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From Research Leadership to the Re-Creation of the Research-Oriented School

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A B S T R A C T

Purpose: This study aimed to develop and empirically validate a structural model explaining the linkage between research leadership and the development of research-oriented schools at the primary education level in Diyala Province, Iraq.

Methods and Materials: The study employed a mixed-method exploratory–sequential design. In the qualitative phase, a systematic literature review and thematic narrative synthesis were conducted, followed by a qualitative Delphi process with 20 educational experts, including principals, teachers, curriculum specialists, and university faculty, to identify and refine key components of research leadership. The quantitative phase used data from 258 primary school teachers and principals selected through multi-stage cluster sampling. A researcher-designed questionnaire based on qualitative findings was administered using a five-point Likert scale. Construct validity was tested via confirmatory factor analysis (CFA), and the overall structural model was evaluated using variance-based structural equation modeling (SEM). Reliability was assessed through Cronbach's alpha and composite reliability indices.

Findings: Results of CFA and SEM confirmed that all factor loadings exceeded the minimum threshold of 0.30 and that all paths were statistically significant (t-values > 1.96). Fit indices indicated strong model adequacy (RMSEA = 0.042, GFI = 0.96, NFI = 0.97). The constructs of research vision, distributed leadership, structural support, data-informed decision-making, and evidence-based accountability emerged as the strongest predictors of research-oriented schooling. Cronbach's alpha coefficients exceeded 0.70 for all variables, confirming internal consistency and reliability.

Conclusion: The validated model demonstrated that research leadership—characterized by shared vision, distributed authority, and evidence-driven decision-making—serves as the structural and cultural foundation for creating and sustaining research-oriented schools.

Keywords: *Research leadership; Research-oriented school; Learning organization; Data literacy; Evidence-informed practice; Structural equation modeling; Iraq.*

1. Introduction

Around the world, policy makers and school leaders have shifted attention from narrowly defined accountability regimes toward cultures of inquiry that position schools as sites of knowledge production rather than mere knowledge transmission. This turn foregrounds "research leadership" as a distinctive capability: the work of designing conditions in which teachers and students systematically ask questions, gather and interpret evidence, and iterate instructional responses in ways that are locally meaningful and publicly learnable (Brown & Malin, 2020). The conceptual roots of this movement lie in classic theories of the learning organization, which argue that durable improvement depends on shared vision, team learning, and disciplined use of data to challenge routines and assumptions (Senge, 1990). In education, these ideas have been translated into practical frameworks for schools-as-learning-organizations that align structures, culture, and professional learning around continuous inquiry and collective efficacy (Oecd, 2016). As a result, "research-engaged schools" have emerged as a reform strategy that integrates evidence-informed practice, knowledge brokering, and networked professional learning communities to close the persistent research–practice gap (Farley-Ripple & Grajeda, 2020; Godfrey & Brown, 2019; Prenger et al., 2019).

Evidence-informed practice is not reducible to adopting external findings; it is an interactional process in which practitioners frame problems, generate or access relevant evidence, and test change ideas in authentic settings (Brown & Malin, 2020). Reviews of professional learning communities underscore that such collaborative structures can be powerful engines for inquiry when they are guided by norms of trust, disciplined dialogue about evidence, and explicit cycles of improvement (Stoll et al., 2006). Yet PLCs do not become research-engaged on their own. They require enabling leadership that distributes authority, allocates time and tools for inquiry, and mobilizes internal and external expertise to sustain disciplined experimentation (Mills, 2025). Recent scholarship on teachers' research engagement likewise shows that motivation, identity, and perceived value are shaped by contextual affordances—leadership signals, workload, access to data, and opportunities to share and scale findings (Kowalczuk-Walędziak, 2024). Together, these strands point to research leadership as a system property that links people, resources, and routines so that evidence can function as an everyday improvement technology rather than a compliance artifact (Brown & Malin, 2020; Mills, 2025).

Two intertwined infrastructures make such leadership actionable: data literacy and collaborative inquiry routines. Data literacy frameworks clarify how educators pose questions, select and transform data, interpret patterns, and translate insights into instructional action while attending to validity, ethics, and equity (Mandinach & Gummer, 2016). Practitioner-oriented guides operationalize these ideas into stepwise cycles (e.g., identifying learner-centered problems, setting measurable goals, examining interim assessments, and designing responsive lessons), thereby making evidence use visible and improvable within faculty work (Boudett et al., 2013). When these technical routines are embedded within the cultural architecture of a learning organization—shared purpose, psychological safety, and distributed expertise—schools can localize research in ways that are both rigorous and responsive (Oecd, 2016; Senge, 1990).

The ecosystem perspective further extends the unit of analysis beyond a single school. Research use is socially organized across boundaries by knowledge brokers who translate, tailor, and mediate research for practitioners, while also channeling practitioner knowledge back to researchers (Farley-Ripple & Grajeda, 2020). Networked professional learning communities provide the social substrate for this brokerage by enabling teachers to co-design inquiries, compare evidence across contexts, and iterate interventions more quickly than isolated schools could manage (Prenger et al., 2019). Recent accounts of research-engaged ecosystems emphasize the need for intentional leadership roles, intermediary organizations, and routines for evidence mobilization so that research does not "bounce off" practice but is absorbed and adapted within local improvement cycles (Godfrey & Brown, 2019).

These organizational and ecosystemic advances intersect with pedagogical movements that inherently require inquiry, such as project-based learning (PBL) and design-thinking approaches. Syntheses in early science education show that PBL fosters conceptual understanding when teachers orchestrate sustained investigations, scaffold inquiry processes, and assess learning formatively (DongJin, 2024). In higher and professional education, design-thinking provides a structured, evidence-seeking, user-centered method for framing problems and iterating solutions, reinforcing habits of mind that schools also need for organizational learning (Bouhaï, 2025). Empirical work in secondary and tertiary settings demonstrates that PBL can improve social and cognitive skills and support conceptual

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gains in demanding subjects (e.g., heat transfer), particularly when integrated with inquiry cycles like the 5E model and when teachers receive support to align assessment, reflection, and revision (Firdausih & Yusnelli, 2025; Prasopsuk et al., 2024). At the student level, PBL appears to cultivate "learning-to-learn" competence and self-efficacy—outcomes that reciprocally enable deeper inquiry and sustained engagement with evidence (Chan et al., 2025). At the system level, digitally mediated infrastructures (e.g., smart learning platforms) can expand access to curated resources, after-school inquiry activities, and data dashboards that make PBL work more visible and coachable, provided that schools attend to issues of equity, privacy, and teacher workload (Dan, 2025).

For research leadership, these pedagogical demands are not peripheral; they are constitutive. Leading for PBL or for design-rich curricula requires the same enabling conditions—protected time, collaborative protocols, accessible data, and cross-boundary partnerships—that define research-engaged schools (Bouhaï, 2025; Mills, 2025). Moreover, leadership that empowers teachers has downstream effects on teacher autonomy and academic optimism, which in turn predict willingness to take inquiry risks, test new practices, and persist through iterative refinement (Tankutay & Çolak, 2025). Studies of boundary objects—such as performance assessments that organize professional dialogue across university and school settings—suggest how artifacts can be designed to carry knowledge across institutional borders, stabilize meaning, and focus joint work, thereby operationalizing the "ecosystem" ideal in everyday routines (Morrison et al., 2025). Complementarily, research monitoring strategies at the school level—tracking the quality of knowledge acquisition and its instructional uptake—illustrate how measurement can serve learning when orchestrated by leaders who treat indicators as formative tools rather than punitive targets (Risnazarov et al., 2025).

