

CITIZEN LINKAGE AND LOCAL GOVERNMENTS FROM BRONFENBRENNER'S ECOLOGY: MULTILEVEL STUDY FOR STUDENT DISRUPTIVE GOVERNANCE PROPOSALS

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Summary:

The study analyzes the citizen engagement of technological students with a local government from Bronfenbrenner's ecological approach. A quantitative, non-experimental and cross-sectional design was applied, 623 surveys were processed with a Likert scale and sociodemographic variables. The results show substantial differences in the micro, meso and macro levels according to age, gender and sex. The theory of collaborative governance and social imaginaries reinforce the understanding of contextual factors about technological students and their link with the community. Disruptive public policy strategies are recommended to institutionalize student participation and foster inclusive environments in the public sector. The findings show the need for multilevel approaches to consolidate democratic processes from technological education.

Keywords: Citizen participation; Technology students; Collaborative governance; Ecological model; Youth

1. Introduction

In recent decades, models of local democracies aimed to consolidate innovative systems of participatory governance that show the need for inclusive global strategies proposed in the New Urban Agenda to involve new social actors in public agendas that respond to the different attitudes and aspirations of those involved; Among them, young people constitute a key demographic group with transformative force and high potential to energize processes of territorial development, civic innovation and social sustainability. (Miura et al., 2025) (United Nations, 2020) (Vercher et al., 2023) (Latin American and Caribbean Youth and the 2030 Agenda for Sustainable Development An Examination from within the United Nations System Working Group on Youth of the Regional Collaborative Platform for Latin America and the Caribbean, n.d.; OECD Public Governance Reviews, 2022)

Technology, as a component added to culture through education, becomes solidary with a mediating effect between man and technology; in Latin America, students of technical and technological education —due to their practical insertion in productive and social processes— constitute a strategic actor for the strengthening of links between the local State and citizens. Despite this, their participation before the public decision-maker is usually underrepresented, their political agency symbolically invisible in the institutional narratives of governance and other shortcomings that foresee the relationship between the absence of formal citizen education and emerging forms of political participation and youth activism, evidence of low structuring of

effective mechanisms of youth participation in the processes of citizen engagement promoted by governments Local. (Alarcon Fioratti et al., 2024) (Bronfman, 2022)

This gap is manifested in the limited attendance or involvement of students in significant actions of civic and cultural co-responsibility that sculpt personal and professional competencies, and in the lack of research that analyzes the symbolic, evaluative and cultural representations – that is, the social imaginaries – that young people construct about their role as community actors. This situation makes it difficult to understand in depth causalities related to apathy, demobilization and diminishing youth protagonism in formal political activities. (Buenaventura Rubio, 2025) (Martínez et al., 2020; ILO, 2025)

The youth representativeness of approximately 20% of the population has led to currents of empowerment under the slogan of working "with", not just "for" young people, to interpret observable practices and their symbolic structures of youth protagonism. In this sense, social imaginaries emerge as a key construct to interpret the representations, expectations and meanings that young people attribute to their relationship with the State, the community and the environment. (OIJ et al., 2023) (UNODC, 2023) (Castoriadis, 1997; Mandache, 2024)

To investigate this critical gap, the present study adopts the Theory of Human Development Ecology as a structuring framework, to explore the multilevel environment and its influence on the behavior and perception of the subject, and to understand the relationship of the citizen with the public apparatus – not as an isolated act, but as a microsystem of dynamic interactions between multiple levels –, including social relations around public management that guarantees the closeness of the citizen with the president, the monitoring and compliance with government transparency; inter-institutional coordination between the various social actors and the redefinition of public problems from a transdisciplinary legal and competence mesosystem; and the macro decisions aligned with the national and cultural context that make up a public sector in general seeking the reconfiguration of an exosystem and macrosystem of participatory policies lacking a metropolitan vision. This perspective is especially useful in scenarios where citizen participation in public management is minimal to examine the interaction between young people, academia, local governments and the community social fabric, framing citizen engagement as a dynamic, relational and contextual process. (Bronfenbrenner, 1979) (Mora Pérez et al., 2024) (Cattaneo & Bocchicchio, 2024) (Álvarez Enríquez, 2021) (Palumbo Pinto et al., 2022)

(Miedijensky & Grinshtain, 2024) Based on similar research, this study takes as a reference the first four levels of the ecological model, which are contextualized in the following table:

Board 1: Ecological model applied to citizen engagement (Bronfenbrenner, 1979)

