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Teacher Leadership in Higher Education: A Systematic Review

Liderazgo docente en educación superior: revisión sistemática de programas y resultados

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Abstract

Higher education leadership research encompasses diverse constructs, participants, and outcomes, making it difficult to distinguish programme-related change from contextual descriptions and associations. The objective of this study is to synthesize evidence from 35 publications on teacher and academic leadership development, identifying programme components, reported outcomes, and methodological limitations through a systematic review with narrative synthesis grouped the selected publications by their analytical function. The corpus comprised 23 programme or development studies, 9 non-intervention primary studies, and 3 secondary reviews. Study characteristics, populations, designs, intervention strategies, and outcomes were extracted; reported numerical estimates were retained at study level. The evidence spans 2009–2026, with 28 publications appearing in 2021–2026. Structured workshops, experiential learning, mentoring, coaching, and peer networks were common components. Changes were more frequently documented for perceived competencies, leadership behaviors, and academic career outcomes than for directly measured teaching quality or student learning. In one matched cohort, programme participation was associated with promotion (hazard ratio 1.61, 95% confidence interval 1.16–2.23) and institutional departure (hazard ratio 0.23, 95% confidence interval 0.16–0.34); these observational associations do not establish causality. This study concludes that leadership development is reported across individual, relational, and institutional domains, but heterogeneity of designs, potential overlapping cohorts, and limited pedagogical outcome measurement restrict causal and cross-disciplinary conclusions.

Keywords: higher education, leadership, teacher education.

Resumen

La investigación sobre liderazgo en la educación superior abarca diversos constructos, participantes y resultados, lo que dificulta distinguir el cambio relacionado con el programa de las descripciones y asociaciones contextuales. El objetivo de este estudio es sintetizar la evidencia de 35 publicaciones sobre el desarrollo del liderazgo docente y académico, identificando los componentes del programa, los resultados reportados y las limitaciones metodológicas a través de una revisión sistemática con síntesis narrativa que agrupó las publicaciones seleccionadas según su función analítica. El corpus comprendió 23 estudios de programas o desarrollo, 9 estudios primarios sin intervención y 3 revisiones secundarias. Se extrajeron las características del estudio, las poblaciones, los diseños, las estrategias de intervención y los resultados; las estimaciones numéricas reportadas se conservaron a nivel de estudio. La evidencia abarca el período 2009-2026, con 28 publicaciones que aparecen

entre 2021 y 2026. Los talleres estructurados, el aprendizaje experiencial, la mentoría, el coaching y las redes de pares fueron componentes comunes. Los cambios se documentaron con mayor frecuencia para las competencias percibidas, los comportamientos de liderazgo y los resultados de la carrera académica que para la calidad de la enseñanza medida directamente o el aprendizaje de los estudiantes. En una cohorte emparejada, la participación en el programa se asoció con el ascenso (cociente de riesgos instantáneos 1,61; intervalo de confianza del 95%: 1,16-2,23) y la salida de la institución (cociente de riesgos instantáneos 0,23; intervalo de confianza del 95%: 0,16-0,34); estas asociaciones observacionales no establecen causalidad. Este estudio concluye que el desarrollo del liderazgo se manifiesta en los ámbitos individual, relacional e institucional, pero la heterogeneidad de los diseños, la posible superposición de cohortes y la limitada medición de los resultados pedagógicos restringen las conclusiones causales e interdisciplinarias.

Palabras clave: educación superior, liderazgo, formación docente.

Introduction

Institutions of higher education need faculty members not just to teach and do research, but also to organize curriculum, to mentor colleagues, and to participate in institutional decisions. These actions involve influence, and it need not be derived from a formal appointment. Research on dispersed leadership makes a distinction between delegated power and leadership that comes from academic ties and professional reputation (Bolden et al., 2009). Similarly, associate deans can align institutional initiatives with teaching and research agendas (Floyd & Preston, 2018). The practical question is if leadership can be produced through organized programs and what are the real outcomes that such programs assess.