Despite this alignment, implementation remains uneven. Time scarcity, initiative overload, and fragmented supports often lead to episodic projects rather than sustained research habits. Reviews of PLCs caution that collegiality without disciplined attention to evidence can reinforce comfortable routines rather than challenge them (Stoll et al., 2006). Similarly, data initiatives that lack clear inquiry purposes or that overwhelm teachers with raw numbers—without scaffolds for interpretation and action—can degrade trust and reduce instructional focus (Boudett et al., 2013; Mandinach & Gummer, 2016). The ecosystem literature adds that, absent intentional brokerage, research remains "decoupled" from classrooms, circulating within academic networks rather than teacher teams (Farley-Ripple & Grajeda, 2020). In response, contemporary accounts of research-engaged environments recommend that leaders specify "theories of action" linking data, professional learning, and classroom change; invest in coaching that helps teams enact inquiry cycles; and cultivate external partnerships that expand the repertoire of evidence and improvement methods accessible to schools (Brown & Malin, 2020; Godfrey & Brown, 2019; Mills, 2025).

The OECD's articulation of schools as learning organizations provides a useful integrator for these moves. It highlights seven action domains—developing a shared vision, promoting team learning and collaboration, establishing a culture of inquiry and innovation, using systems to collect and exchange knowledge, learning with and from the external environment, modeling and growing learning leadership, and aligning strategy, structures, and resources (Oecd, 2016). When combined with organizational learning principles—systems thinking, mental models, shared vision, team learning, and personal mastery—these domains supply a coherent architecture for research leadership that is simultaneously cultural, structural, and technical (Senge, 1990). The practical implication is that leaders should (a) make inquiry "the way we do work here" by scheduling protected time and using boundary objects to focus collective analysis; (b) scaffold teacher data literacy and improvement science methods; and (c) build partnerships and networks that provide access to diverse evidence and design support (Boudett et al., 2013; Mandinach & Gummer, 2016; Morrison et al., 2025; Prenger et al., 2019).

Recent international developments underscore both opportunities and risks. Smart platforms promise to widen the reach of project-based and inquiry-rich learning, but they also generate vast data streams that can distract or distort if not grounded in a clear instructional purpose and robust ethical safeguards (Dan, 2025). Systematic reviews and implementation studies indicate that PBL's positive effects depend on teacher expertise in orchestrating inquiry, which in turn depends on job-embedded learning and leadership that protects time for rehearsal, reflection, and redesign (DongJin, 2024; Firdausih & Yusnelli, 2025; Prasopsuk et al., 2024). At the same time, empowering leadership is linked to teacher autonomy and optimism—psychosocial resources that mediate the uptake of inquiry practices, especially under uncertainty (Tankutay & Çolak, 2025).

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Designing schools that are simultaneously research-engaged and instructionally ambitious thus requires coherent leadership that aligns roles, resources, routines, and partnerships around a lived vision of evidence-informed improvement (Godfrey & Brown, 2019; Kowalczuk-Walędziak, 2024; Mills, 2025).

From a capacity-building standpoint, three levers appear pivotal. First, leaders must cultivate teacher data literacy as an integrative competence—statistical, ethical, and pedagogical—so that evidence can be interpreted in context and translated into actionable change ideas (Mandinach & Gummer, 2016). Second, they must institutionalize collaborative inquiry routines that make the work public: protocols for examining student work, prediction–test cycles for instructional strategies, and quick-turn evidence reviews tailored to local questions (Boudett et al., 2013; Stoll et al., 2006). Third, they must position schools within networks that supply ideas, exemplars, and critical friends, including universities and professional bodies that can act as knowledge brokers and co-researchers (Farley-Ripple & Grajeda, 2020; Morrison et al., 2025; Prenger et al., 2019). When these levers are pulled together, research-engaged schooling becomes less a program and more a property of the system—reproduced daily in decisions about goals, assessments, pedagogy, and resource allocation (Brown & Malin, 2020; Oecd, 2016).

Pedagogically, the alignment with PBL and design-thinking is strategic. PBL's emphasis on authentic problems, sustained inquiry, and public products mirrors the organizational learning cycle at the system level; leading PBL well is therefore a proving ground for research leadership (Chan et al., 2025; DongJin, 2024). Design-thinking's iterative, user-centered stance complements this by training teachers and students to treat feedback as fuel for learning, thereby reinforcing the culture of evidence use that research-engaged schools require (Bouhaï, 2025). Studies in engineering and science education demonstrate that when leaders integrate these pedagogies with structured inquiry routines and supportive technologies, learners' outcomes improve and teachers' professional judgment becomes more evidence-responsive (Dan, 2025; Prasopsuk et al., 2024). Moreover, school-level monitoring of research processes—tracking the quality of questions, data sources, and action cycles—helps ensure that inquiry remains consequential for teaching and learning rather than drifting into documentation for its own sake (Risnazarov et al., 2025).

The emerging consensus is therefore not merely conceptual but actionable: research leadership is the connective tissue that turns evidence into improvement by orchestrating people, processes, and partnerships around coherent inquiry. It draws authority from a shared vision of the school as a learning organization; it draws power from teacher autonomy and optimism nurtured by empowering leadership; it draws method from data literacy and inquiry cycles; and it draws reach from networks and boundary objects that carry learning across contexts (Boudett et al., 2013; Mandinach & Gummer, 2016; Morrison et al., 2025; Oecd, 2016; Prenger et al., 2019; Senge, 1990; Tankutay & Çolak, 2025). What remains under-specified in many settings, however, is a context-sensitive structural model that shows how these elements cohere in primary schooling—where time, assessment regimes, and staffing patterns differ from secondary contexts—and that tests, empirically, the pathways through which leadership practices translate into research-oriented school outcomes (Godfrey & Brown, 2019; Kowalczuk-Walędziak, 2024; Mills, 2025).

Against this backdrop, the present study develops and validates a structural model of the linkages between research leadership and the development of research-oriented schools at the primary level, integrating data literacy and inquiry routines, PLC and network participation, empowering leadership, and PBL/design-thinking–aligned pedagogies into a coherent, evidence-informed framework suitable for local adaptation and empirical testing in Diyala.

2. Methods and Materials

This study employed a mixed-methods design with an exploratory–sequential approach. In this design, the qualitative phase was conducted first to identify and explain the dimensions and components of the linkage between research leadership and the research-oriented school. Based on the qualitative findings, the quantitative phase was then implemented to empirically test the conceptual model and assess the validity of constructs and structural relationships. Therefore, the qualitative component served as the theoretical and analytical foundation of the study, while the quantitative component played the role of empirical verification and generalization of findings. This methodological combination allowed the study to benefit from both the depth and interpretive nature of the qualitative approach and the generalizability and statistical precision of the quantitative method.

The qualitative research field was defined in two distinct phases. In the first phase, based on a systematic review and thematic narrative synthesis, the research population

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consisted of all scholarly articles, books, dissertations, and credible national and international documents related to the research-oriented school, organizational learning, knowledge management in schools, and the development of research capacity in educational systems. In this phase, the research sample included texts and sources selected according to specific inclusion criteria, such as direct thematic relevance to research leadership and the research-oriented school, publication within a defined time frame, and scientific credibility. The selected texts were identified through a systematic search strategy in reputable domestic and international databases. Thematic narrative synthesis was then applied to extract, categorize, and analyze the data in the form of overarching and sub-themes.

