

Discovering impact indicators in university mentorship programs for women in STEM: A systematic review of LAWCC publications (2020–2024)

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Abstract

STEM mentorship programs are designed to support women from career selection through to professional advancement and empowerment. Evaluating their impact is essential to assess effectiveness and guide evidence-based improvements. This study presents a systematic review of publications from the Latin American Women in Computing Congress (LAWCC) between 2020 and 2024, aiming to identify and classify the impact indicators used in university-level mentorship programs for women in STEM. A combined methodological approach was applied, integrating the PICO approach to formulate the research question and the PRISMA methodology to ensure transparency and rigor in the selection process. Of 62 papers reviewed, 5 fulfilled the inclusion criteria and were analyzed qualitatively using Atlas.ti. The analysis identified 17 impact indicators, categorized by evaluation type (qualitative, quantitative, or mixed) and impact dimension (psychological, academic, institutional, vocational, social, or attitudinal). The most frequently reported indicators were participation, motivation, student satisfaction, and vocational interest. To structure the identified indicators, the logical model by Wolf and Brenning was employed and adapted, organizing them into three levels: immediate outcomes, medium-term results, and long-term impact. This systematization proposes a new evaluation framework designed to assess the impact of STEM mentorship initiatives within the context of gender equity.

Keywords

STEM, mentoring, impact indicator, LAWCC, evaluation

1. Introduction

The participation of women in Science, Technology, Engineering, and Mathematics (STEM) fields in Latin America presents a complex landscape marked by significant progress and persistent challenges. Although women represent approximately 45% of all researchers in Latin America and the Caribbean, a percentage that reflects remarkable parity compared to other regions substantial gaps remain in specific areas and at higher hierarchical levels [1]. These disparities are not solely the result of structural issues but are also rooted in deep-seated cultural, social, and economic barriers.

From an early age, many girls are confronted with stereotypes that discourage their interest in STEM fields [2]. Research has shown that such beliefs negatively affect the self-confidence and academic aspirations of girls and young women, even when they demonstrate equal or superior abilities compared to their male peers [3]. This situation is exacerbated in contexts with limited access to technological resources. According to the Digital Gender Inequality in Latin America and

Proceedings XVII Congress of Latin American Women in Computing 2025, October 27–30, 2025, Valparaíso, Chile.

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the Caribbean report [4], women living outside major urban centers face additional barriers in connectivity, infrastructure, and access to devices, which limits their educational, social, and economic opportunities. At the same time, traditional gender roles such as caregiving and domestic responsibilities create further obstacles for women to pursue and persist in STEM careers, which often require substantial time commitments [5]. Moreover, women who do enter these fields frequently experience discrimination and harassment in male-dominated environments, which can lead to early or permanent attrition from STEM pathways [6].

Including more women in STEM is not only an ethical imperative but also a strategic necessity for the region's sustainable development. Multiple studies indicate that closing the gender gap in STEM could boost regional GDP (Gross Domestic Product) while also enhancing innovation and organizational competitiveness [7], [8]. Diverse teams tend to produce more inclusive solutions, as seen in the design of products and services that better address the needs of the entire population [9][10]. In this context, a wide range of initiatives has emerged to reduce gender disparities, including university-based mentorship programs for women in STEM. These programs provide academic support, career guidance, professional networks, and safe spaces for development [11][12]. International organizations such as UNESCO and the IDB, along with private companies like Google and IBM, have promoted such initiatives with promising results in terms of retention, persistence, and graduation rates among women in STEM fields [1].

However, the effectiveness of many of these programs remains under-documented. Wolf and Brenning [13] note that while mentoring efforts often involve significant commitment from coordinators and mentors, they frequently lack robust evaluation mechanisms to clearly measure their impact. Mentorship, understood as a supportive relationship between an experienced individual and a mentee seeking academic, personal, or career development [14], plays a key role in women's trajectories, but it must be accompanied by concrete tools to assess outcomes.

In Latin America, the Latin American Women in Computing Congress (LAWCC), co-located with the Latin American Conference on Informatics (CLEI), is one of the region's most important academic forums for presenting and discussing initiatives aimed at reducing the gender gap in computing and STEM. Since 2020, LAWCC proceedings have been indexed in CEUR and Scopus, reinforcing their value as a source of information on university-level mentorship programs across diverse Latin American contexts [15]. Considering this, this article aims to identify the impact indicators used to evaluate university mentorship programs for women in STEM, based on a systematic review of LAWCC publications from 2020 to 2024. Impact indicators make it possible to assess meaningful changes in program participants or related institutional environments at immediate, intermediate, or long-term levels. Establishing solid and standardized evaluation frameworks is essential not only to determine the real effectiveness of these initiatives but also to guide efficient resource allocation, enable the replication of best practices, and support the continuous improvement of existing programs.

