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Service-learning in university education: an innovative strategy for professionals committed to sustainable development

Aprendizaje-servicio en la formación universitaria: estrategia innovadora para profesionales comprometidos con el desarrollo sostenible

Aprendizagem-serviço na formação universitária: estratégia inovadora para profissionais comprometidos com o desenvolvimento sustentável

Abstract

Introduction: this study examines the relevance of Service-Learning (SL) in Higher Education Institutions as a strategic axis to strengthen professional training and social engagement. The methodology aligns with national development plans, articulating teaching and outreach as substantive university functions. **Objective:** to assess perceptions regarding the implementation of SL, identifying methodological needs and gaps to ensure its application is coherent with social demands and national guidelines. **Method:** a mixed-methods study with a concurrent triangulation design. Participants included faculty members and students from the Regional University Center of Chontales, along with institutional and community leaders. **Results:** findings reveal strong interest and positive attitudes, highlighting the potential of SL to integrate theory and practice. Its contribution to ethical commitment and curricular relevance is evident; however, a gap persists between the positive valuation of SL and its effective institutionalization. **Conclusion:** SL emerges as a strategy with high formative value and technical feasibility, essential for strengthening the university-society relationship and contributing to sustainable human development.

Keywords: social engagement, community development, Service-Learning, pedagogical innovation

Resumen

Introducción: este estudio analiza la pertinencia del Aprendizaje-Servicio (ApS) en las Instituciones de Educación Superior como eje estratégico para fortalecer la formación profesional y el compromiso social. La metodología se alinea con los planes de desarrollo nacional, articulando la docencia y la extensión como funciones sustantivas universitarias.

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Objetivo: valorar la percepción sobre la aplicación del ApS, identificando necesidades y brechas metodológicas para su implementación en coherencia con las demandas sociales y los lineamientos nacionales. **Método:** investigación de enfoque mixto con diseño de triangulación concurrente. Participaron docentes y estudiantes del Centro Universitario Regional de Chontales, junto a líderes institucionales y comunitarios. **Resultados:** los hallazgos revelan un alto interés y apertura actitudinal, destacando el potencial del ApS para integrar teoría y praxis. Se evidencia su aporte al compromiso ético y a la pertinencia curricular; no obstante, se identifica una brecha entre la valoración positiva y la institucionalización efectiva de la metodología. **Conclusión:** el ApS se proyecta como una estrategia de alto valor formativo y viabilidad técnica, esencial para consolidar el vínculo universidad-sociedad y contribuir al desarrollo humano sostenible.

Palabras clave: compromiso social, desarrollo comunitario, Aprendizaje-Servicio, innovación pedagógica

Resumo

Introdução: este estudo analisa a pertinência da Aprendizagem-Serviço (AS) nas Instituições de Educação Superior como eixo estratégico para fortalecer a formação profissional e o compromisso social. A metodologia está alinhada aos planos nacionais de desenvolvimento, articulando o ensino e a extensão como funções universitárias substantivas. **Objetivo:** avaliar a percepção sobre a aplicação da AS, identificando necessidades e lacunas metodológicas para sua implementação em coerência com as demandas sociais e as diretrizes nacionais. **Método:** pesquisa de abordagem mista com desenho de triangulação concurrente. Participaram docentes e estudantes do Centro Universitário Regional de Chontales, além de líderes institucionais e comunitários. **Resultados:** os achados revelam elevado interesse e abertura atitudinal, destacando o potencial da AS para integrar teoria e prática. Evidencia-se sua contribuição para o compromisso ético e para a pertinência curricular; contudo, identifica-se uma lacuna entre a avaliação positiva e a institucionalização efetiva da metodologia. **Conclusão:** a AS se projeta como uma estratégia de alto valor formativo e viabilidade técnica, essencial para consolidar o vínculo universidade-sociedade e contribuir para o desenvolvimento humano sustentável.

Palavras-chave: compromisso social, desenvolvimento comunitário, Aprendizagem-Serviço, inovação pedagógica



Introduction

Currently, institutions of higher education (IHEs) face the challenge of training professionals who, in addition to acquiring technical and scientific skills, develop a robust social commitment aimed at addressing real community issues. While curricula have integrated competencies related to social impact, challenges remain in translating these into concrete educational experiences that effectively bridge institutional learning with community needs, which are further influenced by limitations in logistical resources and human capital.