In the second qualitative phase, which was based on the qualitative Delphi method, the research population consisted of experts and scholars in educational management, curriculum planning, philosophy of education, as well as experienced principals and teachers with substantial lived experience in research-oriented schooling and the institutionalization of research within school environments. The research sample in this phase was selected through purposeful and judgmental sampling. Theoretical criteria for expert selection included holding academic expertise in relevant fields, possessing credible research or executive experience, and expressing willingness to actively participate in the Delphi process. The number of participants was determined based on theoretical saturation and group consensus; qualitative data were collected, refined, and analyzed over several rounds of interaction.

Practically, the inclusion criteria for experts consisted of: (1) managerial or instructional leadership experience in primary schools of Diyala Province or related upper administrative levels; (2) research and action-research experience or participation in school development programs; and (3) familiarity with evidence-based approaches. Based on purposeful sampling, 20 participants were selected, representing diverse roles such as school principals, lead teachers/educational mentors, curriculum and evaluation specialists in educational departments, university faculty with field experience, and representatives of inter-school intermediary institutions or networks. Participation was voluntary and based on informed consent, confidentiality assurance, and anonymity. For transparency, a summary of preliminary operational definitions of components, boundaries, and observable examples was shared with the experts, along with the agenda for each Delphi phase. A unified communication channel was established to receive feedback and inquiries. The main data collection tools in all Delphi phases were open-ended questions and requests for elaboration and examples. Emphasis was placed on the qualitative reasoning and contextual evidence provided, rather than merely positive or negative votes.

The quantitative phase targeted all teachers and principals of secondary schools in Iraq, as they are the primary actors in the research-oriented school process. Due to the extensive population and logistical constraints, a multi-stage cluster sampling method was used to ensure geographical and organizational diversity. The sample size was determined based on the requirements of Partial Least Squares (PLS) structural equation modeling, which typically recommends a minimum of ten times the largest number of formative or reflective paths leading to a construct in the model. Accordingly, a sample size of approximately 258 participants was deemed appropriate for final analysis.

In the qualitative section, the primary data collection tool in the first phase was a data extraction checklist from academic studies and texts, developed based on pre-designed indices such as publication year, study type, subject, and key findings. In the second phase, data were collected through open-ended and semi-structured Delphi questionnaires, distributed to experts in multiple rounds and gathered either in written or online formats. This tool allowed iterative refinement, review, and consensus-building regarding themes and components. In the quantitative section, the research instrument was a researcher-made questionnaire on the research-oriented school, designed based on clusters and components identified in the qualitative phase. The questionnaire included items on a five-point Likert scale to assess the importance of each component in shaping the construct of the research-oriented school. After its initial design, the questionnaire was revised through expert review and tested in a pilot study for reliability and validity.

The validity of qualitative findings was ensured through strategies such as peer debriefing, participant validation, and data and source triangulation. In the first phase, accuracy in resource selection and transparency of inclusion criteria were indicators of validity and reliability, while in the second phase, achieving theoretical consensus among experts served as an additional validation index. In the quantitative phase, content validity was assessed using Content Validity Ratio (CVR) and Content Validity Index (CVI), while construct validity was evaluated through confirmatory factor analysis and structural equation modeling. Reliability was assessed using Cronbach's alpha and composite reliability coefficients.

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In the qualitative section, data analysis in the first phase was performed using thematic narrative synthesis, meaning that findings from selected studies were integrated both descriptively and analytically, followed by the extraction of main and sub-themes. In the second phase, Delphi data were analyzed through qualitative content analysis and iterative consensus-building to identify and confirm the final components of the conceptual model of the research-oriented school. In the quantitative section, questionnaire data were first processed using descriptive statistics and then analyzed through variance-based structural equation modeling (PLS-SEM) to test the conceptual model. This method was selected for its ability to handle complex models, reduced dependency on large sample sizes, and suitability for non-normally distributed data. Both the measurement model (including factor loadings and construct validity) and the structural model (including model fit indices) were evaluated.

Ethical principles were rigorously observed in both qualitative and quantitative phases. In the systematic review phase, all sources were cited accurately, and data distortion was strictly avoided. In the Delphi phase, participants joined voluntarily after being fully informed about the research objectives, and their responses were kept confidential. In the quantitative phase, respondents were informed of the study's purpose and data usage before completing the questionnaire, and their participation was entirely voluntary. All collected data were used exclusively for scientific purposes, and no individual names or school identities were disclosed in the reports.

3. Findings and Results

This section reports the activities undertaken for data analysis leading to the research findings. As mentioned in the methodology section, the analysis of the research questions was conducted in three phases. The first phase involved a systematic review, the second phase employed a qualitative Delphi method, and the third phase used factor analysis and structural equation modeling. The analyses are reported sequentially below.

Analysis of Research Question 1: What clusters can be identified within the linkages between research leadership and the research-oriented school?

Phase One Analysis: Systematic Review

The scope of the review, guided by the systematic review question, covered the international literature from 2006 to 2025 in the field of schooling, particularly at the primary education level; however, cross-level studies that explained the organizational nature of schools were also included. The initial conceptual framework encompassed the following concepts: "school as a learning organization," "professional learning communities," "action research and practitioner inquiry by principals and teachers," "evidence-informed decision-making and data literacy," and "knowledge brokering and external networks." These concepts were then merged and redefined during the synthesis process. Searches were conducted in key academic databases (Web of Science, Scopus, ERIC) and academic/institutional publishing gateways using a combination of English keywords such as *research-engaged school*, *research-rich school*, *evidence-informed practice*, *school as learning organization*, *professional learning community*, *lesson study*, *teacher inquiry*, *knowledge brokering in education*, and *data literacy for teachers*, combined with *primary/elementary*.

Policy and guidance documents from credible institutions (OECD, EEF, UCL IOE, Chartered College of Teaching, UNESCO/BE2) were also included to cover the organizational and ecosystemic dimensions of schools. Inclusion criteria consisted of direct relevance to the "research-oriented school," reliance on validated research or systematic reviews, and transferability to the primary level. The validity of the sources was assessed based on publisher and journal credibility, methodological clarity, and secondary citations. For data analysis, thematic narrative synthesis was applied. First, core themes were extracted from classical sources (school management, culture and norms of collective learning, practitioner research by principals and teachers, the learning school), and then these were integrated with recent evidence on "evidence ecosystems," "knowledge mediation," and "research-engaged school networks" to form clusters of recurring dimensions. The dimensions and their components, emphasizing their application in primary schools, are described below. The results of this review are presented in Table 1.