The article is organized into four main sections. Section 1 presents the research problem and the context of university mentorship programs for women in STEM in Latin America. Section 2 outlines the methodology used, including the combined application of the PICO framework and the PRISMA methodology, as well as the use of Atlas.ti for qualitative analysis. Section 3 presents the results obtained. Finally, Section 4 discusses the findings, proposes recommendations for future evaluations of mentorship programs, and identifies gaps in the literature and opportunities to improve impact measurement in these types of initiatives.

2. Methodology

For this systematic literature review of LAWCC articles published between 2020 and 2024, the PRISMA methodology [16] was combined with the PICO approach [17] to define the main research question, establish extraction criteria, ensure transparency, thoroughness, and traceability throughout the processes of article identification, selection, inclusion, and content analysis. Finally, the qualitative analysis was deepened using Atlas.ti version 9.

2.1. Application of the PICO Approach

To structure the research question and guide data extraction, the PICO approach (Population, Intervention, Comparator, Outcome) was implemented, enabling a clear delineation of the analytical scope and precise definition of the core components of the study. This methodological approach also guided the coding and thematic extraction processes and facilitated the establishment of a common taxonomy for comparative analysis across the selected documents.

The research question formulated was:

RQ1: *What impact indicators are reported in university mentoring programs for women in STEM, as presented in the LAWCC proceedings from 2020 to 2024?*

The following components were defined:

- **P (Population):** Women students in STEM fields involved in training, mentoring, or support interventions presented within the context of LAWCC.
- **I (Intervention):** Mentoring programs, workshops, training initiatives, and institutional actions aimed at supporting academic and professional development to strengthen female participation in STEM.
- **C (Comparator):** Not always applicable; in some cases, implicit comparisons were identified between cohorts, program phases, or baseline data in relation to the reported outcomes.
- **O (Outcome):** Reported impact indicators, both quantitative and qualitative, such as academic retention, sense of belonging, leadership, empowerment, satisfaction, performance, participation, among others.

In addition, this research question gives rise to other relevant associated questions to be explored in this study, such as:

RQ2: *Which university mentoring programs propose or measure the identified impact indicators in the selected articles?*

RQ3: *How can the identified impact indicators in the selected articles be classified to standardize and promote their future use?*

RQ4: *Are there any other relevant findings related to the impact indicators identified in the selected articles?*

2.2. Application of PRISMA

Specific parameters were defined to delimit the search and selection of studies:

Data source: The open-access CEUR-WS repository was used exclusively, specifically the proceedings of LAWCC from 2020 to 2024. This conference is a regional forum specialized in gender and computing, providing a representative sample of Latin American initiatives.

Inclusion criteria:

Articles were selected if they fulfilled all of the following criteria:

- Proposed or implemented mentoring programs, workshops, or interventions with a gender focus in STEM.
- Included evaluative components or proposed measurable impact indicators.
- Focused on higher education (university-level) populations.
- Published between 2020 and 2024.
- The mentoring programs, workshops, or interventions were developed within the Latin American context.

Exclusion criteria:

Articles were excluded if they:

- Did not present evaluative components or failed to propose measurable indicators.
- Focused on primary or secondary education.
- Focused on social or community-based mentoring.
- Were developed outside the Latin American context.
- Described technological development projects.

2.3. Data extraction process

A total of 62 articles from LAWCC (2020–2024) were extracted based on the following criteria: year, country, type of intervention, evaluation instruments, evaluation indicators (proposed or used), and reported outcomes. The resulting PRISMA diagram is presented in Figure 1. Additional details of the PRISMA Checklist can be found in Appendix A.