Level	Description	Indicators
Microsystem	Immediate relationships of the student with his/her immediate social environment and direct participation in institutional activities.	Family and community interaction and support; Participation
Mesosystem	Interactions between the different microsystems of student participation.	Inter-institutional relations; Stewardship
Exosystem	External structures that indirectly influence the student.	Perception of efficacy
Macrosystem	Values, beliefs and cultural norms that shape the student's perception of their role in society.	Values; Roles; environment

This study is relevant for its double contribution, theoretical and applied. From the theoretical point of view, it integrates complementary approaches – development ecology and social imaginaries – in the analysis of the links between youth and the local State. From what is applied, it offers empirical evidence that can guide the design of public policies within the framework of SDG 16 (Peace, justice and strong institutions), of the strategic dimension "P for Partnerships – *partnerships* –" of the 2030 Agenda and of the lines of research in Public Management, Governance and Participation. Its contribution lies in deconstructing the conception of youth as a beneficiary actor in order to make visible their political role in the construction of sustainable democratic territories.

2. Theoretical Framework

2.1. Theory of Human Development Ecology

This theory states that human development is the result of the interaction between the individual and the multiple levels of his environment. These levels include: (i) the microsystem (direct interactions with family, school, and peers); (ii) the mesosystem (connections between microsystems); (iii) the exosystem (institutions that indirectly affect the individual); (iv) the macrosystem (cultural values, norms and ideologies); (v) chronosystem (changes in time) was later included by the author, however, there is no evidence of enforceability to include this level in its application. Recent literature confirms the applicability of this theory to educational and community analysis in multifaceted socio-cultural contexts, (Bronfenbrenner, 1979) (Eriksson et al., 2018) (Lansey et al., 2023; Leinonen et al., 2024; F. Wang et al., 2024)

2.1.1. Microsystem

It alludes to the social environment of the individual and the institutional spaces of citizen coexistence, key to understanding student behavior in the face of social initiatives. The emotional support of the immediate environment directly influences prosocial behavior, where family support and the motivation generated in institutional participatory spaces are decisive in motivating citizen commitment. (Darling & Steinberg, 1993)

2.1.2. Mesosystem

The mesosystem articulates the interaction between microsystems, emphasizing the connection between environments such as the family, school, and other institutions to generate synergistic environments of learning and participation. Effective communication tools and mutual cooperation reinforce institutional co-responsibility, a key factor for student adhesion in sustainable projects with a social impact. (Epstein, 2018)

2.1.3. Exosystem

The exosystem refers to contexts that are indirectly connected to the individual, but that affect their conditions of participation in environments that generate structural conditions for action. Media visibility, access to resources, and the social perception of student representativeness are factors that shape the recognition and continuity of their civic engagement and influence the social validation of the student role. (Bronfenbrenner, 2005; Lerner et al., 2015)

2.1.4. Macrosystem

The macrosystem is made up of values, sociocultural norms and legal frameworks that condition institutional management before the citizen; This level configures the parameters within which the other systems are developed. In Latin America, the literature deals with how the values associated with sustainability, social justice and political participation as the essence of democratic systems affect governance processes. To reduce the feeling of remoteness and difficulty of political understanding, the practices of youth leadership, environmental commitment and historical awareness emerge as structuring dimensions of collective action, in line with the principles of the 2030 Agenda and university social responsibility. (Bronfenbrenner, 1979) (Magul & Cavalcante, 2024) (Kamada, 2024) (United Nations, 2018)

2.2. Social imaginaries

This concept alludes to the shared symbolic constructions that guide collective action are a set of values, ideas and beliefs that define what is legitimate, desirable and possible through the general will in a society, influencing the perception that young people have about politics, the community and their mission as citizens. Recent empirical studies (García & González, 2020; Silveira et al., 2022) highlight the importance of youth imaginaries in the configuration of participatory practices as forms of resistance by minority groups and representations of democracy. (Castoriadis, 1975) (Taylor, 2004) (Rousseau, 2015) (Gasparo, 2025)

2.3. Citizen engagement

Citizen engagement implies the proximity of the individual to public and private actors in the formulation of public policies with a variety of applications, for example in environmental culture where outstanding ways of promoting environments of citizen co-creation on equal terms are evident; In the Latin American context, this notion has been linked to processes of decentralization, participatory planning, and social control. The participation of young people

has gained relevance in international regulatory frameworks such as the 2030 Agenda, SDG 16, and at the South American regional level in public policies for youth, highlighting their role as key actors for democratic sustainability. (Nguyen et al., 2024) (Wampler & Avritzer, 2004) (United Nations, 2023) (ANII 2021-2025, 2022)