Caire Espinoza (2024), drawing from his experience, identifies three key certainties for the implementation of Service-Learning (SL): this methodology promotes the development of empathetic skills among students; it should be understood as a comprehensive approach rather than merely a sporadic learning strategy, as it requires a deep understanding of phenomena and an adequate approach to addressing issues; and it fosters the cultivation of active citizenship. In this context, SL offers opportunities for students to develop essential technical, scientific, and social competencies necessary for the sustainability of communities, enhancing a more intimate and sensitive connection with the struggles of others.

Service-Learning is considered a transformative mixed educational methodology that combines learning with community service, proving to be an effective tool for linking students with real community issues in response to social demands (González & Rodríguez, 2021). This methodology provides guidelines for future professionals to develop the theoretical and practical skills needed in the workforce, offering solutions to pressing problems faced by individuals through community service projects tailored to various contexts.

These experiences have allowed students to learn by applying knowledge in social settings while simultaneously contributing to the resolution of specific problems in collaboration with community stakeholders. Nevertheless, the implementation of SL in IHEs still presents obstacles, such as the absence of a unified methodological framework that facilitates its adoption, resistance to change in pedagogical practices, and limitations in using technologies that promote the integration of university and community efforts, alongside institutional constraints that affect its sustainability (González-Rabanal, 2021). The implementation of this strategy demands an additional commitment from faculty, students, and community stakeholders, ranging from the internalization of SL experiences and the willingness to apply them to the systematic collection and dissemination of results.

In the Latin American context, various experiences have highlighted the prominent role of students in SL. In the state of Querétaro, Mexico, its application through an activity plan aimed at improving coexistence in a school observatory demonstrated the central role of students in diagnosing and selecting the themes to be addressed, showcasing that SL contributes to both the acquisition of theoretical knowledge and the formation of social and community values (Vázquez-Verdera, 2015). These experiences underscore the importance of student involvement in identifying social issues and designing community projects, moving beyond viewing these practices as mere academic requirements.

Research by Platis (2023) and Capobianco et al. (2021) has evidenced a

growing trend to evaluate the impact of SL on civic training and the social competencies of emerging populations, as well as their engagement with vulnerable groups. However, the complexity of systematizing the enhancement of student competencies according to the intervened scenarios, along with the effects on the communities where these experiences take place, is acknowledged. Nicaragua has a policy on extension that generates a significant volume of social actions; however, the task of demonstrating its impact through systematic processes and scientific dissemination is still underway.

In recent decades, IHEs have assumed a key role in training professionals capable of responding not only to labor market demands but also to the social challenges of the global community. Despite this, significant gaps persist between academic learning and the actual needs of communities (Rodríguez-Farías, 2024). Among these gaps are the insufficient internalization of SL by students, faculty, and communities, and an unequal participation of stakeholders in social projects, which are sometimes viewed more as academic requirements than as processes of community development. These gaps limit the development of genuine social commitment among students and restrict the potential of IHEs as transformative agents of society (González et al., 2021).

Sigmon (1979) articulated three fundamental principles of SL: services must be governed by those who receive them; providers can learn effectively as long as they maintain meaningful control over their learning; and the process is centered on collaboration between the community and academic knowledge, facilitated through experiential learning that supports the holistic development of students. In this regard, Escofet and Bernal (2024) and Chan et al. (2025) highlight the urgent need for SL in contexts that require a strong social commitment from IHEs, as it configures an innovative pedagogical methodology that integrates learning with community-based social projects, allowing students to apply theoretical knowledge in real-world settings while contributing to the resolution of specific issues.

This approach merges elements of active and participatory pedagogy, promoting talent development, strengthening professional capabilities, and fostering ethical values such as social responsibility and civic engagement, all while reinforcing the university-community connection and enhancing sustainable development.