Terminology is not consistent. Teacher leadership is commonly understood as faculty influence on peers, pedagogy and learning, while academic leadership is direction of programs, departments and faculties; instructional or pedagogical leadership is the foregrounding of teaching; distributed or shared leadership is the allocation and emergence of influence, and transformational leadership is vision, intellectual stimulation, support and mobilization. These categories are not mutually exclusive practices but intersect. A recent assessment of 64 empirical papers showed the range of the idea of leadership of teaching and learning in higher education (Kinnunen et al., 2024).

Outcomes need to be separated, too. Learning and confidence are individual objectives, mentorship and cooperation are relational consequences, curriculum adoption, promotion and retention are institutional outcomes, and student learning is a separate educational endpoint. Increased self-rated leadership competency does not, by itself, constitute proof of greater teaching or student accomplishment. Balwant (2016) meta-analysis connects transformational instructor leadership to student-related outcomes, although its constituent studies cannot be included as extra intervention participants in the current corpus.

The literature includes qualitative instances, correlations, program assessments, pre/post comparisons, and matched cohorts. Zulfqar et al., (2021) evaluated a six-week intervention among university administrators; Bonesso et al., (2024) analyzed experiential training among postgraduate students; Tung et al., (2021) and Ribera et al., (2026) evaluated promotion and retention among academic-medicine faculty with comparison groups. These designs answer distinct problems, and do not allow for interchangeable causal interpretations. Additionally, clinical faculty programs may have career structures quite different from those in non-clinical subjects.

This study includes a total of 35 chosen papers, treated as a single integrated evidence corpus. It seeks to characterize designs, demographics, leadership models, training components, individual and relational results, pedagogical and institutional findings and implementation circumstances separating primary intervention evidence from contextual studies and previous evaluations. Particular emphasis is placed on measurement of outcomes, possible reporting of associated cohorts, and the evidentiary boundaries of numerical estimates at the study level.

Methodology

A systematic review with structured narrative synthesis was conducted using the PRISMA 2020 reporting standards (Page et al., 2021). The counting unit was the publication, not the participant, intervention or unique cohort. The final group of 35 publications included 23 program evaluations or development experiences, 9 primary studies without intervention and 3 secondary reviews. Articles relevant to the review were those that explored the leadership of university instructors, program coordinators, academic leaders or similar groupings of faculty; postgraduate trainees and general faculty development studies were included only if their indirect significance was clarified. Conceptual synthesis guided by secondary reviews, not assessments of programme-effect. The years of publication covered are 2009-2026; a start year of 2010 would miss Bolden et al., (2009).

The project materials list Scopus and SciELO as core sources, Web of Science and ERIC as supplemental sources, and retrieval and metadata aids like citation checking and publisher/DOI sites. The search terms were ‘transformational and dispersed leadership’, ‘teacher’, ‘faculty’, ‘academic’, ‘instructional’, ‘higher education’, ‘intervention’, ‘program’, ‘development’ and ‘assessment’.

For reproducibility, the syntax of the database used was standardized through search strings. For Scopus and Web of Science, the search strings were, respectively:

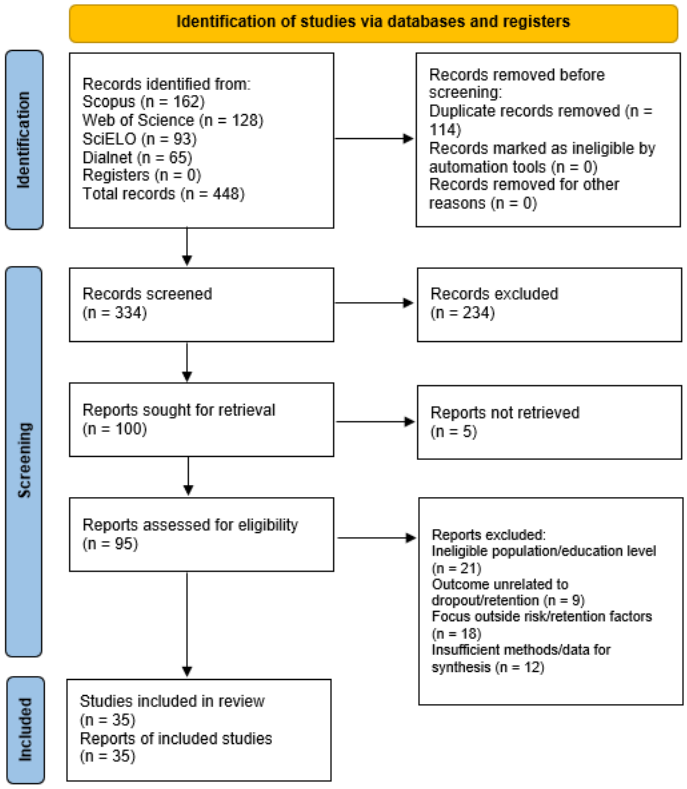
TITLE-ABS-KEY(("teacher leadership" OR "academic leadership" OR "instructional leadership" OR "distributed leadership" OR "shared leadership" OR "transformational leadership") AND ("higher education" OR universit* OR faculty OR academic*) AND (intervention OR program* OR programme* OR development OR training OR assessment OR evaluation))