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Table 1

Results of the Systematic Review for Reconceptualizing the Linkages between Research Leadership and Research-Oriented Schools

Dimensions	Components	Reference Sources
Research-Oriented Leadership	Research-based vision and policy; time structures for teacher inquiry; formal mechanisms for evidence-based decision-making; distributed and accountable leadership; feedback and organizational learning monitoring systems.	Brown & Malin, 2020; OECD, 2016
Culture and Norms of Collective Learning	Inquiry and reflection norms; active professional learning communities; data-/research-based dialogues; professional trust and peer accountability.	Stoll et al., 2006; SpringerLink
Teachers' Professional Capacity for Research and Evidence Use	Skills in action research and classroom study design; lesson study and peer observation; data literacy (collection, interpretation, action); targeted in-service training for evidence-based practice.	Mandinach & Gummer, 2016; Smith & Lytle, 2009; Lewis, 2011
Evidence, Data, and Knowledge Infrastructure	Institutional access to databases and comprehensible summaries; standardized data-cycle processes; defined roles and time for analysis and action; school knowledge repositories.	Stoll et al., 2006; OECD, 2016
Knowledge Mediation and Networks (Evidence Ecosystem)	Mediating roles and mechanisms; formal partnerships with universities/professional bodies; participation in school networks; routines for co-design and intervention trials.	Godfrey & Brown, 2019; Farley-Ripple & Grajeda, 2020
Organizational Learning, Feedback, and Continuous Improvement	Improvement cycles; documentation and knowledge transfer; structured reflection sessions; curriculum and assessment alignment with inquiry.	OECD, 2016; Farley-Ripple & Grajeda, 2020
Educational Equity, Contextualization, and Responsiveness to Local Needs	Targeting achievement gaps; cultural and linguistic adaptation of interventions; identification of "school-based problem areas"; equitable outcome assessment.	OECD, 2016; UNESCO/BE2, 2024

According to the initial results of the systematic review, the research-oriented school begins with leadership that explicitly formulates and institutionalizes an evidence-based learning vision in daily processes. Such leadership is not merely "supportive of research" but acts as a "leader of learning"—creating protected time, structures, and incentives for professional inquiry; mandating evidence use in educational and programmatic decisions; and distributing responsibility across the field. Within this framework, the school transforms into a learning organization that embeds systems for knowledge collection/sharing, cyclical feedback, and external learning integration (OECD, 2016). Moreover, studies show that leaders play a critical role in knowledge mediation and brokerage, such as organizing exchange meetings, defining school research priorities, and facilitating access to resources. As a result, diverse clusters of dimensions and components can be formulated. Each dimension was operationalized into components that can serve as the foundation for designing data collection tools (semi-structured interviews, construct-based questionnaires, and school document analysis) and subsequent modeling phases. This model aligns with validated international literature and can be localized for the context of Diyala, Iraq, through adaptation to conditions such as limited resources, inter-school and university partnerships, and peer-based professional development.

Phase Two Analysis: Examination of Components Using the Qualitative Delphi Method

As described in the methodology section, the Delphi process first focused on the content validity, conceptual coverage, and contextual localization of the components extracted from the systematic review. The inclusion criteria for experts consisted of managerial or instructional leadership experience in primary schools of Diyala Province or related upper administrative levels; research/action research experience or participation in school development programs; and familiarity with evidence-based approaches. Based on purposeful sampling, 20 participants representing diverse roles (school principal, lead teacher/educational mentor, curriculum and evaluation specialist in the education department, university faculty member with field experience, and representative of an intermediary institution or inter-school network) participated voluntarily with informed consent, confidentiality assurance, and anonymity. For transparency, a summary of each component's origin—containing preliminary operational definitions, boundaries, and observable examples—along with the agenda for each Delphi round, was provided to the experts. A single communication channel was established to collect feedback and queries. Data collection tools for all Delphi phases included open-ended questions and requests for elaboration and examples, with an emphasis on qualitative reasoning and contextual evidence rather than binary voting.

Delphi Initial Phase (Orientation and Contextual Calibration Meeting):

Before the official rounds, an orientation meeting was held with four local experts to clarify key terminology, the

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Diyala context, and process expectations. It was established that for some components, alignment of wording with the professional language used in Diyala schools was essential. It was also agreed that each round would last no more than ten days and that anonymized collective feedback would be presented at the beginning of the next round to balance "independent judgment" with "collective learning."

Delphi Phase One (Content Validity, Definition Clarity, and Conceptual Coverage):

In the first Delphi round, each expert was asked to respond narratively to three questions for each component:

(1) "To what extent is this component relevant and necessary in the context of primary schools in Diyala with regard to the idea of research-oriented schools, and why?"

(2) "What ambiguities or overlaps exist between the proposed definition and other components?"

(3) "What observable behavioral/process indicators of this component can be identified in schools?"

Experts were also invited to suggest "missing components" or "subcomponents that should be separated." The responses were analyzed using the constant comparison method. Initial coding was organized around three criteria: "necessity and relevance," "clarity and delineation," and "observability and operationalizability." Results of the first round showed that a strong majority of experts considered the overall framework of clusters and their associated components to be "generally appropriate and adaptable to the local context."

Delphi Phase Two (Redefinition, Merging or Differentiation, and Additions):

Based on feedback from the first round, a revised package was sent to experts containing refined component definitions, clearer boundaries, school-based examples, and analytical notes on overlaps and gaps. In this round, experts were asked to provide written arguments for merging overlapping components or adding new suggested ones and to explain the practical implications of such modifications for implementation in Diyala schools. Agreement in this round was defined not by vote counting but by "convergence of reasoning"—that is, when most experts, supported by experiential evidence, examples, and practical logic, moved toward a common formulation and when disagreements shifted from "conceptual" to "operational preference" levels, qualitative consensus was considered achieved.

Delphi Phase Three (Collective Feedback, Finalization, and Definition Audit):

In the third round, a version containing the final definitions of components, their boundaries and exclusions, and observable school-based examples, along with a composite note summarizing majority and minority arguments, was distributed for member checking. The focus of this stage was stability—whether another round would lead to any meaningful changes in judgment. Responses showed that the remaining disagreements were mostly of an "implementation preference" nature (e.g., the order of introducing certain components in a school's annual plan) rather than conceptual differences. Therefore, the process was concluded in the third round with sufficient stability declared. For transparency, an audit trail was attached, including documentation of definition revisions, reasons for merging/adding, and anonymized expert quotations, enabling traceability of reasoning influences on the final formulation.

Report of Qualitative Delphi Findings: Narrative Summary

The qualitative Delphi analysis confirmed the multi-cluster structure linking research leadership and research-oriented schools while achieving conceptual alignment and contextual operationalization of components for the Diyala setting. The primary outcome of this phase was the confirmation of the central role of research-oriented leadership as the "focal point of emergence of the research-oriented school." Experts emphasized that without distributed research leadership—one that institutionalizes protected time for inquiry, structured reflection sessions, and mandatory policies for evidence use—other components would remain "episodic projects" rather than "sustainable practices." Ultimately, the integration of merged and added components enabled the study to remain both faithful to the evidence base of the systematic review and grounded in local professional consensus. These indicators, though not converted into quantitative checklists, serve as guiding narratives for developing subsequent data collection tools (semi-structured interviews and construct-based questionnaires) and are shared with school implementers as "benchmark narratives."

Beyond achieving conceptual consensus, the qualitative Delphi process also generated an implicit implementation roadmap. Experts reached a tacit agreement on a logical sequence for linking research leadership with research-oriented schools in Diyala, noting that in practice, transitions among these stages would be iterative and context-dependent. Based on the Delphi consensus, four narrative operational steps were recommended:

(1) Developing a "Definitions and Boundaries Manual" for components to establish a common language between

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researchers and schools, to be distributed to all participants at the beginning of field data collection.