2.4. An integrative articulation

The convergence between ecological systems, social imaginaries and collaborative governance allows us to analyze how institutional and symbolic structures shape young people's dispositions towards participation. This research contributes to overcoming reductionist approaches and to recognizing the presence of young people in their territorial political context. This articulation integrates global institutional antecedents, from Latin America, and Ecuador, and is supported by empirical research that reinforces the transnational validity of the proposed analytical model. (United Nations, 2020; UNDP, 2008; UNESCO, 1977) (ILPES & ECLAC, 2023; UNDP, 2008) (Presidency of the Republic of Ecuador, 2024) (Berasaluze Correa / A I N H O & Eus, n.d.; Bricout et al., 2021; Bynner et al., 2023; Clavero Mira et al., 2025; Hütt Herrera & Hernández Cruz, 2023; Persson, 2021)

3. Methodological Design

3.1. Contextual foundation

Technological students from an institute participated in a project to link with society by implementing community citizen linkage services articulated with a local government, aimed at the target population settled in geographical areas with a high vulnerability index in the province of Santa Elena, Ecuador, as part of the promotion of comprehensive protection systems for the guarantee of constitutional rights with emphasis on priority attention groups. (COOTAD, 2010)

In 2010, the population of the province of Santa Elena went from 298,693 inhabitants to an increase of 385,735 in 2022. This represents a growth of approximately 87,042 people in 12 years. The population registered in the rural sector is 183,950 inhabitants, of which 92,386 (50.2%) are men and 91,564 are women (49.8%). The population in the provincial urban perimeter is made up of 201,785 inhabitants, 98,917 (49.0%) men and 102,868 women (51.0%). The population density is close to 84 inhabitants per square kilometer, higher than the national total figure of 70 inhabitants per km², in a territorial extension of Ecuador is 256,370 km². (INEC, 2024)

3.2. Methodological foundation

This chapter agrees with the hypothetical-deductive paradigm and the quantitative approach with a non-experimental design because the variables were not exposed to any manipulation; of a transversal type because it characterized a specific population in a specific place and time, with a descriptive scope because it shows with acuity the dimensions of a community. The research is of an applied and field nature, focused on the characterization of the social imaginaries of technological students with respect to their relationship with local governments. To collect data from a finite and quantitative population, the survey technique was used, through a structured questionnaire of 26 questions, applied to a sample of 623 participants. The answers were measured on a 4-point Likert-type scale (1 = Not at all; 2 = Somewhat agree; 3 = Agree; 4 = Strongly agree), except for the initial six questions that collect sociodemographic

information on a nominal scale. (Hernández et al., 2014) (Manterola et al., 2023)
(Hernández Sampieri & Mendoza Torres, 2018) (Latorre Beltrán et al., 1996)

3.3. Variable operationalization matrix

The operationalization matrix has been designed to empirically represent the fundamental theoretical constructs of the study: Bronfenbrenner's ecology of human development, social imaginaries and the community bonding of the technological student according to the following table:

Board 2. Variables, Dimensions and Indicators and Type of Scale		
Ecological level	Dimension	Indicators
Microsystem	Direct relationships and immediate support	Family and community interaction; Support from the immediate environment; Attendance at assemblies; Student Engagement Joint projects;
Mesosystem	Interagency Connections	Inter-institutional communication; Collaborative agreements; Institutional co-responsibility Dissemination in the media;
Exosystem	External institutional and media influence	Institutional openness; Perception of effectiveness; Community appreciation Institutional coherence with values; Social justice;
Macrosystem	Cultural values, sustainability and leadership	Student leadership; Generational change; Institutional influence; Green practices

3.4. Data collection

As a result of inter-institutional agreements between an Ecuadorian technological institute and a local government, the directors of Enlace Ciudadana informed the students about the implementation of this study, who accessed an online form, which included information about the research project and the anonymous questionnaire with the request for collaboration and consent to statistically use the answers. No personal information, names, surnames, or residence addresses of the informants were required. The survey did not collect email addresses or other personal data from the respondent. The research team never knew the identity of who answered each survey. It was specified that the information analyzed together with the response of other people would serve to obtain a collective scenario on the citizen engagement of students in the social axis of local governments. It was reported that the average response would be around 10 minutes, that participation is completely voluntary, the ethical aspects of the study

were declared and it was recorded that, by answering the questionnaire, the participant has given his free and informed consent for the strictly scientific use of his answers.