TS=(("teacher leadership" OR "academic leadership" OR "instructional leadership" OR "distributed leadership" OR "shared leadership" OR "transformational leadership") AND ("higher education" OR universit* OR faculty OR academic*) AND (intervention OR program* OR programme* OR development OR training OR assessment OR evaluation))

For SciELO and Dialnet, the same Boolean expression was applied to title, abstract, and keyword fields where supported. The initial retrieval comprised 448 records (Scopus, n = 162; Web of Science, n = 128; SciELO, n = 93; Dialnet, n = 65). Provided data did not provide exact execution dates, source level result numbers, de-duplication log, screening choices and reasons for exclusion of full text. No such counts, prospective protocol registration or independent dual-screening technique is therefore asserted. The documented endpoint utilized here is the final inclusion total of 35. The other PRISMA values are left empty by design, not assumption.

Figure 1

PRISMA 2020 flow diagram applied to the study



Source: own elaboration

A systematic extraction matrix collected each publication's reference, year, context, population, study strategy, program or exposure, leadership concept, measurable outcome, central finding and DOI or official link. Articles were categorized by analytic function. For numerical results, original denominators, effect measurements, confidence intervals and unspecified comparison conditions were preserved. Publications that were related, including the Zulfqar reports from 2021 and 2024, were labeled as possibly dependent until the cohorts could be confirmed for identification; the same program name across institutions was not considered proof of identical sample.

The selected corpus contains 35 publications: 23 (65.7%) programme or development studies, 9 (25.7%) non-intervention primary studies, and 3 (8.6%) secondary reviews. Thus, 32 records are primary publications, but the study count should not be interpreted as 32 independent interventions. 28 of the 35 publications (80.0%) date from 2021–2026. The contexts encompass Pakistan, the United Kingdom, Israel, Arab states, Australia, South Africa, Saudi Arabia, Europe and China, and multiple academic-medicine settings. Populations include faculty members, coordinators, department heads, deans, clinical teachers, leadership teams, and, in one study, postgraduate students. These contextual differences restrict unqualified generalization.

A descriptive methodologic reading examined baseline equality, presence of a control group, participant self-selection, self-report versus independent measurement, attrition in follow-up, and transferability of discipline-specific outcomes. The submitted paperwork does not confirm the official use of MMAT, RoB 2 or ROBINS-I scores at the research level. Results were synthesized by individual, relational, pedagogical, institutional and student-level outcomes, using transparent synthesis without meta-analysis principles (Campbell et al., 2020). Because of different outcome measures and designs, incompatible variances, and the inability to assume independence across reports, we did not perform a pooled effect.

Results and discussion

Table 1
Publication profile and function within the synthesis

Indicator	Value	Interpretation
All included publications	35 (100%)	Publications, not independent cohorts or experiments
Programme/development studies	23 (65.7%)	Describe interventions and development experiences with unequal causal strength
Non-intervention primary studies	9 (25.7%)	Characterise mechanisms, associations, and context
Secondary reviews	3 (8.6%)	Do not re-count underlying primary participants
Publications from 2021–2026	28/35 (80.0%)	Recent concentration within the selected corpus
Publication range	2009–2026	The 2009 study is retained in the predefined set

Source: own elaboration.