(2) Creating a "Semi-Structured Interview Guide" derived from observable indicators of each component to enhance the quality of qualitative field data.

(3) Transforming components into questionnaire constructs with clear, context-based behavioral items and revalidating their content through brief expert review.

(4) Designing a "Mid-Level Support Map" (education departments/networks) to enable subsequent quantitative–qualitative data to more precisely reveal the supportive role of intermediary structures as a necessary condition for linking research leadership with research-oriented schools.

After finalizing the manual, the semi-structured interview guide was prepared based on observable indicators of each component to ensure the quality of field-level qualitative data. This process prepared the groundwork for analyzing the second research question, which is reported in the following section.

Analysis of the Second Research Question: "In what structural model can the clusters inferred in the qualitative phase be formulated?"

In line with this question, a model needed to be designed for linking the development of research-oriented schools with research leadership at the primary level in Diyala that could be validated both theoretically (through expert consensus) and empirically (with field data). From this perspective, the best path for addressing the second question is to first construct a conceptual model based on the Delphi findings and then validate it with field data through factor analysis and structural equation modeling. The output of this stage will be a validated structural model for explaining research-oriented schools. This is a descriptive–narrative model for "designing a model of the linkage between research leadership and the development of research-oriented schools at the primary level in Diyala Province."

The proposed model suggests a multilevel structural mechanism of influence in which the extracted clusters are defined as latent constructs and the causal and functional relationships among them are described. Solid arrows indicate explicit and direct relationships among dimensions, whereas dotted arrows denote latent and indirect relationships. According to this model, at the conceptual level, "research-oriented leadership" plays the role of an exogenous/antecedent variable that, through direct and indirect mediation, shapes the attainment of "outcomes and achievements of the research-oriented school." At the same time, "inferred indicators" are introduced as moderating or mediating constructs that amplify effects, facilitate knowledge transfer and durability, and condition the orientation of linkages between research leadership and research-oriented schools to contextual factors. To assess the initial validity of this model, the focus was placed on four preferred criteria: fit, comprehensibility, generalizability, and controllability. These four criteria were judged by 15 experts proficient in modeling and the relevant field using a six-question, five-point Likert-type scale. The collected data were evaluated with a one-sample t test, the results of which are shown in Table 2.

Table 2

Estimated Adequacy of the Designed and Validated Model (Expected Mean = 3)

Criteria	Questions Based on the Criteria	Mean	Standard Deviation	Test Statistic (t)	Significance
Fit	Have the concepts been generated from the data under review?	3.88	0.446	7.207	0.000
Comprehensibility	Are the concepts identifiable and systematically interrelated in an overall manner?	3.47	0.552	11.66	0.000
	Have the categories been well formulated?	3.95	0.454	7.344	0.000
Generalizability	Has the theory been explained in such a way that it considers varying changing conditions?	3.53	0.422	8.823	0.000
	Have broader conditions that may affect the phenomenon under study been described?	3.33	0.477	5.975	0.000
Controllability	Do the theoretical findings appear to be important?	3.56	0.536	6.212	0.000

The results in Table 2 indicate that for all criteria, the calculated t statistic is significant at the 0.01 level. Moreover, comparing the mean of all criteria with the expected mean shows that, from the specialists' viewpoint, the model exhibits acceptable fit and has been confirmed with 99% confidence. At this stage, it is necessary to convert the components into questionnaire constructs with clear, context-based behavioral items. To accomplish this, it was determined that a fresh remapping of the constructs identified thus far should be provided.

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At the end of the qualitative phase of this study, it is necessary to redefine the main cluster as a latent construct. These constructs must first be renamed and then, for each construct, a sufficient number of observable or measurable indicators must be developed so that they are suitable for structural equation modeling. Accordingly, the naming of the constructs was revised. Each indicator can later be converted into one or more explicit questionnaire items. The constructs and their corresponding indicators are introduced below. In the remapping of constructs, the pivotal cluster was named "Research Leadership." The indicators related to this cluster and their definitions are presented in Table 3.

Table 3

Constructs of the "Research Leadership" Cluster in Linkage with the Research-Oriented School

Indicators	Definitions
School Research Vision	The existence of an official, clear, and inspiring vision that presents research as one of the school's core missions.
Mission Statement and Research Values	The embedding of research values in the school's mission and the alignment of educational goals with school-based knowledge production.
Allocation of Protected Time for Research	Regular planning and allocation of specified time for teachers' research activities without interfering with daily instructional duties.
Provision of Structural Support for Research	Anticipation of organizational, incentive, and logistical resources for conducting research at the school level.
Distributed Leadership in Research	Participation of the principal, deputies, and teachers in research-related decision-making and role sharing instead of managerial centralization.
Principal's Research Role Modeling	The principal's practical role as a model in conducting or supporting school-based research.
Evidence-Based Policies and Guidelines	The design and implementation of internal bylaws and policies based on data and empirical evidence.
Incentive and Reward System for Research	The existence of motivational mechanisms (material or non-material) to recognize teachers and staff who are active in research.
Capacity-Building for Middle Leaders	Preparing lead teachers, deputies, and instructional coordinators to assume leadership roles in research activities.
Creating a Research-Based Accountability Culture	The principal's emphasis on using research results in decision-making and on accountability to the school community based on data.
Research Networking Among School Leaders	Participation of the principal and school leaders in regional and national networks to exchange research experiences and benchmark other schools.

These eleven indicators cover a fuller spectrum of research leadership—from "vision and values" to "policy-making, motivation, capacity-building, and networking."

Following multiple rounds of remapping clusters and indicators linking research leadership to the development of research-oriented schools—which constitute the outputs of the first and second research questions—and after multilayered qualitative validations, appropriate conditions were created to guide the study into the quantitative phase. The quantitative analyses of the study are reported next within the process of analyzing the third research question.

Analysis of Research Question Three: How valid and well-fitted is the formulated model—linking research leadership to the development of research-oriented schools at the primary level in Diyala Province, Iraq—from an empirical standpoint?

To analyze this question, the structural equation modeling (SEM) method was preferred. This analytical model enables both the confirmatory factor analysis (CFA) of the designed model and the capability to validate the model. To this end, it was necessary to convert the model designed in the qualitative stage—based on the clusters and indicators inferred for linking research leadership to the development of research-oriented schools—into an appropriate questionnaire for implementing SEM. The designed questionnaire included the following items:

To what extent is the existence of a clear research vision for the school important in shaping a research-oriented school?

To what extent is embedding research values in the school's mission statement important for guiding educational activities?

To what extent does the allocation of specified and protected time for teachers' research activities play a role in realizing a research-oriented school?

To what extent is anticipating structural supports (such as resources and logistical backing) effective in strengthening school-based research?

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To what extent is the participation of the principal, deputies, and teachers in research-related decision-making necessary for achieving research leadership in the school?

To what extent is the principal's role as a practical model in conducting research important for developing the school's research culture?

To what extent are the formulation and implementation of evidence-based policies and guidelines effective in properly orienting the school's educational decisions?

To what extent is the existence of incentive and reward systems for research activities important for motivating and sustaining the school's research efforts?

To what extent is the preparation and empowerment of middle leaders to guide research vital for the success of the research-oriented school?

To what extent is the principal's emphasis on evidence-based accountability and research results important for institutionalizing research?

To what extent is the participation of the principal and school leaders in regional and national networks important for expanding experiences and benchmarking research practices?