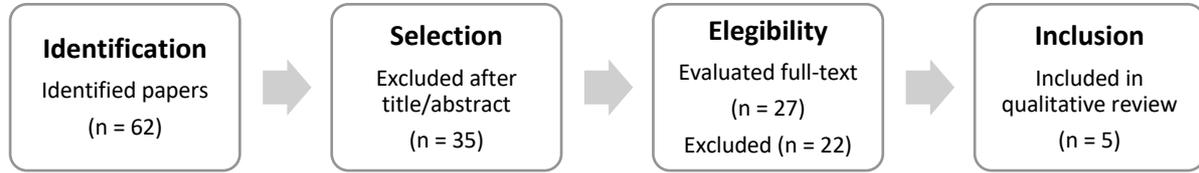


Figure 1: PRISMA flowchart for selection of the articles in this review.

According to the application of the PRISMA protocol (Figure 1), the following process was done:

- a) **Identification.** A systematic search was carried out in the CEUR-WS.org repository, the official and comprehensive source for LAWCC publications, which meets the criteria of reliability and open access. All available articles published between 2020 and 2024 were retrieved: 13 in 2020, 9 in 2021, 11 in 2022, 19 in 2023, and 10 in 2024, totaling 62 unique records.
- b) **Selection.** Following a review of titles and abstracts, 35 articles were excluded for not meeting the inclusion criteria outlined in Section 2.2, resulting in a preliminary selection of 27 articles.
- c) **Eligibility.** The full texts of the remaining 27 articles were evaluated, and 22 were excluded for various reasons. Common reasons for exclusion included the absence of evaluation of specific mentoring programs; a focus on primary or secondary rather than higher education; reflective analyses or essays without evaluative components; bibliometric studies; literature reviews; and exploratory studies on motivation lacking concrete program evaluation. Additional exclusions were made for studies focused on professional entrepreneurship, technological development, or mobile application use that did not constitute university-level mentoring programs. Table 1 shows the 27 selected full-text papers organized by year of publication. More details about them in appendix B.

Table 1

The 27 selected full-text papers organized by publication year

| Year | Papers | Quantity |
|------|---|----------|
| 2020 | [18] [19] | 2 |
| 2021 | [20] [21] [22] [23] [24] | 5 |
| 2022 | [25] [14] [26] [27] [28] [29] | 6 |
| 2023 | [30] [31] [32] [33] [34] [35] [36] [37] [38] [39] | 10 |
| 2024 | [40] [41] [42] [43] | 4 |

- d) **Inclusion.** Ultimately, 5 articles fulfilled all inclusion criteria and were incorporated into the qualitative analysis using Atlas.ti. Table 2 provides a summary of the selected articles and indicates that no articles from 2020 or 2021 met the established inclusion criteria. The number of identified indicators is also presented in the table.

Table 2

Selected papers via PICO and PRISMA.

| Year | Paper title | Country | Indicators |
|------|---|-------------------|------------|
| 2022 | Fomento à Equidade de Gênero nas Áreas STEAM [25]. | Brazil | 13/17 |
| 2022 | Definition and Implementation of W-STEM Mentoring Network [14]. | Several Countries | 14/17 |
| 2023 | Experience in the creation of the JUMI Community [33]. | Colombia | 12/17 |
| 2024 | Challenging the gender gap in STEM with Python and Data Science [40]. | Costa Rica | 6/17 |
| 2024 | Hack4women: In search of a framework [42]. | Chile | 4/17 |

3. Results

This section presents the results obtained in response to the primary research question (RQ1), as well as additional questions that emerged in the course of the analysis.

RQ1: *What impact indicators are reported in university mentoring programs for women in STEM, as presented in the LAWCC proceedings from 2020 to 2024?*

An analysis of the five selected articles revealed a total of 17 proposed or evaluated impact indicators. These include active participation in offered activities, sustained motivation toward STEM-related tasks or careers, and the development of a sense of belonging in traditionally male-dominated spaces. Key elements also include the presence of support networks through mentoring, the strengthening of personal empowerment, and increased vocational interest in scientific and technological disciplines. Other relevant indicators include the availability of institutional resources, organizational awareness of gender gaps, and the consolidation of a scientific identity among participants. Additionally, it is considered important to assess indicators such as organizational climate, perceived academic self-efficacy, and student satisfaction—all fundamental to understanding the effectiveness of the implemented interventions.

At the quantitative level, identified indicators include academic performance, enrollment rates in STEM programs, development of leadership skills, academic program retention, and completion rates of the interventions. Together, these indicators provide a comprehensive view of the impact of mentoring programs and serve as a basis for guiding future evaluation and improvement strategies. A detailed definition of each identified indicator, the type of evaluation (qualitative, quantitative, or mixed), the corresponding impact dimensions (psychological/emotional, academic/educational, vocational/professional, institutional/contextual, participatory/social, and perceptual/attitudinal), and the related articles for each indicator can be found in Appendix C. This classification enables an integrated and multidimensional analysis of the impact of mentoring programs.