However, the implementation of SL within IHEs faces persistent challenges, including the lack of a unified methodological framework, resistance to change among students, faculty, and community stakeholders, as well as technological and logistical constraints hindering its expansion (Butin, 2010; Gómez, 2024). These barriers underscore the need for innovation in the design and execution of SL experiences, particularly in vulnerable contexts where communities confront pressing needs and limited resources. This necessitates collaborative efforts between university and community actors from the outset of experiences and consensual decision-making aimed at sustainable community development.

In this context, the present research addresses the challenges of implementing Service-Learning in Nicaragua's higher education institutions, particularly in areas like Chontales, where a socially active extension policy coexists

with limited systematic documentation of the impact of these experiences. The problem focuses on the gaps between the potential for formative and community development through SL and the real conditions for its institutionalization, effective stakeholder participation, and documentation of outcomes in the Nicaraguan academic realm.

The study fits within a framework of policies and reference frameworks that guide the educational and social development of the country. It contributes to the Research Lines of UNAN-Managua, particularly in CED-1.1: Educational Systems, Their Challenges and Perspectives, and CED-1.5: Citizen Formation as a Challenge of Contemporary Society, within the axis CED-1: Education for Development. Furthermore, it aligns with the National Education Strategy 2024-2026, specifically with EJE 11: Research and Innovation, aimed at promoting scientific research and innovation among students and faculty (CNE, 2024); with the Plan to Fight Poverty and Foster Human Development, which emphasizes talent preparation from higher education and comprehensive university management (GRUN, 2021); and with the Sustainable Development Goals, particularly Goal 1: End poverty in all its forms (UN, 2015; Amiano et al., 2024).

Within this collaborative framework, the research recognizes the necessity to revisit and systematize the outcomes of pedagogical practices based on SL as a key tool for strengthening the connection between IHEs and socially committed communities, generating contributions from academia that bolster university outreach efforts. In this context, the central research question guiding the study was: How is the Service-Learning strategy perceived and implemented in the higher education institutions of Nicaragua, and what needs and academic guidelines emerge for its effective incorporation into professional training and community development?

Based on this inquiry, the study aimed to evaluate perceptions regarding the application of Service-Learning (SL) in higher education, identifying methodological needs and gaps for its implementation in coherence with social demands and national guidelines.

Finally, the article is structured into four sections: first, the theoretical framework and relevance of Service-Learning are established in relation to national education and development policies in Nicaragua; second, the methodological pathway based on a mixed-methods approach using concurrent triangulation is described; the third section presents and discusses the results, contrasting the perceptions of faculty, students, and community leaders to identify operational gaps; and lastly, an integrative proposal is outlined, aimed at advancing towards the curricular institutionalization of SL, ensuring that university education responds ethically and with quality to the challenges of the environment while generating scientific evidence that supports its replicability.

Methods and materials

The research was grounded in a mixed-methods approach (qualitative-quantitative), following the design of concurrent triangulation proposed by Creswell

and Plano (2018), which allows for the complementary integration of numerical and qualitative data. The study was structured around four transversal axes: the transformative methodology of Service-Learning (SL), the university-community linkage, integral training, and contextual innovation.

Quantitative phase and sampling

For the quantitative component, a finite population of $N = 468$ individuals was considered, comprising students from the Medicine and Nursing programs at UNAN-Managua (CUR-Chontales) and teaching staff. The sample size was determined using the formula by Scheaffer and Mendenhall (2006), assuming a confidence level of 90% and a margin of error of 5%, an appropriate criterion for applied studies in higher education where a balance is sought between statistical precision and the operational feasibility of data collection. Under these parameters, a sample of $n = 171$ participants was obtained.

To ensure representativeness, a stratified random sampling approach with proportional allocation was applied, using three strata of interest: Nursing students, Medicine students, and faculty members. Participants were randomly selected within each stratum from the official enrollment and faculty lists, respecting the relative weight of each group in the total population (Table 1). This procedure reduces standard error and ensures that inferences regarding the implementation of SL take into account the academic peculiarities of each program.

Table 1

Sample size and distribution

Group	Population (N)	Proportional Calculation	Sample (ni)	Relative Weight (%)
Nursing Students	170	$(170/468) \times 171$	54	31.6%
Medical Students	148	$(148/468) \times 171$	62	36.3%
Teachers	150	$(150/468) \times 171$	55	32.1%
Total	468		171	100%

Source: Own elaboration based on enrollment and faculty records (2023).