Four interconnected strands are identifiable: transformational approaches emphasise vision and intellectual support (Zulfqar et al., 2021; Balwant, 2016); shared and distributed perspectives stress role clarity, trust, and participation (Bolden et al., 2009; Lizier et al., 2024); instructional leadership foregrounds teaching priorities (Shaked, 2021; Kinnunen et al., 2024); and development-oriented approaches operationalise learning through training, mentoring, experiential activity, and professional networks (Ladyshewsky & Flavell, 2012; Mayowski et al., 2022). These strands should not be interpreted as equally tested interventions.

Training architectures combine workshops, reflection, feedback, coaching, simulation, and peer interaction. Bonesso et al., (2024) incorporated self- and external assessment of experiential learning. Falandry et al., (2024) piloted tailored simulations and modules; Williams et al., (2025) combined workshops, 360-degree feedback and executive coaching across 18 months; Pololi et al., (2025) examined group peer mentoring; and Gottlieb et al., (2021) evaluated a virtual community of practice. Duration and complexity alone do not indicate effectiveness: they must be related to the specified outcomes, the delivery actually received, and the measurement schedule.

Table 2
Integrated evidence matrix for all 35 included articles

N°	Author(s) and title	Design/context and main finding
1	Alghamdi (2024) Enhancing organizational commitment through shared leadership: insights from Saudi higher education	Cross-sectional correlational study of Saudi faculty. Finding: Shared leadership correlated with organizational commitment; causality untested.
2	Balwant (2016) Transformational Instructor-Leadership in Higher Education Teaching: A Meta-Analytic Review and Research Agenda	Meta-analysis of instructor leadership and student outcomes. Finding: Positive associations; neither a new trial nor independent intervention evidence.
3	Bolden et al., (2009) Distributed Leadership in Higher Education: Rhetoric and Reality	Multiple cases from 12 UK universities. Finding: Distinguishes delegated from emergent distribution of leadership and the role of power.
4	Bonesso et al., (2024) Developing leadership behaviours in higher education: A quasi-experimental study on the effect of experiential learning	Quasi-experiment; postgraduate trainees; controls and self/external assessment. Finding: Visionary, coaching and affiliative behaviors increased; indirect relevance to practicing faculty.
5	Dinh et al., (2023a) Academic Leadership Development: An Exploratory Study on the Impacts at the Institutional Level Based on an Erasmus+ Capacity Building Project	Erasmus+ programme across 12 universities in Europe and China. Finding: Institutional change and collaboration assessed; student effects not isolated.
6	Dinh et al., (2023b) Developing a comprehensive leadership development model in higher education context: A co-design approach	Participatory co-design; 24 actors from 11 European/Chinese institutions. Finding: Integrated development model proposed; programme effectiveness not tested.
7	Falandry et al., (2024) Tailoring a specific medical leadership development program for faculty members: the Lyon-Ottawa experience	Ten medical faculty; pilot Lyon–Ottawa simulations and modules. Finding: Pilot acceptability and satisfaction; independent competency gains unestablished.

8	Fattah et al., (2023) Building leadership capacity among junior faculty: Evaluating multi-level outcomes of a leadership program	Twelve-month blended LEAD programme for junior medical faculty. Finding: Surveys cover learning, behavior and organizational contribution; no direct student effects.
9	Fenech (2023) Evaluating Leadership Development in Academia	Quantitative evaluation using a four-level programme framework. Finding: Reaction, learning, behavior and organizational results reported in the original context.
10	Floyd & Preston (2018) The role of the associate dean in UK universities: distributed leadership in action?	Sequential mixed methods; 15 interviews in five UK institutions, survey n = 172. Finding: Associate deans connect strategy to faculty teaching, quality and research.
11	Franko et al., (2025) Academic Leadership Development for Black and Latinx Faculty: Program Refinements and Participant Change Over Time in a Mixed-Method Study	Six-month mixed-method programme with interviews and repeated measures. Finding: Changes in practice and programme refinements reported; institutional equity not inferred from self-report.
12	Frantz et al., (2022) Exploring the views of academics on an academic leadership program in higher education	Qualitative programme evaluation; 13 academics in South Africa. Finding: Participants reported confidence, mentoring, communication and networks.
13	Ghamrawi et al., (2024) Teacher leadership in higher education: why not?	Phenomenological study of six early-career academics from six Arab states. Finding: Informal leadership through mentoring and modelling; no intervention tested.
14	Gottlieb et al., (2021) Faculty development using a virtual community of practice: Three-year outcomes of the Academic Life in Emergency Medicine Faculty Incubator program	Virtual faculty incubator; 89 medical faculty, three cohorts; follow-up surveys. Finding: Knowledge 4.1/9 to 7.0/9; curriculum and roles reported; 33/89 responded at one year.
15	Janke et al., (2024) A Case Study of Multi-Institutional Leadership Circles to Support Faculty Leadership Development	Qualitative case study of virtual, multi-institutional pharmacy leadership circles. Finding: Feedback, problem-solving and networks described without counterfactual comparison.