The frequency of use of the identified evaluation indicators across the five articles is presented in Figure 2. The most measured indicators were participation, motivation, student satisfaction, and vocational interest. In contrast, the least considered indicators included academic performance, leadership development, and completion rate.

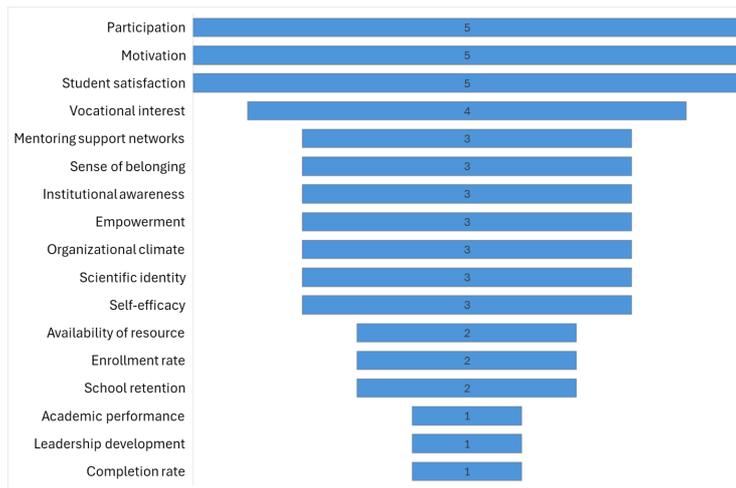


Figure 2: Frequency of use of impact indicators in selected LAWCC papers.

Figure 3 illustrates the distribution of impact evaluation indicators by country. Interestingly, leadership development was not measured in the mentoring programs of any individual country, and the completion rate was considered only in the case of Costa Rica. In contrast, participation, motivation, and student satisfaction were included in all of the selected papers, while vocational interest was not measured exclusively in Chile but also in other countries.

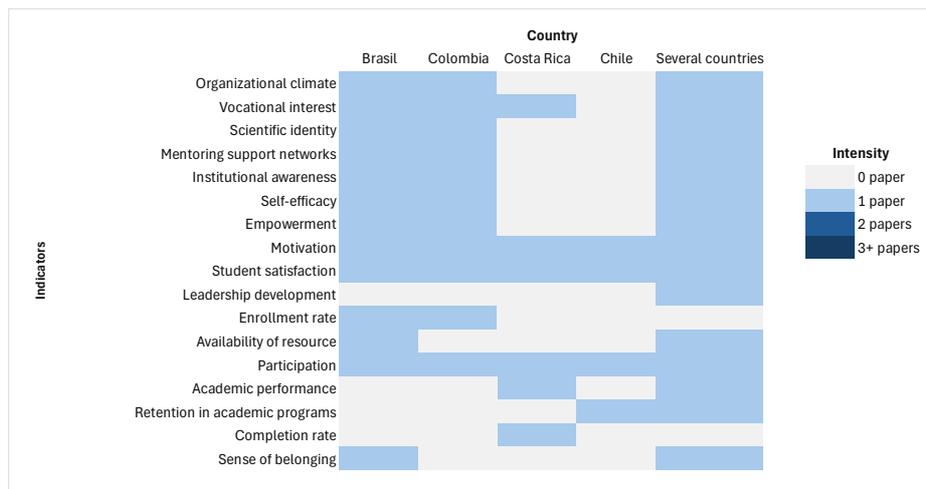


Figure 3: Geographic Distribution of Impact Indicators in selected LAWCC Papers.

Figure 4 displays the distribution of impact indicators by year. It is noteworthy that most of the indicators were proposed or measured in the selected works from 2022, except for academic performance and completion rate, which were not addressed that year. The analysis of the results gives rise to additional questions which will now be addressed.

RQ2: Which university mentoring programs propose or measure the identified impact indicators in the selected articles?

Although some articles [25][14][33][40][42] measured the outcomes of mentoring programs using certain indicators, either evaluated or proposed for future evaluation, there is no evidence of a comprehensive program assessment that includes an analysis of improvement opportunities or lessons learned based on those indicators. Table 3 presents all mentoring programs associate with the selected papers. Besides, none of the articles mention the indicators considered prior to the implementation of the program. As a result, the effects of the program are not measured over the

short, medium, and long term. In general, only a few immediate and medium-term indicators are proposed or evaluated, according to the classification that will be presented in response to RQ3.

