



Organizational learning and organizational citizenship behavior in higher education: a PLS-SEM model with gender moderation

Aprendizaje organizacional y comportamiento de ciudadanía organizacional en educación superior: un modelo PLS-SEM con moderación de género

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ABSTRACT

Introduction: Organizational learning can foster voluntary behaviors that extend beyond formal job responsibilities and contribute to collective performance in higher education institutions. Objective: To analyze the relationship between organizational learning dimensions and organizational citizenship behavior and to assess the moderating effect of gender. Methods: A quantitative, non-experimental, cross-sectional, explanatory-correlational study was conducted with 246 faculty and administrative staff members from an Ecuadorian university, selected through non-probability convenience sampling. Data were collected through online questionnaires and analyzed using PLS-SEM. Results: The model explained 62.0% of the variance in organizational citizenship behavior ($R^2 = 0.620$). Strategic leadership showed the strongest association ($\beta = 0.638$; $p < 0.05$), followed by team learning ($\beta = 0.227$; $p < 0.05$) and connection with the environment ($\beta = 0.165$; $p < 0.05$). Inquiry and dialogue, learning systems, learning opportunities, and collective vision were not statistically significant. Gender did not show a significant moderating effect. Conclusions: The relationship between organizational learning and organizational citizenship behavior was selective across dimensions, with strategic leadership, team learning, and connection with the environment showing the most relevant associations.

Keywords: organizational learning; organizational citizenship behavior; strategic leadership; PLS-SEM; higher education.

RESUMEN

Introducción: El aprendizaje organizacional puede favorecer conductas voluntarias que exceden las funciones formales y contribuyen al desempeño colectivo de las instituciones de educación superior. Objetivo: Analizar la relación entre las dimensiones del aprendizaje organizacional y el comportamiento de ciudadanía organizacional, así como evaluar el efecto moderador del género. Metodología: Se desarrolló un estudio cuantitativo, no experimental, transversal y explicativo-correlacional con 246 docentes y miembros del personal administrativo de una universidad ecuatoriana, seleccionados mediante muestreo no probabilístico por conveniencia. La información se recopiló mediante cuestionarios en línea y se analizó mediante PLS-SEM. Resultados: El modelo explicó el 62,0% de la varianza del comportamiento de ciudadanía organizacional ($R^2 = 0,620$). El liderazgo estratégico presentó la asociación de mayor magnitud ($\beta = 0,638$; $p < 0,05$), seguido del aprendizaje en equipo ($\beta = 0,227$; $p < 0,05$) y la conexión con el entorno ($\beta = 0,165$; $p < 0,05$). Investigación y diálogo, sistemas de aprendizaje, oportunidades de aprendizaje y visión colectiva no alcanzaron significancia estadística. El género no mostró un efecto moderador significativo. Conclusiones: La relación entre aprendizaje organizacional y ciudadanía organizacional fue selectiva a nivel dimensional, con predominio del liderazgo estratégico, el aprendizaje en equipo y la conexión con el entorno.

Palabras clave: aprendizaje organizacional; comportamiento de ciudadanía organizacional; liderazgo estratégico; PLS-SEM; educación superior.

INTRODUCTION

Higher education institutions are not only dependent on strict formal compliance with the functions assigned to teaching staff and even administrative personnel, but also on discretionary behaviors that favor cooperation, address problem solving, as well as the assignment of group tasks. In this sense, organizational citizenship behavior (OCB) represents a set of voluntary behaviors that exceed the threshold of requirements strictly associated with the job position and that favor the functioning of the organization. The literature has shown that OCB is understood as a multidimensional construct and that its antecedents can be found both in individual characteristics and in relational and organizational conditions [1].