16	Kinnunen et al., (2024) Bringing clarity to the leadership of teaching and learning in higher education: a systematic review	Systematic review of 64 empirical publications (2017–2021). Finding: Conceptual diversity of leadership of teaching and learning; secondary evidence.
17	Ladyshewsky & Flavell (2012) Transfer of Training in an Academic Leadership Development Program for Program Coordinators	Ten university coordinators; 20-week programme; interviews 6–12 months later. Finding: Reported durable communication, influence and confidence; qualitative transfer evidence.
18	Li et al., (2022) Learning while leading: a realist evaluation of an academic leadership programme	Realist qualitative evaluation; ten faculty leaders; ten-month programme. Finding: Mentoring, context and identity shape programme experience and perceived value.
19	Lizier et al., (2024) Importance of clarity, hierarchy, and trust in implementing distributed leadership in higher education	Qualitative case study of an Australian faculty. Finding: Role clarity, hierarchy and trust condition distributed leadership.
20	Mayowski et al., (2022) Evaluation of two longitudinal faculty leadership training programs: behavioral change and institutional impact	Medical school; two pre/post leadership programmes and follow-up interviews. Finding: Self-rated competence improved (reported $p < .001$); 21 interviews at 1–4 years.
21	Nahata et al., (2025) Sustained Impact of an Intramural Faculty Leadership Training Program at an Academic Medical Center	Comparative follow-up of medical-center faculty and controls. Finding: Perceived leadership and role attainment examined; volunteer selection limits attribution.
22	Newman et al., (2016) Measuring the Impact of Longitudinal Faculty Development: A Study of Academic Achievement	Longitudinal medical-faculty development with comparison group. Finding: Academic achievement compared; programme not exclusively focused on leadership.
23	Pololi et al., (2025) Implementation and evaluation of a group peer mentoring and leadership development program for research faculty in academic medicine	One-year academic-medicine programme; quarterly group mentoring. Finding: Explores mentoring, vitality and inclusion; randomized project context does not make every reported outcome randomized.
24	Ribera et al., (2026) Measuring the impact of a leadership in academic medicine program on faculty advancement and leadership attainment	Academic-medicine propensity-score matched cohort. Finding: 443 participants vs 886 controls; promotion, retention and leadership roles, not learning.

25	Ruiz & Troya, (2025) Teacher Leadership in Higher Education: A Systematic Review	Systematic review of higher-education teacher leadership. Finding: Synthesizes previously published research; not a new primary sample.
26	Sewerin & Holmberg (2017) Contextualizing distributed leadership in higher education	Case study; technical university, ten staff members and documents. Finding: Teaching, research and organizacional logics shape collaboration.
27	Shaked (2021) Instructional leadership in higher education: The case of Israel	Qualitative interviews with 22 Israeli department heads. Finding: Instructional leadership constrained by autonomy, priorities and teaching conceptions.
28	Söderhjelm et al., (2018) Academic leadership: management of groups or leadership of teams? A multiple-case study on designing and implementing a team-based development programme for academic leadership	Multi-case group intervention in academic departmental teams. Finding: Team training elucidates coordination conditions; not a randomized trial.
29	Steinauer et al., (2023) The APGO Academic Scholars and Leaders Program: Supporting obstetrics and gynecology faculty development for 20 years	Retrospective alumni survey of a long-running obstetrics/gynecology programme. Finding: Reported teaching, leadership and career outcomes; recall and self-selection possible.
30	Tung et al., (2021) The impact of a faculty development program, the Leadership in Academic Medicine Program (LAMP), on self-efficacy, academic promotion and institutional retention	Academic-medicine programme; 232 participants and 232 matched controls. Finding: Promotion HR 1.61 (95% CI 1.16–2.23); departure HR 0.23 (0.16–0.34); observational.
31	Vogel (2022) Shared leadership in higher education: an exploration of the composition of school leadership teams and school performance	Five-year longitudinal institutional analysis in Australia. Finding: Explores leadership-team composition and performance; not a training-effect study.
32	Way et al., (2024) Leadership Development and Its Association With Retention of Surgical Versus Nonsurgical Faculty at a Large Academic Health Center	Longitudinal comparison within 165 programme alumni: 61 surgical, 104 others. Finding: Retention differs by specialty; this is not trained-versus-untrained comparison.
33	Williams et al., (2025) A Framework for Leadership in Organizational Development: A Novel Approach for Advancing Women Administrative and Faculty Leaders in Academic Medicine	Eighteen-month pre/post programme for academic/administrative women leaders. Finding: Several self-rated competencies improved, except personal growth; no equivalent controls.