3.5 Study population

Board 3. Sociodemographic characterization of participants

Nominal	Age	Gender	Sex	Disability	Ethnic group	Residence	f	(%)
Age	2						234	37,56
Age	1						167	26,81
Age	3						146	23,43
Age	4						62	9,95
Age	5						13	2,09
Age	6						1	0,16
Gender		1					454	72,87
Gender		2					166	26,65
Gender		3					3	0,48
Sex			2				455	73,03
Sex			1				164	26,32
Sex			3				4	0,64
Disability				2			588	94,38
Disability				1			22	3,53
Disability				3			13	2,09
Ethnic group					1		599	96,15
Ethnic group					4		10	1,61
Ethnic group					2		5	0,8
Ethnic group					5		5	0,8
Ethnic group					3		4	0,64
Residence						4	374	60,03
Residence						1	86	13,8
Residence						5	76	12,2
Residence						2	76	12,2
Residence						3	11	1,77

Board 4. Meaning of the numerical codes assigned to the control variables

Control (Nominal)	Variable	Code / Meaning
Age		1: 18–24 years; 2: 25–34 years; 3: 35–44 years; 4:45–54 years; 5: 55–64 years; 6:65 years or older
Gender identity		1: Female; 2: Male; 3: I'd rather not say it
Sex		1: Male; 2: Female; 3: I'd rather not say it

Disability / Functional diversity	1: Yes; 2: No; 3: I prefer not to say it
Ethnic self-identification	1: Mestizo; 2: Indigenous; 3: White; 4: Montubio; 5: Other
Area of residence	1: Regenerated area; 2: Marginal urban area; 3: Non-regularized settlement; 4: Rural area; 5: Other

3.6. Normality test

In order to measure the normality of a sample of 623 individuals, in the present study, the Kolmogorov–Smirnov^a normality test with Lilliefors correction (Kolmogorov–Smirnov^a) was applied in order to verify whether the distributions of the ordinal variables of the questionnaire conformed to a normal distribution, an essential condition to define the applicability of parametric or non-parametric statistical tests in inferential analysis. This test compares the cumulative empirical distribution of the observed data with the cumulative distribution of a theoretical normal distribution. The Kolmogorov–Smirnov statistician D Th It was calculated using the following equation: , where is the empirical cumulative distribution function, is the theoretical cumulative distribution function (normal in this case), denotes the supreme (maximum absolute difference). $D = \sup |Fn(x) - F0(x)|$

In the results obtained for the main variables (Microsystem and Mesosystem), values of the K-S statistic of and , respectively, with bilateral significance were observed. As the significance values are less than 0.05, the null hypothesis of normality is rejected; it is concluded that the variables do not follow a normal distribution and that the use of non-parametric tests such as Spearman and Kruskal–Wallis is justified. $D = 0,402$ $D = 0,414$ $p < 0,000$

Board 5. Kolmogorov-Smirnova normality tests

	Statistical	Gl	Gis.
Microsystem	0,402	623	0,000
Mesosystem	0,414	623	0,000
Exosystem	0,429	623	0,000
Macrosystem	0,428	623	0,000

to. Lilliefors Correction of Significance

3.7. Correlations

To identify the degree of association between the dimensions of Bronfenbrenner's ecological model (Microsystem, Mesosystem, Exosystem and Macrosystem), Spearman's non-parametric bivariate Rho correlation test was applied suitable for ordinal variables that do not meet the assumptions of normality, characteristic of this research, using the equation , where is Spearman's correlation coefficient, is the difference between the ranges of each pair of observations, it is the number of pairs of observations. According to these results, positive and

statistically significant correlations are observed between students' perceptions of their socio-political environment (bilateral sig. = 0.000) between Microsystem vs. Mesosystem, Microsystem vs. Exosystem, Microsystem vs. Macrosystem; The finding reinforces the ecological validity of the model applied to the study of the social imaginary of citizen engagement. $\rho = 1 - (6 * \Sigma d^2) / (n * (n^2 - 1))$ $\rho_{\text{Microsystem vs. Mesosystem}} = 0,595^{**}$ $\rho_{\text{Microsystem vs. Exosystem}} = 0,582^{**}$ $\rho_{\text{Microsystem vs. Macrosystem}} = 0,616^{**}$

Board 6. Spearman's correlation coefficient

Dimension	1	2	3	4
Microsystem	1,000			
Mesosystem	,595**	1,000		
Exosystem	,582**	,619**	1,000	
Macrosystem	,616**	,674**	,744**	1,000

** . The correlation is significant at the 0.01 level (bilateral).

Board 7. Case Processing Overview

	N	%
Valid	623	100,0
Cases Excluded	0	0,0
Total	623	100,0

to. Elimination by list is based on all procedural variables.