Among these conditions is organizational learning. From this perspective, a learning-oriented organization is not limited to providing formal training activities but develops conditions that favor the creation, acquisition, exchange, and integration of knowledge at the individual, group, and organizational levels. Marsick and Watkins proposed the Dimensions of the Learning Organization Questionnaire (DLOQ) as a framework to evaluate this phenomenon through dimensions linked to continuous learning opportunities, inquiry and dialogue, team learning, systems for sharing knowledge, building a collective vision, connection with the environment, and strategic leadership for learning [2]. This approach makes it possible to analyze learning as an organizational property composed of differentiated practices, rather than treating it solely as a global construct.

The relationship between organizational learning and OCB has a relevant theoretical and empirical basis. Somech and Drach-Zahavy identified early on that organizational learning conditions could be associated with a greater willingness of workers to engage in behaviors that exceeded their formal responsibilities [3]. Subsequently, the study of learning climate showed that environments favorable to development and knowledge exchange are related to outcomes such as involvement, proactivity, and creativity [4]. In the same direction, it has been observed that a learning-oriented culture can contribute to extra-role behavior when articulated with conditions such as trust and organizational justice [5]. These antecedents suggest that learning practices can generate a favorable context for workers to expand their contribution beyond prescribed obligations.

However, the relationship does not necessarily operate uniformly. Zia et al. showed that informal learning can act as an intermediate mechanism between the learning climate and OCB, demonstrating that the transformation of learning conditions into citizenship behaviors may depend on relational and everyday knowledge exchange processes [6]. This observation is particularly relevant when organizational learning is disaggregated into dimensions, since practices such as team learning or leadership for learning could present more immediate associations with employee behavior than predominantly structural organizational mechanisms. Consequently, evaluating only an aggregate effect of learning may obscure differences among the components that make up the construct.

This problem is particularly relevant in higher education institutions, knowledge-intensive organizations where academic and administrative activities require coordination, professional autonomy, and ongoing interaction. In Palestinian universities, organizational learning proved to be a relevant variable in the relationship between inclusive leadership and extra-role behaviors of academic staff, according to Aboramadan et al. [7]. Likewise, the analysis of organizational learning in higher education has highlighted that institutional transformation processes require continuous learning, reflection, and capacity to adapt to environmental demands [8]. These results suggest that universities are especially suitable settings for examining how internal learning conditions are transformed into voluntary behaviors that support the organization.

The most recent research on OCB in higher education also reveals the importance of leadership conditions and the organizational environment. Taamneh and collaborators showed that ethical leadership is related to organizational citizenship in higher education institutions and that this relationship depends on the conditions of organizational justice [9]. In public universities, servant leadership has also demonstrated significant relationships with OCB among teaching staff [10], while job satisfaction has been identified as an explanatory mechanism between perceived justice and citizenship behavior in staff of public higher education institutions [11]. Leadership humility has also been linked to OCB through processes related to employee satisfaction and commitment [12]. Together, these studies indicate that citizenship behaviors are sensitive to the characteristics of the organizational context and the quality of the relationships established in institutions.

The most recent evidence reinforces this contextual perspective. In university professors, organizational climate has shown the capacity to explain OCB through relational mechanisms such

as idiosyncratic deals and leader-member exchange, also observing that some of these relationships may vary depending on individual and organizational conditions [13]. This result is particularly relevant because it challenges the idea that all components of the organizational environment exert equivalent direct effects on discretionary behaviors. Consequently, it is necessary to identify which dimensions of the learning climate have their own explanatory capacity and which may operate through indirect mechanisms that are not captured when only the global effect of the construct is analyzed.

Added to this heterogeneity is the possible influence of individual characteristics. Gender has been considered a potential moderating variable of OCB, although the available results do not allow a uniform pattern to be established. Nasurdin et al. analyzed gender as a moderator of relationships associated with organizational citizenship behavior, demonstrating the relevance of considering individual differences when studying the antecedents of OCB [14]. More recently, Khan and Rubel incorporated gender into a moderating model of the relationship between organizational practices and citizenship, using PLS-SEM to test whether the intensity of these relationships varied across groups [15]. The existence of context-dependent results suggests that gender should not be assumed a priori as a universal determinant, but rather subjected to empirical testing in different sectors and cultural environments.