As shown in Table 1, the sampling process ensured a proportional distribution among the three analyzed strata, maintaining correspondence with the original finite population. The stratum of medical students represents the largest proportion of the sample (36.3%), followed by teachers (32.1%) and nursing students (31.6%), providing an adequate level of representativeness for the analysis of study variables and group comparisons.

Qualitative phase and study subjects

For the qualitative phase, a theoretical convenience sample was formed,

consisting of 50 key stakeholders associated with the communities and institutions where direct learning processes occur, in addition to teachers involved in the quantitative component. The selection of informants was based on criteria of appropriateness, previous experience in social intervention processes, and participation in activities related to Service-Learning, until theoretical saturation was reached in the analyzed categories.

Two focus groups were established, comprising 17 teachers and 13 community leaders, aimed at deepening perceptions, experiences, and assessments regarding the implementation of SL and its contribution to community development.

Data collection instruments

For the quantitative component, two structured questionnaires were administered, one for students and the other for teachers, focused on capturing perceptions about the implementation of Service-Learning and its contribution to integral education. Each questionnaire included sociodemographic data and Likert-type items that operationalized the dimensions defined in the study (SL methodology, university-community linkage, integral training, and contextual innovation). Indicators such as formative impact (contribution to professional and ethical profile), social commitment (values and responsibility), theory-practice linkage, familiarity with the SL term, and participation in SL projects were analyzed as categories in the results.

The questionnaires underwent content validation through expert judgment, which assessed the clarity, coherence, and relevance of the items concerning these dimensions and indicators, allowing for adjustments in wording and the order of specific questions prior to their final implementation.

In the qualitative component, an open-ended question guide was utilized for focus groups with teachers and community leaders, centered on their experience with SL, the conditions for its implementation, and its impact on communities. The guide was organized around thematic axes that mirrored the quantitative dimensions and indicators (formative impact, social commitment, theory-practice linkage, familiarity with SL, and participation in projects), enabling the emergent categories to be subsequently contrasted with numerical findings.

Additionally, a document analysis of regulations and institutional documents related to higher education policy and competency-based curricula was conducted to contextualize SL practices and contrast the empirical findings with the existing normative framework regarding social linkage, competency-based training, and university social responsibility.

These dimensions and indicators were later grouped into three integrative analytical axes: attitudinal perception towards SL, identification of implementation needs, and innovation proposals aimed at sustainability and social development. These axes guided both the presentation of results and the triangulation process.

Analysis procedure and triangulation

The treatment of quantitative data was performed using descriptive statistics supported by SPSS software, yielding frequency distributions and measures of central tendency for the main study variables. In the qualitative component,

thematic analysis was conducted from open coding processes and categorization of focus group discussions, utilizing ATLAS.ti software to organize and relate units of meaning.

Subsequently, a convergent concurrent triangulation approach was applied, integrating the quantitative and qualitative findings into an integration matrix that allowed for the comparison of statistical trends and discursive perceptions based on the analysis categories and study objectives. The triangulation was structured around the three defined analytical axes: in the attitudinal perception axis, the high acceptance of SL was examined against the backdrop of existing conceptual confusions; in the identification of needs, the demands for training, teacher support, and joint planning with community leaders were contrasted; and in the innovation proposal, interests in sustainability, community health, environment, and technology projects were articulated, recognizing SL as a pivotal axis for bridging the gap between academia and human development.

Results and discussion

The implementation of Service-Learning (SL) at CUR-Chontales, UNAN-Managua, yielded findings that highlight a critical gap between the perceptions of stakeholders and operational realities, necessitating a comprehensive intervention proposal.

Analysis of perception and participation

Table 2 summarizes the quantitative trends regarding perception and participation. A strong appreciation for SL as a driver of integral education is noted, with high percentages for formative impact, social commitment, and theory-practice linkage. However, the data reveal a low systematic participation rate (7%), indicating that SL has not yet been institutionalized as a transversal practice within the curriculum.