Board 8. Reliability Statistics

Cronbach's Alfa	N of elements
0,901	26

Database Transformation and Calculation in SPSS v25

4. Results

This chapter presents the empirical findings obtained from the statistical analysis of the data collected through the questionnaire applied to 623 students from technological institutes in the province of Santa Elena, Ecuador. The analysis has been structured in two levels: descriptive and inferential, with the aim of characterizing the social imaginaries linked to student participation in local governance from Bronfenbrenner's ecological perspective.

4.1 Descriptive results

Board 9. Descriptive statistics

	N	Media	Desv. Deviation	Minimal	Maximum
MICRO	623	13,36	2,095	4	16
MEAT	623	13,44	2,042	7	16
EXO	623	13,59	2,051	4	16
MACRO	623	26,85	4,005	12	32
Age	623	2,23	1,030	1	6

In Table 9 – out of a possible maximum of (16) – the dimensions behave as follows; the Microsystem shows a positive assessment of the mean (13.36) related to the student's close environment as a driver of community bonding; the slight dispersion of the moderate standard deviation (2.09) alludes to some variability in the participant's individual experiences; the Mesosystem (Mean = 13.44) evaluates the student's idea of connection interinstitutional, with a slightly higher mean and consistent deviation (2.04). The Exosystem (Mean = 13.59) reflects the highest mean among the first three with homogeneous variability (2.05), which reflects a favorable perception towards institutional openness and projection. The Macrosystem (Mean = 26.85 out of 32 points) implies a high identification with normative and cultural values associated with participatory governance; The standard deviation (4.01) is the highest, reflecting a greater dispersion of criteria or imaginaries about the social and cultural structure, possibly influenced by sociodemographic variables such as age or residence, which reinforces the hypothesis about the influence of cultural and normative frameworks on youth citizen participation.

4.2 Inferential results: differences between groups

In order to identify possible significant differences in perceptions of community attachment according to sociodemographic variables, Kruskal-Wallis tests were applied, selected for its relevance in the analysis of non-parametric ordinal data derived from Likert scales using the formula where: total number of observations (sum of all groups); : number of groups (categories); : number of observations in the group ; : sum of the ranks in the group ; : Kruskal–Wallis statistic (similar to). $H = (12 / (N * (N + 1))) * \sum (Ri^2 / ni) - 3 * (N + 1)NkniRiiH\chi^2$

H_0H_1 In this test, the Null Hypothesis () is that the distributions of scores in all groups are equal, while the Alternative Hypothesis () at least one group differs significantly from the others; if , it is rejected, concluding that there is at least a significant difference in perceptions between the groups. Kruskal–Wallis does not require normal distribution, is suitable for ordinal variables such as Likert scales, is robust against outliers, and allows comparing three or more groups. $p < 0.05H_0$

Board 10. Ecological model by age groups

Test Statistica,b	MICRO	MEAT	EXO	MACRO
H for Kruskal-Wallis	25,366	19,903	14,063	21,458
G1	5	5	5	5
Asymptotic sig.	,000	,001	,015	,001
to. Kruskal Wallis Test				
b. Grouping variable: Age				

In Table 10, the results show statistically significant differences between age groups in the four dimensions of the ecological model, which empirically supports the hypothesis of the study related to generational variability in social imaginaries about community bonding. In the microsystem, the results ($\chi^2(5) = 25.366$; $p < 0.001$) indicate significant variation in the perceptions of support from the immediate environment, suggesting that the predisposition of community attitudes is modulated by the experiences and responsibilities of each stage of the life cycle. Regarding the mesosystem, a significant difference is also observed ($\chi^2(5) = 19.903$; $p = 0.001$) that could be attributed to different levels of exposure, trust or previous knowledge about inter-institutional collaborative processes. The results of the exosystem ($\chi^2(5) = 14.063$; $p = 0.015$) reveal differences in perception that assume that the structures indirectly involved influence everyday life. The macrosystem ($\chi^2(5) = 21.458$; $p = 0.001$) evidences student understanding of the normative and cultural principles that structure participation with social justice and local democracy.

Board 11. Eco-model by gender

Test Statistica,b	MICRO	MEAT	EXO	MACRO
H for Kruskal-Wallis	9,438	4,640	1,519	8,012
G1	2	2	2	2
Asymptotic sig.	,009	,098	,468	,018
to. Kruskal Wallis Test				
b. Grouping variable: Gender identity				

In Table 11, the results obtained from the microsystem ($H = 9.438$; $df = 2$; $p = 0.009$) indicate statistically significant differences that suggest that gender affects the willingness to interact with the immediate environment in processes of citizen participation, which is related to symbolic constructions of role and belonging. In the macrosystem ($H = 8.012$; $df = 2$; $p = 0.018$) cultural and normative representations differ according to gender identity associated with sociocultural perspectives that assign different levels of political involvement to genders. The mesosystem ($H = 4.640$; $p = 0.098$) and exosystem ($H = 1.519$; $p = 0.468$) suggest a relatively homogeneous perception of gender identities as a significant variable in the social construction of imaginaries at at least two key ecological levels.