After preparation and multiple rounds of revision, this questionnaire was distributed among a sample previously described in the methodology section. The demographic information of this sample group is described below.

In this section, the demographic characteristics of the research sample are described in terms of gender, age, education, and work experience. Descriptive analysis of the data shows that, of all respondents in the quantitative section of this study, 104 were men and 154 were women, indicating gender balance. In terms of age, 48 respondents were under 30 years old, 81 were between 31 and 40, 91 were between 41 and 50, and 38 were over 51. Regarding educational attainment, 154 respondents held a bachelor's degree, 101 a master's degree, and 3 a doctorate. Based on professional experience, 62 respondents had less than 10 years of experience, 110 had 11–20 years, 53 had 21–30 years, and 33 had over 31 years. Overall, the demographic profile of the study sample exhibits adequate diversity and demographic qualifications.

To conduct the descriptive analysis of the research constructs, measures of central tendency and dispersion were used, and the results are reported in Table 4.

Table 4

Descriptive Statistics of the Constructs Linking Research Leadership to the Development of Research-Oriented Schools

Constructs	Mean	Standard Deviation	Variance	Skewness	Kurtosis
School Research Vision	3.201	0.453	0.206	0.060	-0.087
Mission Statement and Research Values	3.855	0.448	0.200	-0.494	1.619
Allocation of Protected Time for Research	3.814	0.589	0.347	-0.392	0.193
Provision of Structural Support for Research	3.430	0.619	0.383	-0.278	-0.409
Distributed Leadership in Research	3.324	0.653	0.426	-0.238	-0.491
Principal's Research Role Modeling	3.627	0.643	0.414	-0.094	-0.116
Evidence-Based Policies and Guidelines	3.255	0.651	0.424	-0.567	0.015
Incentive and Reward System for Research	3.755	0.458	0.400	-0.394	0.629
Capacity-Building for Middle Leaders	3.343	0.698	0.437	-0.429	0.439
Creating a Research-Based Accountability Culture	3.452	0.535	0.362	-0.267	-0.482
Research Networking Among School Leaders	3.344	0.655	0.326	-0.239	-0.471

Based on the findings in Table 4, it can be concluded that the mean of the study variables is above 3. In addition, the skewness and kurtosis values for all variables fall within the range of -2 to +2, indicating that the data follow a normal distribution. Beyond skewness and kurtosis, the Kolmogorov–Smirnov test was also used in this study to assess data normality. The statistical hypotheses for this test were formulated as follows:

H0: The study variables are normally distributed. H1: The study variables are not normally distributed.

The results of the normality test for the distribution of data in the model linking research leadership to the development of research-oriented schools are presented in the table below. Given that the Kolmogorov–Smirnov test statistic (Table 5) for all variables was calculated to be above 0.05, the normality assumption can be accepted.

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Table 5

Results of the Kolmogorov–Smirnov Test

Kolmogorov–Smirnov	Constructs
0.080	School Research Vision
0.089	Mission Statement and Research Values
0.171	Allocation of Protected Time for Research
0.108	Provision of Structural Support for Research
0.138	Distributed Leadership in Research
0.149	Principal's Research Role Modeling
0.152	Evidence-Based Policies and Guidelines
0.167	Incentive and Reward System for Research
0.136	Capacity-Building for Middle Leaders
0.150	Creating a Research-Based Accountability Culture
0.162	Research Networking Among School Leaders

Given the results in the table cited above, the use of parametric tests—including confirmatory factor analysis—for data analysis is permissible.

Confirmatory factor analysis (CFA) is one of the principal methods in SEM, aimed at testing hypothesized relationships between constructs and questionnaire items. This method allows the researcher to examine the degree of fit between empirical data and the proposed theoretical structure and to determine whether the selected indicators have the ability to explain the constructs under study. In essence, CFA is part of the measurement model and serves as the foundation for validating the entire model. This estimation pertains to the measurement component of the SEM. The strength of the relationship between items and constructs is assessed using factor loadings, which should exceed 0.30 for the relationship strength to be considered reasonable; otherwise, the item is omitted. The significance of these relationships is calculated using the t-value, which must fall outside the interval -1.96 to +1.96 to declare the relationship significant. The results of CFA for all constructs designed in the qualitative stage of the study are reported separately below. The CFA results for the Research Leadership construct are shown in Figures 1 and 2.

Figure 1

Factor Loadings of the Construct Linking Research Leadership with the Research-Oriented School

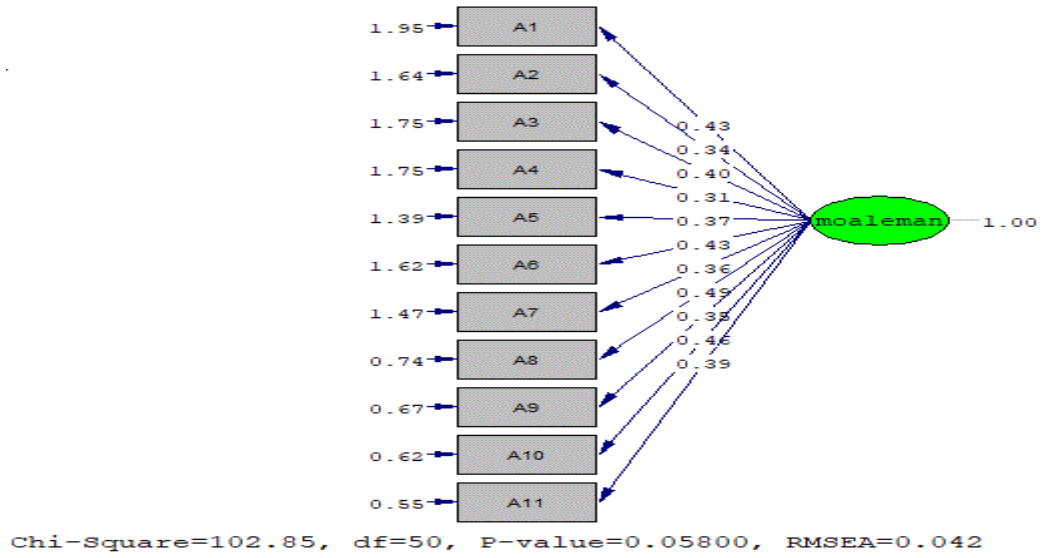

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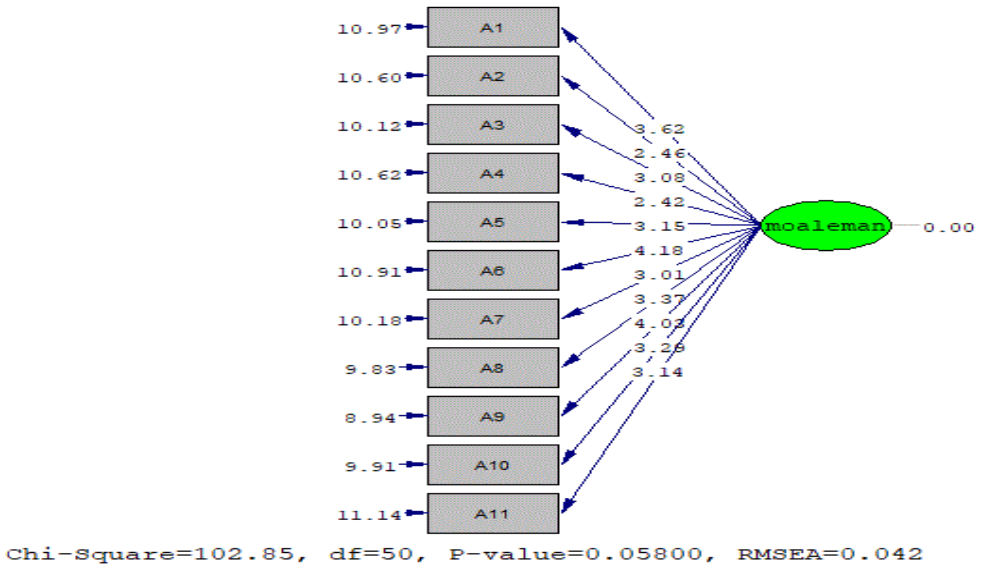
Figure 2