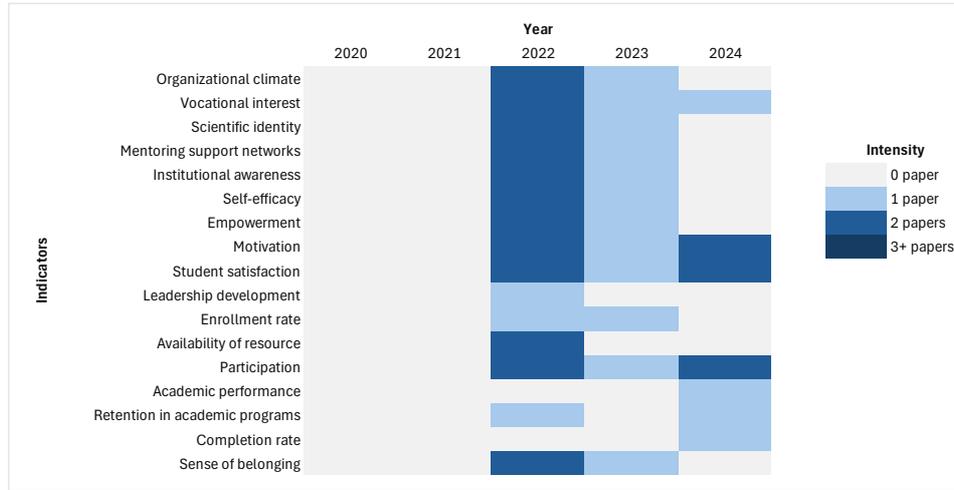


Figure 4: Temporal evolution of Impact Indicators in Selected LAWCC Papers.

Table 3

Mentoring programs measuring or proposing identified impact indicators.

| Program | Description | Country | Type |
|--------------------------------------|--|--|---------------------|
| Digital Girls Project of Mato Grosso | University initiative promoting female STEAM participation through educational workshops, outreach programs, and collaborative research in computing and technical fields [25]. | Brazil | Evaluation |
| W-STEM Mentoring Network | Three-way mentoring network improving women's STEM retention in Latin American universities through peer support and gender-sensitive training with adaptable institutional guidelines [14]. | Multi-country initiative spanning Latin America and Europe | Evaluation proposal |
| JUMI Community | Student-led community promoting women's technical careers through outreach, partnerships, and mentorship to inspire engineering choices and reduce gender disparities [33]. | Colombia | Evaluation |
| Hack4women | Competitive event addressing gender inequities in technical fields through collaborative research, problem-solving, and solution development to tackle women's career barriers [42]. | Chile | Evaluation proposal |
| Learning data science with python | Virtual inter-institutional program training women in programming and environmental data analysis through hands-on projects connecting computing with conservation and sustainability challenges [40]. | Costa Rica | Evaluation |

RQ3: How can the identified impact indicators in the selected articles be classified to standardize and promote their future use?

To analyze and categorize the impact indicators identified in the selected articles, the logic model proposed by Wolf and Brenning [13], was adapted. These authors developed a conceptual framework for systematically evaluating mentoring programs for women in STEM by organizing and linking program components to expected outcomes. This logic model enabled us to capture the intended effects or impact at three levels: *immediate outcomes, medium-term results, and long-term impact*.

In relation to **immediate outcome indicators** assess the initial implementation and reception of the mentoring program, forming the foundation for subsequent effects, these indicators measure operational aspects and the quality of the initial experience. With respect to **medium-term result indicators**, these assess psychological and attitudinal changes that occur during or immediately

after the mentoring program. These changes function as mediators of long-term impact. Finally, the **long-term impact indicators** evaluate sustained changes in behavior, professional decisions, and identity that emerge after the completion of the program. More details about our proposal for an evaluation framework according to all these effects are described in Table 4, Table 5 and Table 6.