Despite these advances, at least three relevant gaps remain. First, much of the evidence analyzes general antecedents of OCB such as leadership, justice, satisfaction, or organizational climate, while there is less clarity regarding the differentiated effect of the dimensions that make up a learning-oriented climate. Second, a significant proportion of recent studies in higher education come from Asian, African, European, and Middle Eastern contexts, which limits the direct extrapolation of their results to Latin American institutions. Third, evidence on the moderating role of gender continues to be dependent on the context and the organizational antecedent analyzed. The research itself that supports this article was conceived to examine these relationships in an Ecuadorian higher education institution, considering separately the dimensions of the learning climate and the moderation of gender.

To counteract the shortcomings found, the purpose of the present study was to examine the relationship between the dimensions of the organizational learning climate and organizational citizenship in teachers and administrative staff at a higher education institution in Ecuador, as well as the moderating effect that gender could have on these relationships. It was assumed that the dimensions of the organizational learning climate would be positively associated with OCB and that the magnitude of these relationships could differ according to gender. In this way, it is intended to verify the existence of evidence regarding which specific components of organizational learning are best able to predict OCB behaviors in higher education, renouncing the notion that the dimensions of the construct would have a similar influence.

METHODS

A quantitative, non-experimental, cross-sectional study was conducted to examine the relationship between organizational learning and organizational citizenship behavior (OCB), and also the moderating effect of gender. Data collection was limited to one single point in time, a fact that we associate with the non-manipulation of variables; hence, the interpretation of the results is in terms of structural association and explanatory capacity of the model, and not of causal relationships.

The reference population for the analysis consisted of the teachers and administrative staff of the Amazon State University, Ecuador. The number of participants is limited to 246, recruited by non-probabilistic convenience sampling, which refers to accessibility, presence, and availability. Information collection was carried out in the first weeks of 2026 using a Google Forms questionnaire. The thesis states that the reference population referred to teachers and administrative staff and indicates that it was through this digital platform that the instrument was distributed.

Organizational learning was evaluated using the Dimensions of the Learning Organization Questionnaire (DLOQ), developed by Marsick and Watkins [2]. The instrument included 7 dimensions: continuous learning opportunities, inquiry and dialogue, collaboration and team learning, systems to capture and share learning, collective vision, connection to the environment, and strategic leadership for learning. The items were rated using a 5-point Likert scale, where 1 corresponded to "totally disagree" and 5 to "totally agree". The version used was translated and adapted to the institutional context and was previously evaluated by 4 experts.

Organizational citizenship behavior was measured using the instrument employed by

Padilla-Lugo and González-Hernández [16], consisting of 16 items rated on a 5-point Likert scale. The instrument allowed the evaluation of discretionary and prosocial behaviors developed in the work environment. Before its application, it was also submitted for evaluation by 4 academic and professional experts, with the purpose of verifying its relevance to the context studied.

Data processing and analysis were performed using SmartPLS with partial least squares structural equation modeling (PLS-SEM). This technique was chosen because it allows simultaneous estimation of measurement and structural models with multiple latent constructs, as well as examination of direct relationships and moderation effects [17]. The analysis was carried out in two stages: evaluation of the measurement model and evaluation of the structural model.

In the first stage, the quality of the measurement model was evaluated using indicators of internal consistency, composite reliability, and convergent and discriminant validity. Internal consistency was assessed using Cronbach's alpha, rho_A, and composite reliability (rho_C). Convergent validity was determined from external loadings and average variance extracted (AVE), with AVE values equal to or greater than 0.50 considered adequate. Discriminant validity was verified using the Fornell-Larcker criterion and the heterotrait-monotrait ratio (HTMT), with reference values below 0.85 or 0.90 [18].

In the second stage, the structural model was evaluated using standardized path coefficients (β), variance inflation factor (VIF), coefficient of determination (R^2), and effect size (f^2). For the latter, values of 0.02, 0.15, and 0.35 were considered reference points for small, medium, and large effects, respectively. VIF values below 3 were also observed, indicating the absence of relevant collinearity problems among the predictor constructs.

