacher management and the work environment. However, the study has limitations inherent to its cross-sectional design and sample size. Additionally, the use of the same sample for both EFA and CFA, while justified by constraints in accessing the target population, may have capitalized on sample-specific variance. Although we employed rigorous procedures to minimize this risk (theory-driven factor retention, no post-hoc model modifications), cross-validation with independent samples is warranted. Consequently, it is suggested that future research test the factorial invariance of the ECCOCT in larger and independent samples to confirm the stability of the measurement model; examine the nomological validity of the instrument; and employ longitudinal designs that allow for modeling the predictive effect of OCB on objective indicators of academic performance, student satisfaction, and institutional educational quality.

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AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Mabel Ibarra Luna	✓	✓		✓		✓	✓	✓	✓	✓		✓	✓	
Pablo Erazo-Muñoz		✓	✓	✓	✓			✓	✓	✓	✓			
Braian López Ossa	✓					✓	✓	✓		✓	✓		✓	✓

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, [MIL], upon reasonable request.

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BIOGRAPHIES OF AUTHORS

Mabel Ibarra Luna holds master's degree in Human Talent Management from the University of Manizales. She is an associate teacher at the Catholic University of Manizales in Colombia, attached to the Faculty of Health Sciences and the Faculty of Administration. She is a member of the Integrated Management Systems Research Group and Leader of the Health Administration Research Line at the same university. She is a research associate recognized by Minciencias (Colombia). She can be contacted at email: mibarra@ucm.edu.co.

Pablo Erazo-Muñoz is a Ph.D. in Administration from the National University of Colombia with a laureate doctoral thesis on eudaimonic happiness at work and job performance in teachers. He holds a master's degree in Administration (with honors) and specializes in Educational Management. He is a junior researcher recognized by Minciencias (Colombia) and leader of the research group "Pedagogical Knowledge and Skills in SENA Professional Training." His research focuses on human resource management, organizational behavior, and advanced quantitative methodology, with expertise in psychometric validation, structural equation modeling (PLS-SEM, CB-SEM), and scale development. He has been an administrative professional at SENA, former principal of Boston school, and administrative director at the Catholic University of Manizales. He is a postgraduate professor in administration and educational management at Colombian universities. He can be contacted at email: paerazom@unal.edu.co.

Braian López Ossa is a professional nurse at the Catholic University of Manizales, specializing in Occupational Health and Safety, and holds a master's degree in Integrated Management Systems from the same university. He is an adjunct teacher at the Faculty of Health Sciences and the Faculty of Administration at the Catholic University of Manizales. He is particularly interested in occupational risk prevention in the health, education, and organizational sectors. He can be contacted at email: blopez@ucm.edu.co.