Board 12. Eco-friendly model by sex

Test Statistica,b	MICRO	MEAT	EXO	MACRO
H for Kruskal-Wallis	7,585	6,375	1,759	7,942
G1	2	2	2	2
Asymptotic sig. to. Kruskal Wallis Test	,023	,041	,415	,019
b. Grouping variable: Sex				

Regarding Table 12, the microsystem responds to a value of $H = 7.585$ with $df = 2$ and $p = 0.023$; inference that the gender of the participants significantly influences how direct relationships are valued as a support for civic action. The mesosystem, $H = 6.375$ with $p = 0.041$, intervened by organizational structures, expresses differentiated institutional experiences that can be attributed to factors of access, voice or representation. The macrosystem, $H = 7.942$ and $p = 0.019$, exposes sociocultural ideals associated with sex that determine student beliefs about the principles of local governance. The exosystem ($H = 1.759$; $p = 0.415$) reveals the shared perception between the sexes about the indirect influence of institutional environments. These findings confirm that biological sex is a valid segmentation factor in the structuring of social imaginaries related to citizen bonding.

Board 13. Ecological model according to disabilities

Test Statistica,b	MICRO	MEAT	EXO	MACRO
H for Kruskal-Wallis	,576	,744	,495	,423
G1	2	2	2	2
Asymptotic sig. to. Kruskal Wallis Test	,750	,689	,781	,810
b. Grouping variable: Disability Functional diversity				

Table 13 explores three categories whose asymptotic significance values ($p > 0.05$) do not show significant differences between groups in all dimensions of the ecological model. This result with a statistically homogeneous result suggests that the condition of disability or functional diversity does not significantly influence the way in which students perceive their community versus local government ties; however, it does not exclude the possibility of structural, symbolic or attitudinal barriers not captured by the indicators used.

Board 14. Ecological model by ethnicity

Test Statistica,b	MICRO	MEAT	EXO	MACRO
H for Kruskal-Wallis	5,067	8,468	4,069	7,654
G1	4	4	4	4
Asymptotic sig. to. Kruskal Wallis Test	,281	,076	,397	,105
b. Grouping variable: Free and voluntary ethnic self-identification				

In Table 14, none of the dimensions analyzed presents statistically significant differences at the level $\alpha = 0.05$, although it is important to note that the dimension of the mesosystem ($p = 0.076$) is close to this threshold, which could suggest latent trends or subtle differences in the perception of the quality of the links between the educational institute and local governments according to the ethnic variable. However, in socio-political contexts of structural inequality and complex interethnic relations, the absence of statistical significance should not be understood as substantive equality. Material conditions, symbolic stigmas, or gaps in access to information may not be fully reflected on Likert scales, especially in samples where minority groups may be underrepresented.

Board 15. Ecological model according to area of residence

Test Statistica,b	MICRO	MEAT	EXO	MACRO
H for Kruskal-Wallis	5,773	5,737	3,507	4,711
G1	4	4	4	4
Asymptotic sig. to. Kruskal Wallis Test	,217	,220	,477	,318
b. Grouping variable: Zone of residence				

In Table 15, the asymptotic significance values ($p > 0.05$) were as follows: Microsystem ($p = 0.217$), Mesosystem ($p = 0.220$), Exosystem ($p = 0.477$) and Macrosystem ($p = 0.318$). These results suggest that there are no substantial variations in the social imaginaries about community engagement according to the territorial origin of the students, attributed to the result of equitable institutional policies of access to outreach projects and academic socialization processes that partially neutralize the structural inequalities of the residential environment.