The statistical significance of the structural relationships was determined using a bootstrapping procedure with 5000 subsamples, which provided estimates of the standard errors and significance levels for the path coefficients. A significance level of $p < 0.05$ was adopted for testing the proposed relationships.

To analyze moderation, gender was incorporated as a moderating variable in the relationships between each dimension of organizational learning and OCB. Separate interaction terms were estimated to determine whether the magnitude of the structural relationships varied as a function of participant gender. This procedure enabled moderation to be evaluated specifically for each dimension of the model, rather than only on a global measure of organizational learning.

Regarding ethical aspects, according to the information provided by the author, the research procedure and instruments were reviewed by professionals at the researcher's affiliated institution before their application. In the version intended for publication, no ethics committee approval or approval code will be declared unless documentation exists that expressly supports such a statement.

RESULTS

The sample consisted of 246 teachers and administrative staff members from Universidad Estatal Amazónica. Of these, 57% were women and 43% were men. Regarding age, 38% were between 31 and 40 years old, 30% between 41 and 50 years old, 15% between 18 and 30 years old, 12% between 51 and 60 years old, and 5% were over 60 years old. As for academic training, 67% reported doctoral studies, 32.5% master's studies, and 0.5% undergraduate education.

The descriptive analysis showed mean scores higher than 3.90 for all organizational learning dimensions. Strategic leadership had the highest mean ($M = 4.32$; $SD = 0.82$), followed by connection with the environment ($M = 4.31$; $SD = 0.79$). Continuous learning opportunities had a mean of 4.07, research and dialogue 4.06, and team learning 4.00. Learning systems and collective vision both presented a mean of 3.97.

Organizational citizenship behavior had an overall mean of 4.41 and a standard deviation of 0.83. Of the responses corresponding to this construct, 88.01% were concentrated in categories 4 and 5 of the scale, while 2.52% were located in categories 1 and 2.

The evaluation of the measurement model showed Cronbach's alpha coefficients between 0.919 and 0.959 for the organizational learning dimensions. Organizational citizenship behavior had $\alpha = 0.957$. The rho_A values ranged from 0.929 to 0.964, while composite reliability (rho_C) values ranged from 0.937 to 0.967.

The average variance extracted (AVE) values exceeded 0.50 for all constructs. Strategic leadership had an AVE of 0.830, connection with the environment 0.782, and learning systems 0.781. Organizational citizenship behavior recorded the lowest AVE in the set, at 0.594.

Table 1. Descriptive statistics of the analyzed constructs

Construct	Mean	SD
Continuous learning opportunities	4,07	0,99
Research and dialogue	4,06	1,01
Team learning	4,00	1,02
Learning systems	3,97	1,05
Collective vision	3,97	1,04
Connection with the environment	4,31	0,79
Strategic leadership	4,32	0,82
Organizational citizenship behavior	4,41	0,83

Note. Means and standard deviations of the analyzed constructs are shown. Own elaboration.

Table 2. Reliability and convergent validity of the measurement model

Construct	Cronbach's α	rho_A	rho_C	AVE
Team learning	0,930	0,934	0,945	0,741
Organizational citizenship behavior	0,957	0,964	0,961	0,594
Connection with the environment	0,944	0,945	0,956	0,782
Research and dialogue	0,919	0,929	0,937	0,714
Strategic leadership	0,959	0,961	0,967	0,830
Learning opportunities	0,927	0,930	0,942	0,732
Learning systems	0,944	0,945	0,955	0,781
Collective vision	0,935	0,937	0,949	0,755

Note. Reliability and convergent validity indicators of the measurement model are presented. Own elaboration.

Discriminant validity was examined using the Fornell-Larcker criterion. Correlations between constructs remained below the square root of the corresponding AVE. The highest association was observed between strategic leadership and collective vision ($r = 0.905$), compared with the square root of the AVE of 0.911 for leadership. Connection with the environment showed a correlation of 0.857 with research and dialogue, lower than the reference value of 0.884.