Table 2

Summary of quantitative results: Perception and Participation

Key Indicator / Category	Students (n=116)	Teachers (n=55)
Formative Impact: contribution to professional and ethical profile	82% (S/CS)	80% (S/CS)
Social Commitment: promotion of values and responsibility	88% (S/CS)	84% (S/CS)
Linkage: effective connection between theory and practice	84% (S/CS)	90% (S/CS)
Familiarization: full knowledge of the term "SL"	18% (S)	24% (S)
Participation: active involvement in SL projects	7% (S)	7% (S)

Source: Own elaboration based on surveys (2025).

Note. S (Always), CS (Almost Always).

The data presented in Table 2 expose a fundamental diagnostic paradox: while there is a significant consensus regarding the ethical and formative value of Service-Learning, this recognition has not translated into widespread practice. The contrast between the high valuation of social commitment (88% among students) and the minimal systematic participation (7% in both groups) suggests that SL operates under a logic of exceptionality rather than as a structuring axis of education.

This asymmetry indicates that, although students and teachers possess the necessary human sensitivity for community engagement, the absence of a formal institutional structure limits these efforts to isolated initiatives. Consequently, the positive perception acts as a potential catalyst that, to close the operational gap, requires a normative transition that transcends voluntarism and consolidates the methodology as a mandatory, systematic learning experience.

Triangulation and gap diagnosis

The integration of quantitative and qualitative approaches, summarized in Table 3, provides a holistic view of the researched reality. The analysis shows that the identified gap does not stem from a lack of interest or willingness among stakeholders, but rather from a void in methodological definition and institutional structure that would imbue social interactions with pedagogical significance.

While quantitative indicators reflect a favorable attitude and alignment with national normative frameworks, the qualitative phase reveals that such willingness materializes in isolated actions with limited pedagogical reflection, where SL tends to be confused with traditional clinical or professional practices.

Table 3

Triangulation of results: Synthesis of Convergences and Divergences

Study Dimensions	Quantitative Findings	Qualitative Findings	Triangulation Analysis
Attitudinal Perception	High acceptance of SL and alignment with national plans.	Conceptual confusion: SL is associated with clinical and professional practices.	Divergence: Political will and favorable attitudes exist, but a shared and differentiated theoretical foundation of SL is lacking. Convergence: Stakeholders call for a less paternalistic, more participatory model, with shared responsibility between university and community.
Identification of Needs	Demand for training and greater teacher support.	Need for joint planning with community leaders and clarity in roles.	
Innovation Proposal	Interest in sustainability and social	Proposals in community health,	Overall Synthesis: SL emerges as a potential axis for bridging the gap

development projects.	environment, and technology from local contexts.	between academia and human development.
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Source: Own elaboration (2025), based on the triangulation of quantitative results (surveys of teachers and students) and qualitative results (interviews with community leaders and focus groups) at CUR-Chontales, UNAN-Managua.

The synthesis presented in Table 3 indicates that the central problem does not lie in attitudinal resistance, but in the absence of a formal methodological structure that differentiates SL from other practices and integrates it into the curriculum. This definitional gap suggests that, while the university has fostered a service culture aligned with national development policies, it has not yet consolidated the component of academic reflection that is indispensable for SL. When contrasting quantitative enthusiasm with qualitative conceptual imprecision, it becomes clear that the transition from voluntary service to educational innovation requires institutional mediation to transform territorial experiences into evaluable and systematized scientific knowledge.

Discussion: towards a comprehensive proposal for innovation and pedagogical sovereignty

The research indicates that Service-Learning (SL) at CUR-Chontales is currently in a phase of methodological latency: there is fertile ground due to the high receptivity of stakeholders, but implementation faces a structural reciprocity gap. As noted by Balbi et al. (2023) and Ortiz and Macuch (2022), SL only transcends mere assistance when it fosters prosocial attitudes and when the community becomes an active partner in learning. In this study, the community of Juigalpa perceives the university presence mainly in a patient-receiver dynamic, revealing that bidirectionality remains more of a theoretical aspiration than a consolidated practice.