5. Discussion of results

According to the results, the citizen link of students with the local government is conditioned by multilevel factors according to the ecological model of development. In the microsystem, the support of the immediate social circle has a direct effect on the civic participation of young people as an emotional and motivational support that generates prosocial behaviors and community commitment. Our findings reinforce that a favorable social circle – families that value participation and teachers who promote social initiatives – enhances the inclination of technological students to get involved in public service projects. This coincides with previous studies that underscore the humanistic academic role of promoting a democratic civic school climate that elevates knowledge and returns the political interest of students. On the contrary, indifferent family or school contexts can limit young people's motivation towards the public. (Bronfenbrenner, 1979) (Darling & Steinberg, 1993) (Eriksson et al., 2018) (Gómez & Suárez, 2023)

In the mesosystem, the interaction between academia and local governments emerges as a critical factor. The results show that students adhere to social impact initiatives in the presence of cooperation agreements, service-learning programs or pre-professional internships in prefectures creates synergistic environments of learning and participation favorable to the application of technological knowledge to real problems in the community. Related research evidenced remarkable results in youth governance following the implementation of replicable designs of

community participatory models guided by social workers. (Epstein, 2018) (Y. Wang et al., 2025)

At the exosystem level, indirect factors such as institutional support, media coverage, and available resources influence the conditions of student participation and improve social recognition and continuity of engagement. This is consistent with , who argue that broader institutional contexts can enable or hinder the individual's action. The results give relevance to the symbolic validation of the environment – such as awards, dissemination or public mentions of student work – due to the degree of social approval of the civic role that reinforces their identity as citizen actors. Conversely, the lack of local institutionalized mechanisms to involve young people in public deliberation, the absence of external incentives, and distrust of authorities lead to apathy, exclusion, and other barriers frequently mentioned by young people. Our results reflect this reality: where local government does not offer channels or recognize youth contributions, the participation of tech students is marginal. (Bronfenbrenner, 2005; Lerner et al., 2015) (Park, 2023)

In the macrosystem, the country's cultural values, social norms and legal frameworks shape the horizon of possibilities for participation in young people's social imaginaries that operate as filters of reality, since they define what is "possible" and what is "desirable" in collective action, influencing young people's trust in institutions and their sense of political effectiveness. Previous studies highlight how collective imaginaries associated with social justice, participatory democracy and sustainable development act as drivers of youth citizen action. A society that espouses ideals of equity, transparency and co-responsibility is fertile ground for young people who internalize these values and show a greater willingness to get involved in public affairs. In this way, international conventions such as the United Nations 2030 Agenda (SDG 16) promote the inclusion of young people in the construction of solid institutions as key agents of sustainable development. In fact, the social imaginaries shared among young people profoundly shape their political behavior; If young people imagine that activism "does not work" or is not their own, they will hardly recognize their own actions (for example, on social networks) as civic participation. (Castoriadis, 1997; Taylor, 2004) (Durán et al., 2025) (Park, 2023) (United Nations, 2023) (Allaste & Tiidenberg, 2015)

The results also reflect inequality gaps in participation. In the bivariate analyses of the study, differences in linkage were observed according to sociodemographic variables (e.g., parents' educational level, access to technology, etc.). Therefore, it is crucial that any citizen engagement initiative considers equity criteria, so as not to replicate in the participatory sphere the same inequalities that exist in educational and economic access. The integrative interpretation of these results confirms the usefulness of the ecological and collaborative governance approach to understanding youth participation.

The findings highlight positive and negative factors at multiple levels (micro, meso, exo, macro) that configure the link between the technological student and the public apparatus; Recognizing the interaction between levels is essential: for example, we detect that the beneficial effect of a strong mesosystem (institute-government alliance) is fully manifested when it is accompanied by a microsystem of support (family and motivating teachers). In other words, the positive effects of a collaborative institution are channeled through the student's close relationships. This complex view avoids reductionist explanations and provides a holistic analytical model where the agency of youth is understood within its sociocultural territory. The

theoretical implications and practical recommendations derived from these findings are presented below.

6. Practical Recommendations for Disruptive Public Policies

6.1 Institutionalize student participation: Local governments in developing countries should include sustainable mechanisms with binding power in various areas of interest to involve students, especially from technological institutes, in public management. Evidence suggests that when there are institutionalized channels, young people feel heard and assume co-responsibility in decisions. A disruptive policy, in this sense, could be the rotational integration of young representatives with voice and vote in local governments, periodically renewing these positions to give opportunities to more students. Other recommendations include formal incentive and reward plans, official recognition, community service certifications, or academic credit for participation. (Park, 2023)

6.2 Promote co-creation and civic innovation: Leveraging the technological skills of these students, governments should prioritize public solution co-creation initiatives and citizen innovation labs where young technologists, officials, and the community co-design applications, systems, or proposals to solve local problems. A practical recommendation is that municipalities in developing countries comply with specific participatory budgets for youth-led projects, allowing even people from marginalized sectors to channel resources to their communities, which is a disruptive turn in traditional policies. (Wampler, 2012)

6.3 Adapt participation strategies to the digital reality: Public policies must update their methods of communication and participation by developing interactive digital platforms where students can act in real time with the local government and capture the attention of young people on their own terms. The use of intuitive and visual tools could provide immediate feedback that leads to concrete action with tangible results of student engagement in the short term. The adoption of technologies must be accompanied by civic digital literacy campaigns, teaching how to use these platforms safely and effectively to influence the public.