Significance Levels of the Construct Linking Research Leadership with the Research-Oriented School



Relying on the CFA results, it was observed that the factor loadings for all items exceed 0.30, indicating a desirable strength of the relationship between each item and its latent variable. Moreover, the t-values were obtained as greater than 1.96, confirming the significance of these relationships. The model fit indices are presented in Table 6.

Table 6

Goodness-of-Fit Indices for the Construct Linking Research Leadership to the Development of Research-Oriented Schools

Fit Indices	Acceptable Range	Calculated Value
RMSEA	Less than 0.05	0.042
χ^2/df	Between 1 and 3	2.05
GFI	Greater than 0.90	0.96
AGFI	Greater than 0.90	0.91
NFI	Greater than 0.90	0.97
IFI	Between 0 and 1	0.95

Reliability is one of the technical characteristics of a measurement instrument, indicating the extent to which the instrument yields consistent results under similar conditions. One method for calculating reliability is Cronbach's alpha. If Cronbach's alpha exceeds 0.70, the questionnaire's reliability is evaluated as acceptable. The results are reported in Table 7.

Table 7

Cronbach's Alpha Coefficients for the Study Variables

Constructs	Cronbach's Alpha
School Research Vision	0.731
Mission Statement and Research Values	0.774
Allocation of Protected Time for Research	0.852
Provision of Structural Support for Research	0.807
Distributed Leadership in Research	0.816
Principal's Research Role Modeling	0.857
Evidence-Based Policies and Guidelines	0.872
Incentive and Reward System for Research	0.800
Capacity-Building for Middle Leaders	0.826
Creating a Research-Based Accountability Culture	0.875
Research Networking Among School Leaders	0.728
Total	0.812

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The computed Cronbach's alpha coefficients in this study were greater than 0.70 for all variables. Therefore, the questionnaire's reliability is evaluated as acceptable.

4. Discussion and Conclusion

The results of this study empirically confirmed the structural model linking research leadership to the development of research-oriented schools at the primary level in Diyala, Iraq. Quantitative analyses using confirmatory factor analysis and structural equation modeling demonstrated that all indicators significantly loaded on their respective latent constructs, and all paths exhibited strong statistical significance. Fit indices such as RMSEA = 0.042, GFI = 0.96, and NFI = 0.97 confirmed the adequacy and internal consistency of the model. Furthermore, Cronbach's alpha coefficients exceeded 0.70 for all constructs, ensuring satisfactory reliability. Collectively, these findings provide robust empirical evidence that research leadership—conceptualized as a multidimensional construct encompassing vision, distributed leadership, structural support, and a culture of evidence-informed practice—is a critical antecedent to the institutionalization of research-oriented schools.

The statistical validation of the model reinforces the theoretical position that research-engaged schooling depends not on isolated teacher initiatives but on systematic leadership practices that coordinate structures, values, and routines (Brown & Malin, 2020). Specifically, the results indicated that variables such as *school research vision*, *mission statements embedding research values*, and *principal modeling of research behavior* carried high factor loadings, confirming their central role in shaping a coherent organizational direction. This aligns with the notion of the "learning organization," in which shared vision and collective inquiry form the backbone of continuous improvement (Senge, 1990). The data demonstrated that distributed leadership and structural supports—such as allocated research time and logistical assistance—were also significant contributors, echoing findings from the OECD's framework for schools as learning organizations, where resource alignment and empowerment mechanisms are fundamental to sustaining collective learning (Oecd, 2016).

These results validate the conceptual assumption that leadership which is explicitly research-oriented transcends managerial coordination and becomes a pedagogical and cultural force within the school. When principals act as role models in conducting or supporting research, they normalize inquiry as a legitimate professional practice rather than an exceptional or external activity (Kowalczuk-Walędziak, 2024). This effect is amplified when leadership responsibilities are distributed, allowing teachers and middle leaders to co-own the processes of problem identification, data analysis, and solution testing (Tankutay & Çolak, 2025). The empirical model revealed strong correlations between distributed leadership and outcomes related to teacher capacity and motivation, reflecting earlier research showing that empowering leadership enhances teacher autonomy, optimism, and willingness to engage in risk-taking associated with inquiry and innovation (Tankutay & Çolak, 2025).

Another noteworthy finding of this study is the strong influence of *data-informed decision-making* and *evidence-based policies* on the establishment of a research culture within schools. The significant factor loadings for these constructs demonstrate that data literacy is not merely a technical skill but a leadership function central to school improvement. This resonates with Mandinach and Gummer's conceptualization of data literacy as a bridging competence that connects information use to pedagogical reasoning and action (Mandinach & Gummer, 2016). The structural paths observed in this study reveal that when principals and teachers systematically use data to plan, reflect, and adjust instruction, research becomes embedded in the school's operational logic rather than remaining a peripheral or symbolic activity. The presence of a "research-accountability culture"—where evidence guides not only teaching but also self-assessment and community reporting—was shown to be a mediating factor between leadership and school outcomes, aligning with previous findings that accountability built on inquiry rather than surveillance fosters sustained engagement with evidence (Boudett et al., 2013).

Moreover, the study found that the *incentive and reward systems* for research exerted a moderate but significant impact on sustaining research engagement. These findings echo prior studies emphasizing that professional recognition—whether intrinsic or extrinsic—plays a pivotal role in transforming episodic participation in research into habitual professional behavior (Brown & Malin, 2020; Mills, 2025). However, the results also suggest that material incentives alone are insufficient without a parallel reinforcement of intrinsic motivators such as professional identity, moral purpose, and collective efficacy. This insight aligns with the argument that authentic research leadership cultivates intrinsic motivation by linking inquiry to teachers'

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moral and professional aspirations rather than compliance-based incentives (Mills, 2025).

The model also confirmed the significance of *networking and knowledge exchange* across schools, showing that participation in regional or national networks facilitates the diffusion of research-informed practices. This finding reinforces the view that research-engaged schools thrive not in isolation but within ecosystems that enable horizontal learning and knowledge brokering (Farley-Ripple & Grajeda, 2020; Godfrey & Brown, 2019). Such ecosystems transform research from a localized effort into a collective infrastructure for educational improvement. Empirically, the linkage between network participation and research capacity parallels Prenger et al.'s evidence that networked professional learning communities amplify professional capital by creating feedback loops between local experimentation and shared expertise (Prenger et al., 2019). Within the Diyala context, where material and infrastructural resources are limited, such networks appear to substitute for formal research institutions, acting as informal yet potent vehicles of professional learning.