Table 4

Immediate outcome indicators.

| Indicator | Description |
|-----------------------------|--|
| Participation | Number and percentage of students and mentors involved in and completing the program. |
| Frequency of Contact | Number of sessions and quality of mentor–mentee interactions. |
| Satisfaction | Level of satisfaction with the program regarding content, logistics, and mentors. |
| Mentorship Quality | Evaluation of the mentor–mentee relationship in terms of trust, support, and perceived usefulness. |

Table 5

Medium-term indicators.

| Indicator | Description |
|---------------------------------|---|
| Self-efficacy | Confidence in one’s ability to perform tasks related to STEM. |
| Motivation | Increased motivation toward STEM fields. |
| Sense of Belonging | Degree to which the student feels part of the academic or STEM environment. |
| Achievement expectations | Perceived expectations of performance in STEM field. |
| Empowerment | Perception of autonomy, initiative, and personal agency. |

Table 6

Long-term impact indicators.

| Indicator | Description |
|-----------------------------------|---|
| STEM Career Intentions | Likelihood that the student will pursue a career in STEM. |
| STEM Persistence | Continuation in STEM programs or career paths over time. |
| Leadership Development | Interest in and ability to take on leadership roles |
| Network Building | Development of professional and support networks within the STEM field. |
| Professional STEM Identity | Self-identification as a future science or technology professional. |

This proposed evaluation framework enables a comprehensive evaluation of mentoring programs, recognizing that impact occurs through multiple causal pathways rather than in a linear or monocausal manner [13]. The interrelation among the three levels of indicators reflects the processual nature of academic and professional development: immediate outcome indicators establish the necessary conditions for medium-term results, which in turn facilitate the achievement of long-term impacts.

Figure 5 illustrates how the 17 identified impact indicators align with the logic model proposed by Wolf & Brenning, highlighting which indicators fully align, partially align, or do not align at all based on whether they are explicitly considered in the evaluation framework proposed in this study. Additionally, Figure 6 presents how the 17 impact indicators could be classified according to our proposed evaluation framework, although not all are included, as determined by our qualitative analysis among indicators in the selected papers and with similar studies via atlas.ti.

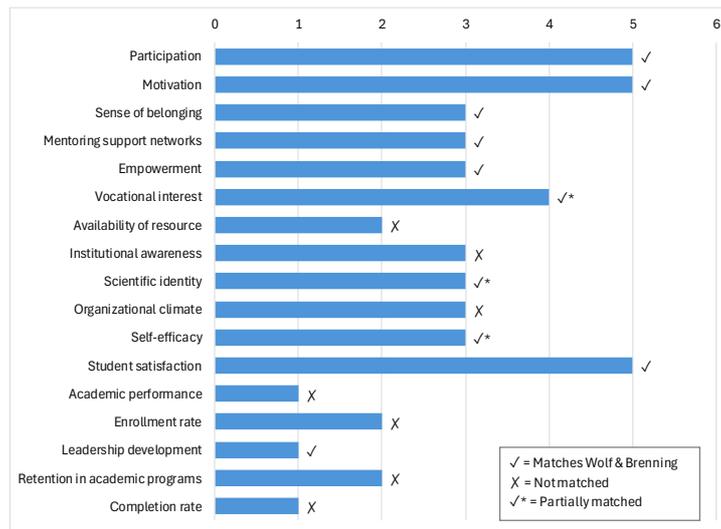


Figure 5: Impact indicators found in LAWCC selected papers and their correspondence with the Wolf & Brenning logic model.

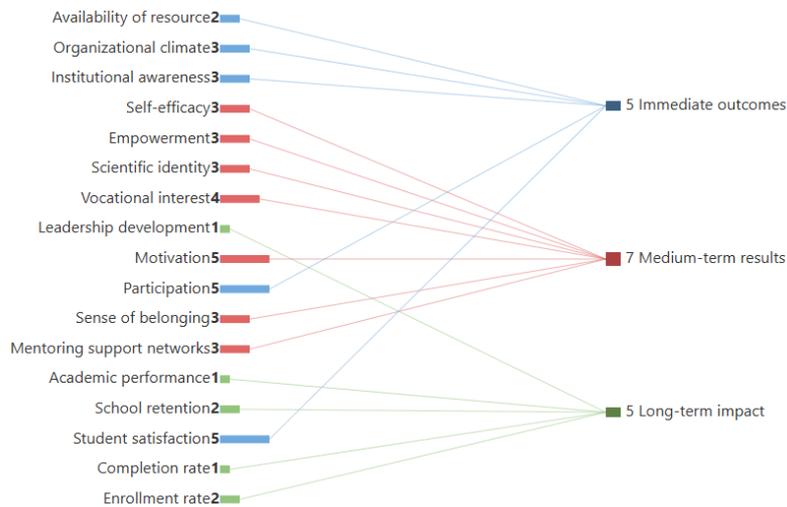


Figure 6: Distribution of identified impact indicators according to our proposal for an evaluation framework.