6.4 Foster an inclusive participatory culture: Disruptive policies should also aim to demystify the public apparatus, and build trust and change the local political culture towards a more inclusive one for youth. This involves incorporating citizenship training and leadership content in higher technical education into real service-based learning projects. It is also suggested to organize intergenerational mentoring programs, linking students with public servants as experiential learning about the internal institutional functioning. Likewise, to expand opportunities, it is recommended to prioritize the inclusion of young people from historically excluded sectors (rural, indigenous, low-income or women in STEM areas) in all these programs. This could be achieved through quotas or targeted calls, mobility grants for geographically distant students to participate in events, and adapting schedules and formats of participation for those who work or have family responsibilities.

6.5 Evaluation and sustainability: It is recommended to implement participatory evaluation systems of these policies through innovative processes of citizen participation where young people themselves should be involved in measuring the impact of the initiatives. This feedback will allow programs to be adjusted on the fly and maintain their relevance. Sustainability over time is key, so it is recommended to anchor these policies in local regulatory frameworks, so that youth participation is institutionalized and as part of the local governance model beyond temporary political wills.

The new socio-political realities – including contexts of crisis, youth unemployment, distrust of democracy – demand bold responses to articulate a new paradigm of disruptive public policy. Doing public management including youth as a strategic partner of the public sector addresses the lack of opportunities and revitalizes democratic governance in developing countries. As the UN points out, significantly involving young people, not only a (United Nations, 2018) *means* to form better citizens, but an *end* in itself in decision-making, is an investment with immediate and long-term returns, strengthening social cohesion and trust in institutions.

The ability of our societies to move towards more inclusive and democratic development models in the years to come will depend to a large extent on how effectively we implement these measures.

7. Annexes

7.1 Conflicts of interest:

The authors declare that they have no potential conflicts of interest with respect to the research, authorship and/or publication, which may have influenced the interpretation of the results of this article.

7.2 Funding

The authors declare that they have not received financial support from any person or institution for the research, authorship and/or publication of this article.

7.3 Declaration of originality:

The article is the result of original and unpublished research, and has not been previously submitted or published in another journal.

7.4 Ethical considerations:

Informed consent was guaranteed for all participants. The information was treated with confidentiality and anonymity, in accordance with the ethical principles of social research.

7.5 Authorship:

The manuscript was prepared by the team made up of the authors, who have actively participated in all stages of the research process.

7.6 Addendum

Appendix A.

Reference framework for the survey "Citizen Linkage and Local Governments from Bronfenbrenner's Ecology: Multilevel Study for Student Disruptive Governance Proposals".

Board 16. Database coding

Code	Age	Gender identity	Sex	Disability Functional diversity	Free and voluntary ethnic self-identification	Area of residence	Quantitative
1	18-24	Female	Man	Yes	Mongrel	Regenerated area	Not at all agreed
2	25-34	Male	Woman	No	Indigenous	Marginal urban area	A little agreement

3	35-44	I'd rather not say it	I'd rather not say it	I'd rather not say it	White	Non-regularized settlement	I agree
4	45-54				Montubio	Rural area	Totally agree
5	55-64				Other	Other	
6	65+						

Appendix B.

Operationalization of variables for the survey "Citizen linkage and local governments from Bronfenbrenner's Ecology: multilevel study for proposals for student disruptive governance".

Board 17. Operationalization

Variable Type	Questionnaire Items	Ecological level	Dimension	Indicators
Ordinal	P07, P08, P17, P18	Microsystem	Direct relationships and immediate support	Family and community interaction; Support from the immediate environment; Attendance at assemblies; Student Engagement
Ordinal	P09, P10, P19, P20	Mesosystem	Interagency Connections	Joint projects; Inter-institutional communication; Collaborative agreements; Institutional co-responsibility
Ordinal	P11, P12, P21, P22	Exosystem	External institutional and media influence	Dissemination in the media; Institutional openness; Perception of effectiveness; Community appreciation
Ordinal	P13, P14, P23, P24, P15, P16, P25, P26	Macrosystem	Cultural sustainability values, and leadership	Institutional coherence with values; Social justice; Student leadership; Generational change; Institutional influence; Green practices

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