34	Zulfqar et al., (2021) Developing Academic Leaders: Evaluation of a Leadership Development Intervention in Higher Education	Intervention; 37 deans/heads in two Pakistani universities; six weeks. Finding: Greater awareness of six transformational behaviors; no equivalent control post-test.
35	Zulfqar et al., (2024) Evaluation of the temporal impact of a leadership development program in higher education	Follow-up at three months and one year after six-week training. Finding: Awareness declined from immediate post-test but remained above baseline; possible overlap with item 1.

Note: titles are reproduced as published, except entry 25, whose Spanish title is translated and labelled here; the original bibliographic title remains in the reference list. One row denotes one publication. Study designs are not assigned equal causal strength. *Source:* own elaboration.

Programme evaluations frequently reported increased awareness, confidence and leadership behavior, often through self-report. Mayowski et al., (2022) reported pre/post improvement in assessed confidence items ($p < .001$) alongside follow-up interviews. The six-week programme of Zulfqar et al., (2021) documented greater awareness of transformational practices, although an equivalent control-group post-test was lacking. In their later temporal evaluation, awareness fell relative to immediate post-test yet remained above baseline (Zulfqar et al., 2024); these publications must not be treated as independent replications without cohort verification. Bonesso et al., (2024) combined self- and external ratings with a comparison group but enrolled postgraduate students rather than established faculty.

Relational outcomes include mentoring, collegial influence and professional networks. Ladyshewsky & Flavell (2012) interviewed ten coordinators after programme completion; Frantz et al., (2022) reported participants' perceptions of confidence and support; and Janke et al. (2024) described virtual leadership circles for genuine academic challenges. Gottlieb et al., (2021) enrolled 89 participants but had 59 initial survey respondents and only 33 at one year, corresponding to approximately 66% and 37% of the starting cohort. This attrition makes longitudinal self-reported outcomes particularly vulnerable to response bias.

Direct pedagogical outcomes are less consistently measured than leadership perceptions and career markers. Gottlieb et al., (2021) reported curriculum development by 37/59 respondents during the programme and by 19/33 at follow-up. These are output reports, not demonstrated improvements in student learning. Steinauer et al., (2023) used retrospective alumni reporting on teaching and leadership. The student-related associations synthesized by Balwant (2016) represent secondary evidence and do not establish effects of the development programmes analyzed here.

Comparative academic-medicine cohorts provide estimates for career outcomes. Tung et al., (2021) matched 232 participants with 232 non-participants and reported promotion HR 1.61 (95% CI 1.16–2.23) and institutional departure HR 0.23 (95% CI 0.16–0.34). Ribera et al., (2026) matched 443 participants with 886 controls and reported promotion HR 1.57 (95% CI 1.31–1.88), departure HR 0.72 (0.60–0.85), and leadership attainment OR 2.02 (1.49–2.73). These are distinct study-specific estimates, not pooled effects. Matching addresses recorded differences but cannot eliminate unmeasured motivation or institutional selection. Way et al., (2024) compared surgical with non-surgical alumni, which answers a specialty question rather than a participation question.