This conceptual ambiguity is critical: while acceptance and appreciation rates for social commitment are high, qualitative discourses show that SL is diluted among traditional professional practices, where the focus is primarily on the teacher-student dyad, with the community occupying a secondary role. This "clinical practice" obscures the potential of SL as a strategy for citizenship training and the building of critical citizenship. Although normative tools such as extension policies and frameworks for university social responsibility exist, the absence of a differentiated methodological framework prevents social commitment from becoming fully realized as cognitive capital.

As Souza and Silva (2024) assert, the SL methodology must ensure that all stakeholders retain meaningful control over the process so that service transforms into a critical and evaluable learning experience rather than merely an extracurricular activity. In this respect, the results from CUR-Chontales indicate the need to transition from isolated interventions to structured pedagogical devices with explicit learning objectives, defined evaluation criteria, and systematic spaces for joint reflection among students, teachers, and the community.

To bridge this gap, the comprehensive proposal arising from the research

suggests integrating SL as a transversal component of the curriculum rather than viewing it as an appendage to teaching. This alignment should resonate with the National Plan to Fight Poverty and the National Education Strategy, as well as the frameworks for university social responsibility across Latin America. The focus should not solely be on relocating students to the community; instead, the Juigalpa community should be recognized as a living classroom of popular knowledge that dialogues with academic knowledge under more horizontal conditions.

Finally, as Cid-Romero (2025) and Turk and Pearl (2021) argue, genuine pedagogical innovation occurs when social commitment enhances learning outcomes through critical reflection and the production of context-specific knowledge. This viewpoint aligns with international experiences in institutionalizing SL (e.g., ERASMUS programs and Latin American networks), where the methodology solidifies as a response to complex social challenges and as a strategy for university social responsibility. By advancing toward the institutionalization of SL, Nicaraguan universities not only prepare technically competent professionals but also foster political subjects capable of co-producing sovereign solutions, positioning higher education as a genuine engine of social and ethical transformation.

Conclusions

This study evaluates perceptions and the implementation of the Service-Learning (SL) strategy in higher education institutions, aiming to strengthen integral training and university social commitment. Through a mixed-methods approach, it allowed an understanding of how this methodology can transform the relationship between academia and the real needs of social and productive sectors.

The findings confirm that SL is perceived by both students and teachers as an innovative pedagogical strategy with high potential to promote prosocial attitudes and significant learning outcomes. However, a critical gap was identified between positive valuation and systematic execution, with only 7% of participants engaging recurrently in formalized projects. The lack of conceptual clarity leads to SL being confused with assistive volunteerism or traditional professional practices, undermining the principle of reciprocity and diluting its transformative potential.

The significance of this research lies in its capacity to diagnose the methodological transition faced by Nicaraguan universities. The triangulation between quantitative data and the voices of community leaders from Juigalpa illustrates that SL transcends mere didactic technique, configuring itself as a tool for educational sovereignty capable of operationalizing the guidelines of the National Plan to Fight Poverty and the National Education Strategy. Its primary contribution involves proposing a model where the community evolves from being a passive recipient of services to being recognized as a living classroom for the co-production of knowledge.

Despite these contributions, the study has limitations. The low level of technical familiarity with the term SL among key stakeholders initially hampered the differentiation between traditional extension experiences and the methodology under analysis. Additionally, the limited institutional documentation of previous

projects reduced the possibility of conducting comparative analyses of long-term impact, so the results should be understood as an early-stage approximation to institutionalization. These limitations open avenues for future research aimed at systematizing SL experiences across different territories, evaluating their longitudinal effects on the development of competencies, and deepening models for assessing community impact.

Finally, the consolidation of SL requires a strategic reorientation that goes beyond the individual will of certain teachers. It is imperative for higher education institutions to define normative and methodological frameworks that integrate social commitment as an assessable competency within the curriculum, articulated with policies for university social responsibility. Only through joint planning with the community, systematic teacher training, and the institutionalization of evaluation and monitoring devices can it be guaranteed that the university not only trains technically competent professionals but also citizens capable of leading ethical and social transformation processes that align with the country's demands.

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Declaration of author responsibility

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Ramón Ignacio López García 2: Supervision, Validation/Verification, Visualization, Drafting/Original Draft, and Writing, Review and Editing.

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