In interpreting these findings, it is useful to situate them within contemporary shifts toward project-based learning (PBL) and design-oriented educational practices. The observed emphasis on inquiry cycles and teacher-led experimentation mirrors pedagogical principles found in PBL, where learning emerges through sustained investigation and reflection (DongJin, 2024). This pedagogical congruence reinforces the claim that research leadership and PBL share an epistemological foundation: both treat learning as an iterative, evidence-seeking process guided by authentic problems (Firdausih & Yusnelli, 2025). The integration of design-thinking frameworks within research-engaged schools offers further explanation for the empirical strength of leadership constructs that encourage creativity, prototyping, and reflection (Bouhaï, 2025). Leadership that structures time and resources for experimentation essentially operationalizes these pedagogical ideals at the organizational level, providing coherence between classroom inquiry and institutional learning.

Furthermore, the findings indicate that leadership practices fostering inquiry align with the "learning-to-learn" competencies that PBL researchers identify as essential for both student and teacher agency (Chan et al., 2025). As teachers engage in collaborative cycles of problem framing, evidence collection, and solution testing, they experience the same metacognitive growth they seek to cultivate in their students. This recursive relationship between leadership, teacher learning, and student learning underscores the systemic nature of research-engaged schooling. It also resonates with cross-national studies highlighting that PBL supported by smart learning platforms enhances data-informed reflection and extends inquiry beyond classroom boundaries (Dan, 2025). Within such environments, the principal's role evolves from evaluator to facilitator of learning ecosystems—a shift confirmed by the high factor loadings for constructs related to distributed and evidence-based leadership observed in this study.

The study's findings on *capacity-building for middle leaders* also contribute to the literature on sustainable school improvement. The confirmed positive relationships between leadership development and school research outcomes validate previous work showing that middle leaders serve as crucial conduits between strategic vision and classroom enactment (Morrison et al., 2025). By empowering these leaders, principals ensure continuity of inquiry practices even amid leadership transitions. This finding complements international evidence on empowering leadership's influence on teacher autonomy and optimism, demonstrating that distributed professional authority supports resilience and innovation in teaching teams (Tankutay & Çolak, 2025).

The confirmed model also provides empirical backing for the assertion that learning organizations depend on deliberate structures for reflection and feedback (Oecd, 2016; Stoll et al., 2006). The presence of reflective dialogue cycles, documented in the questionnaire's items and substantiated through factor loadings, demonstrates that when teachers are provided time and protocols for collective analysis of evidence, learning becomes systemic rather than individual. These feedback loops correspond to Senge's "fifth discipline"—the integration of personal mastery, shared vision, and team learning into continuous cycles of organizational learning (Senge, 1990). The Diyala data confirm that even under resource constraints, schools can embody these principles when leadership intentionally aligns vision, data use, and professional collaboration.

In addition, the empirical evidence from this study provides a nuanced understanding of how contextual factors mediate the effect of research leadership. In relatively under-resourced settings such as Diyala, leadership practices emphasizing local problem-solving and networked collaboration compensate for limited access to external research infrastructures. This aligns with Mills' argument that the development of environments for research engagement requires contextual customization rather than

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replication of external models (Mills, 2025). Likewise, it echoes findings that the effectiveness of research engagement depends on aligning global frameworks—such as the OECD's learning organization model—with local professional cultures and material realities (Kowalczuk-Walędziak, 2024; Oecd, 2016). In this regard, the Diyala model offers an example of how evidence-informed leadership can adapt international principles to regional conditions, producing both conceptual fidelity and contextual legitimacy.

A further interpretive lens emerges from recent comparative studies on monitoring and knowledge quality improvement in schools, which highlight how formative assessment systems, when led by research-oriented leaders, can enhance both teaching and learning outcomes (Risnazarov et al., 2025). The finding that accountability and evidence use were mutually reinforcing in this study suggests that monitoring mechanisms designed for reflection rather than surveillance can catalyze innovation. This resonates with Farley-Ripple and Grajeda's description of "knowledge brokering" as an intermediary process that transforms evaluation data into organizational learning (Farley-Ripple & Grajeda, 2020). In Diyala's case, leadership practices that foster collective reflection sessions and transparent feedback loops appear to perform similar functions at the school level, serving as internal knowledge-brokering mechanisms.

Overall, the validated model affirms that research leadership functions as the structural and cultural "glue" connecting various elements of the learning organization: data systems, collaborative cultures, distributed authority, and external partnerships. The empirical findings strongly support the idea that when these elements are intentionally aligned, schools evolve from teaching institutions to inquiry institutions. This conclusion corroborates the body of literature emphasizing that evidence-informed leadership is not a discrete strategy but a systemic orientation that integrates vision, structure, and professional learning into a coherent ecology of improvement (Brown & Malin, 2020; Godfrey & Brown, 2019; Mills, 2025).

While the study produced significant theoretical and empirical insights, several limitations should be acknowledged. First, the research was conducted exclusively within the primary school context of Diyala Province, Iraq, limiting the generalizability of findings to other educational levels or regions with different policy frameworks, resources, and professional cultures. Second, the use of self-report questionnaires, though statistically reliable, may have introduced response bias, particularly social desirability bias in perceptions of leadership behavior. Third, cross-sectional design constrains causal inference; while structural equation modeling can infer directional relationships, it cannot confirm longitudinal causality. Additionally, despite triangulation efforts, qualitative depth was limited to expert Delphi input, and richer ethnographic or longitudinal data could have provided deeper understanding of how leadership practices evolve over time. Finally, contextual factors such as political instability, policy shifts, and varying access to professional development may have influenced responses in ways not fully captured by the model.

Future studies should expand the scope of inquiry to include multiple educational levels—secondary, vocational, and higher education—to examine whether the structural relationships observed here remain consistent across contexts. Longitudinal designs could be employed to track how research leadership behaviors and school-level inquiry outcomes evolve over time, thereby clarifying causal mechanisms. Comparative studies between Iraqi provinces or with other countries in the region would also help determine the model's cross-cultural applicability and reveal how sociopolitical environments shape research engagement. Moreover, integrating qualitative methods such as classroom observations, leadership shadowing, and case studies would enrich understanding of the micro-processes through which research leadership influences daily practice. Future research could also explore digital mediation—how data systems, smart learning platforms, and online networks can extend or constrain research engagement in low-resource settings. Finally, advanced statistical approaches, such as multigroup SEM or hierarchical linear modeling, could be employed to examine contextual moderators such as school size, governance structure, or resource allocation patterns.

Practically, the findings suggest that educational leaders should institutionalize protected time and collaborative structures for inquiry, ensuring that research is woven into daily professional routines rather than treated as an add-on activity. School principals should act as role models by conducting or co-leading small-scale research projects, thus signaling that inquiry is a shared professional norm. Policy makers and district administrators should align incentives, resource distribution, and accountability frameworks to reward evidence-informed experimentation rather than mere compliance. Teacher education and in-service programs should integrate data literacy, design-thinking, and project-

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based methodologies to strengthen practitioners' ability to translate evidence into practice. Finally, establishing inter-school and university partnerships can create sustainable ecosystems of shared inquiry, enabling the diffusion of successful models of research leadership and ensuring that research-engaged schooling becomes a systemic, enduring feature of educational improvement.

Authors' Contributions

Authors equally contributed to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

All procedures performed in studies involving human participants were under the ethical standards of the institutional and, or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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