Table 3

Quantitative findings extracted from seven publications (study-specific statistics)

Study [ID]	Sample / contrast	Reported estimate or outcome	Interpretive limit
Bonesso et al., 2024 [2]	Postgraduate students; controls	Visionary, coaching and affiliative behaviors increased	Study population indirectly relevant to faculty.

Gottlieb et al., 2021 [30]	89 enrolled; 59 first, 33 follow-up	Knowledge 4.1/9 → 7.0/9; curricula 37/59 and 19/33	Different denominators; no concurrent controls.
Mayowski et al., 2022 [4]	Two programmes; 21 later interviews	All reported confidence items improved ($p < .001$)	No counterfactual for every endpoint.
Nahata et al., 2025 [5]	95 programme alumni; 156 unmatched controls	Leadership M 3.17 vs 2.85; $d = 0.62$, $p < .001$; clinical roles 53% vs 33%, $p = .018$	Response 64% vs 11%; baseline differences.
Ribera et al., 2026 [23]	443 vs 886 propensity matched	Promotion HR 1.57 (1.31–1.88); departure HR 0.72 (0.60–0.85); leadership OR 2.02 (1.49–2.73)	Measures career/roles, not teaching quality.
Tung et al., 2021 [25]	232 vs 232 matched	Promotion HR 1.61 (1.16–2.23); departure HR 0.23 (0.16–0.34)	Observational; residual confounding.
Zulfqar et al., 2021 [1]	37 deans/heads; six weeks	Awareness of six behaviors increased; comparable effect estimate not available	No equivalent control post-test.

Note: HR = hazard ratio; OR = odds ratio; CI ranges are 95% where specified in the source. A missing estimate is not evidence of a null effect. No estimates have been recomputed or pooled. *Source:* own elaboration.

Organizational conditions influence whether training can be used. Lizier et al., (2024) identified trust, clarity and hierarchy as contextual elements of distributed leadership; Sewerin & Holmberg (2017) showed that teaching, research and managerial logics shape its expression; and Shaked (2021) described the limited priority sometimes accorded to instructional leadership. Li et al., (2022) highlighted the ways organizational culture and individual aspirations condition programme experience. Such studies explain possible mechanisms but cannot quantify programme effectiveness.

Conclusions

Across 35 publications, leadership development is described through 23 programme/development articles, 9 contextual studies and 3 reviews. The evidence points to individual competence, mentoring and collaboration as frequently documented domains, while academic-medicine cohorts additionally report promotion and retention associations. Direct measurements of teaching quality, curriculum uptake and student learning are less developed. The findings do not support a single pooled effect or a causal claim applicable to all disciplines.

The 35-article synthesis is therefore best read as a set of complementary, non-equivalent findings. Workshops and experiential practice may support short-term individual development; mentoring and protected opportunities may support transfer; and institutional career measures can be tracked in comparison cohorts. However, self-reported competence, curriculum production, promotion and student learning are distinct endpoints. Clinical promotion pathways may not transfer to humanities, engineering, or other non-clinical settings. Randomization cannot be inferred merely because an evaluation is embedded within a wider randomized project, and several reports may describe connected cohorts.

Methodological limitations include voluntary enrolment, small or single-site samples, unequal control measurements, self-report, differential attrition, and heterogeneous intervention content. Formal study-by-study risk-of-bias assessment and a reproducible search flow are not documented in the available materials. These omissions must be resolved before the review can be represented as fully reported under PRISMA 2020. The 35

papers remain the integrated corpus, while any numerical comparison is restricted to the specific original study and its population.

Future programmes should specify participants, components, implementation dose and theory of change; use baseline and comparator measures where appropriate; collect independent behavioral and pedagogical endpoints; document follow-up attrition and cohort overlap; and report student outcomes separately from career advancement. Completion of the PRISMA flow from original records and formal appraisal appropriate to each primary design remain essential publication-stage tasks.

Author contribution

Job Alberto Saavedra-Saavedra, Kevin Mario Laura-De La Cruz, Xiomira Alexandra Jaime-Torres and Pilar Valeria Zapana-Aguilar contributed to the conceptualization, literature search, study selection, data extraction, synthesis, interpretation of findings, and drafting and critical revision of the manuscript.

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