In the evaluation of the structural model, VIF values were below 3. The coefficient of determination for organizational citizenship behavior was $R^2 = 0.620$, indicating that the dimensions included in the model explained 62.0% of the variance in the endogenous variable.

Of the seven structural relationships examined, three had positive and statistically significant coefficients. Strategic leadership exhibited the highest coefficient ($\beta = 0.638$; $p < 0.05$), followed by team learning ($\beta = 0.227$; $p < 0.05$) and connection with the environment ($\beta = 0.165$; $p < 0.05$).

The relationships for research and dialogue ($\beta = -0.073$; $p > 0.05$), learning systems ($\beta = -0.059$; $p > 0.05$), learning opportunities ($\beta = -0.030$; $p > 0.05$), and collective vision ($\beta = 0.024$; $p > 0.05$) did not reach statistical significance.

Table 3. Structural relationships between the dimensions of organizational learning and OCB

Structural relationship	β	Significance	Result
Team learning $\rightarrow$ OCB	0,227	$p < 0,05$	Significant
Connection with the environment $\rightarrow$ OCB	0,165	$p < 0,05$	Significant
Strategic leadership $\rightarrow$ OCB	0,638	$p < 0,05$	Significant
Learning systems $\rightarrow$ OCB	-0,059	$p > 0,05$	Not significant
Research and dialogue $\rightarrow$ OCB	-0,073	$p > 0,05$	Not significant
Learning opportunities $\rightarrow$ OCB	-0,030	$p > 0,05$	Not significant
Collective vision $\rightarrow$ OCB	0,024	$p > 0,05$	Not significant

Note. Structural coefficients and significance of the relationships between organizational learning and OCB are presented. Own elaboration.

The moderation analysis showed that gender had no significant effect on any of the evaluated relationships. The interaction coefficients ranged from 0.015 to 0.050, and all p values were > 0.05 .

Overall, three dimensions of organizational learning—strategic leadership, team learning, and connection with the environment—showed positive and statistically significant relationships with organizational citizenship behavior. The remaining four dimensions did not reach significance, and the moderating effect of gender was also not significant.

DISCUSSION

The results indicate that AI-mediated formative feedback was associated with a greater improvement in academic performance than conventional feedback. The experimental group showed an average gain of 19.8 points, while the control group had an average gain of 9.0 points. Since both groups started from practically equivalent scores, the separation observed after the intervention suggests a favorable effect of the feedback modality used. This behavior is consistent with studies that have found that generative models are capable of generating comments that are concrete enough to support the evaluation of academic articles, although human feedback still retains advantages in certain qualitative aspects [16].

The distribution of gains also showed that the change was not exclusively determined by a few students with large increases. The higher concentration of positive scores in the experimental group indicates a relatively widespread pattern among its participants. This observation is consistent with reviews on emerging technologies applied to assessment, which point out that the effectiveness of technological feedback depends mainly on its integration into the pedagogical process and the possibility of using the comments in subsequent performances [17]. Similarly, the literature on generative artificial intelligence and university assessment highlights that its potential increases when it is incorporated into cycles of performance, feedback, and revision, rather than being limited to providing automatic responses after a task [18].

The results are also consistent with studies that link generative artificial intelligence and learning outcomes in higher education. Available evidence indicates that these tools can facilitate the review and understanding of performance when linked to learning objectives and clearly structured activities [19]. However, the automation of feedback alone does not guarantee educational improvement. Reviews on AI-generated feedback warn that the quality of feedback depends on the instructions provided, the disciplinary content, and academic supervision [20]. In the present study, teacher review of each response allowed the technology to be used as a support resource, without transferring grading responsibility to it.

Participants' perceptions corroborated the academic results. The experimental group obtained higher scores in clarity, usefulness, accessibility, and fairness. The greatest differences were found in the usefulness and accessibility items, indicating that students not only valued the modality used positively but also found greater opportunities to understand and apply the information received. This is consistent with the idea of feedback literacy, where learning is based on the student's ability to understand comments and use them to improve in the future [21].