RQ4: Are there any other relevant findings related to the impact indicators identified in the selected articles?

Based on the qualitative analysis conducted using Atlas.ti, several relevant findings emerged regarding the impact indicators identified in the selected papers. The key insights are as follows: Of the 17 impact evaluation indicators identified in the articles analyzed from LAWCC between 2020 and 2024, a total of 10 are included in the proposed evaluative framework adapted from Wolf and Brenning. These include: **participation, empowerment, self-efficacy, motivation, satisfaction, sense of belonging, and leadership development, as well as conceptual equivalents of mentoring support networks (included as network building), scientific identity (as professional identity in STEM), and vocational interest (as STEM career intention).** This alignment demonstrates a strong coherence between the proposed evaluation framework and the recent empirical evidence, supporting its relevance as a tool for assessing the impact of mentorship programs for women in STEM. The relationships among these 10 impact indicators identified in LAWCC 2020–2024 are illustrated in Figure 7.

In addition to the 10 indicators aligned with those identified in LAWCC (2020–2024), the proposed framework incorporates four additional indicators to strengthen the comprehensiveness of the

evaluation (Table 3, Table 4 and Table 5). These include: **frequency of contact and mentorship quality**, which capture **operational and relational aspects of program implementation**; **achievement expectations**, which reflects students projected academic or career aspirations; and **persistence in STEM**, which assesses long-term engagement beyond initial intent. These indicators were added to address dimensions commonly emphasized in educational program evaluations and to ensure that both immediate-term interactions and long-term outcomes are adequately measured, enhancing the analytical depth of our proposal.

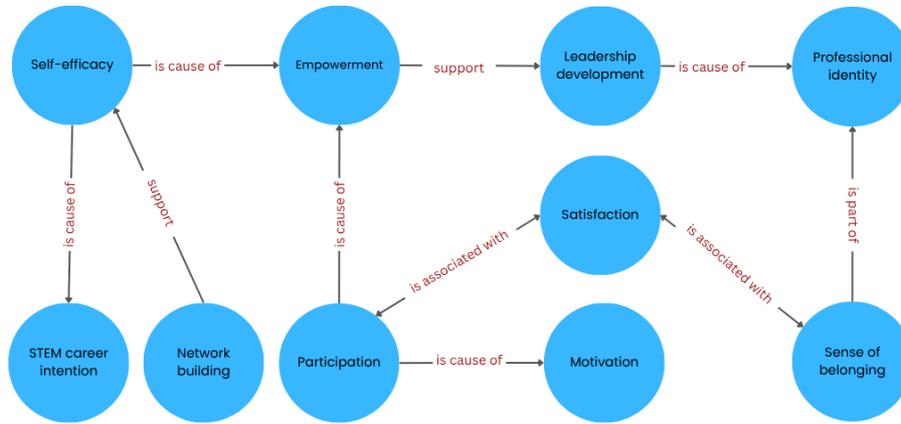


Figure 7: Network map with the relevant relationships among the 10 impact indicators identified in LAWCC 2020–2024.

4. Discussion

4.1. Interpretation and Implications

To reduce selection bias in the article review process, predefined inclusion and exclusion criteria were applied according to the PICO framework. The search and preselection were guided by specific keywords present in titles, abstracts, and full texts, including: mentoring, women in STEM, impact, indicators, evaluation, training, leadership, empowerment, and related terms. A manual and exhaustive review of the complete corpus of LAWCC publications from 2020 to 2024 was conducted, ensuring full coverage of the analyzed universe. No automated filters were applied, as the corpus was limited and thoroughly reviewed manually. A standardized protocol for reading, coding, and data extraction was employed, supported by the Atlas.ti v9 software. This ensured objectivity in identifying impact indicators and consistency across documents. Additionally, the PRISMA flow diagram was used to document each phase of the process (identification, selection, eligibility, and inclusion), ensuring the traceability and replicability of the study. All exclusion decisions were fully justified based on the defined criteria, and methodological transparency was maintained throughout the analysis.