The difference observed in accessibility is especially relevant for inclusive assessment. Generative technologies enable explanations to be reformulated, levels of detail to be changed, and additional guidance to be provided—features that can help make some learning experiences more flexible [22]. However, these benefits are contingent on factors such as technological availability, digital competencies, and the quality of interaction. Therefore, artificial intelligence should not be regarded as inclusive merely because of its presence, but because of its effective capacity to reduce barriers within the assessment process.

In addition, a greater advantage in descriptive terms was found among students with low initial performance. Specifically, the between-group difference was 12.9 points for low performance, 10.7 points for medium performance, and 8.0 points for high performance. In this regard, research conducted with university students showed that immediate interaction with generative models favored cognitive processes directed at didactic tasks, especially when students had opportunities to request additional explanations or provide explanations [23]. Similarly, studies on feedback generated through artificial intelligence have also found positive evaluations regarding the speed, availability, and degree of detail of the generated comments [24]. These characteristics may be especially useful for students who experience a high degree of initial difficulty.

Perceived equity was also higher in the experimental group, although the difference was smaller than that observed for the utility and accessibility dimensions. This finding can be explained by the fact that assessment equity depends on multiple elements beyond feedback, including consistency of criteria, available opportunities, and participation conditions. Studies on inclusive assessment in higher education have shown that apparently equal procedures can produce

different barriers for students with different needs [25]. In the present study, the use of common rubrics and teacher supervision may have contributed to maintaining equivalent criteria, while AI-mediated feedback expanded the opportunities to understand the aspects requiring improvement.

The interpretation of the effect according to initial performance should be made with caution. Low, medium, and high levels were used primarily for descriptive purposes; the existence of moderation must therefore be established through the interaction term between group and initial score. Furthermore, the smaller difference observed in high-performing students could be partially related to a ceiling effect. Consequently, the results do not allow us to affirm that the intervention exclusively benefits lower-performing students.

Among the limitations are the use of intact academic groups, the intervention in a single course, and the relatively short follow-up duration. Finally, the results correspond to feedback generated with AI support and supervised by an instructor, not to a completely automated system. This distinction is fundamental given the documented differences between the quality of human feedback and that produced exclusively by generative models.

Overall, the findings support the incorporation of artificial intelligence as support for formative assessment when used with explicit criteria, teacher supervision, and opportunities to subsequently apply feedback. The most relevant contribution is not limited to the increase in average performance, but also includes improvements in utility and accessibility and a potentially important advantage among students with lower initial performance.

CONCLUSIONS

Organizational learning demonstrated an important explanatory capacity for organizational citizenship behavior, with $R^2 = 0.620$, but this relationship was not uniform across its dimensions; only 3 of the 7 evaluated dimensions showed statistically significant relationships with OCB.

Strategic leadership was the dimension most strongly associated with organizational citizenship behavior ($\beta = 0.638$; $p < 0.05$). This finding indicates that, in the analyzed model, learning support practices, strategic communication, personnel orientation, and institutional coherence had the strongest associations with voluntary citizenship behaviors.

Significant positive relationships were also found between OCB and team learning ($\beta = 0.227$; $p < 0.05$) and connection with the environment ($\beta = 0.165$; $p < 0.05$). In this institution, collaborative dynamics and interaction with the external and internal needs of the organization were related to a greater presence of citizenship behaviors.

The dimensions of research and dialogue, learning systems, learning opportunities, and collective vision did not show significant direct relationships with OCB. Thus, although participants positively valued these practices, the results do not allow us to affirm that their existence directly translates into greater organizational citizenship behaviors.

Gender did not exert a significant moderating effect on any of the analyzed relationships, since all interaction coefficients presented p values > 0.05 . Consequently, within the studied sample, the strength of the relationships between organizational learning and OCB did not vary significantly according to gender.

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They do not exist.

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