The results of this systematic review reveal a growing interest in evaluating the impact of mentoring programs targeting women in STEM within the Latin American context, particularly in the LAWCC articles published between 2020 and 2024. However, there is a notable lack of standardization in the indicators used, which hinders comparisons across initiatives and the consolidation of long-term learning. Unlike international frameworks such as that of Wolf and Brenning (2023), which propose structured and scalable logic models, the studies analyzed tend to rely on qualitative or mixed-methods approaches with limited longitudinal continuity or cohort tracking. This constrains the ability to measure sustainable outcomes over time. Moreover, the review highlights an urgent need to develop comparable evaluation frameworks across countries and institutions that incorporate validated indicators and facilitate the sharing of tools, methodologies, and results. Establishing a common taxonomy such as the one proposed in this study

could support the design, monitoring, and continuous improvement of interventions, contributing to the reduction of gender gaps in the scientific and technological fields in Latin America.

To enhance replicability, this study outlines the adaptation of the Wolf and Brenning logic model by organizing 17 identified impact indicators into three levels: immediate outcomes (e.g., participation, satisfaction), medium-term results (e.g., motivation, self-efficacy), and long-term impacts (e.g., leadership development, STEM persistence). These indicators were systematically mapped through thematic coding using Atlas.ti and aligned with dimensions proposed in existing evaluation models for mentoring programs. While the framework is theoretically grounded, its practical relevance would be strengthened by the inclusion of applied case examples demonstrating its implementation in real institutional settings. Furthermore, measuring long-term impacts particularly in attitudinal and institutional dimensions presents specific challenges, including delayed effect manifestation, difficulties in longitudinal participant tracking, and the influence of contextual factors such as cultural or policy changes. In the absence of sustained follow-up strategies, longitudinal data remain limited, constraining the robustness of long-term impact assessments.

4.2. Scope and validity

While this study applied rigorous inclusion criteria to ensure methodological consistency, the resulting sample size was necessarily limited, which may affect the generalizability of the findings. The focus on LAWCC proceedings chosen for their regional relevance and thematic alignment provided valuable insights but may have restricted exposure to a broader range of initiatives. Additionally, although the proposed evaluation framework is grounded in established theoretical models, it has yet to be tested in empirical contexts. The exclusion of non-university programs, while deliberate for analytical clarity, may have overlooked important data on indicators such as motivation and identity, which often emerge during earlier educational stages. These considerations highlight valuable opportunities for future research to validate the framework in practice and to expand the scope of analysis across educational levels and sources.

5. Conclusions and recommendations

It is essential to establish indicators that enable the measurement of progress and/or outcomes of mentoring programs before, during, and after their implementation. These results should be periodically analyzed, reviewed, and communicated to all stakeholders to continuously improve the effectiveness of such programs. This systematic review identified a relevant set of 17 impact indicators used in university-level mentoring programs for women in STEM, with particular emphasis on those related to participation, motivation, student satisfaction, and vocational interest. While these findings demonstrate a growing effort to measure the effects of these interventions, they also reveal limited standardization in evaluation approaches and a lack of longitudinal continuity in the analyzed studies.

The adaptation of the logic model proposed by Wolf and Brenning [13], as applied in this study, enabled a systematic analysis and categorization of the various impact indicators used or proposed in the mentoring programs reviewed. This facilitated the identification of patterns and gaps in evaluation practices within the Latin American context. As a result, it is recommended to advance toward the development of comprehensive evaluation frameworks that incorporate not only academic and attitudinal indicators, but also dimensions such as leadership, empowerment, support networks, and institutional impact, accompanied by practical examples of implementation.

Future research should focus on empirically testing and refining the proposed evaluation framework by applying it in active university-level mentoring programs and integrating it into the design of new initiatives. This work should also broaden the scope of analysis by incorporating institutional reports, national policy documents, and other relevant sources to strengthen the representativeness and relevance of the findings. Finally, expanding the framework to include primary and secondary education would allow for the creation of a regionally adaptable impact

model that spans the entire educational continuum, providing a solid foundation for long-term strategies to advance gender equity in STEM fields across Latin America.

Declaration on Generative AI

GenAI is used to reformulate sentences and improve clarity.

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A. PRISMA 2020 Checklist

The complete PRISMA 2020 checklist can be accessed at: [link](#)

B. Full-text reviewed articles

The detailed list of reviewed articles is available at: [link](#)

C. Classification and definition of mentoring impact indicators by dimensions and evaluation type

For the complete classification of impact indicators, see: [link](#)