

From curiosity to contribution: An integrated framework for coherent doctoral knowledge production

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Abstract: *Contemporary doctoral education requires researchers to produce original knowledge while navigating increasingly complex methodological, interdisciplinary, ethical, technological, and international research environments. Yet doctoral research training is frequently organised around discrete methodological competencies, potentially obscuring the relationships through which research questions, theoretical perspectives, methodological choices, evidence, analysis, ethics, and scholarly contribution acquire coherence. This conceptual paper addresses this gap by developing the Integrated Doctoral Research Design Framework (IDRDF), which reframes doctoral research design as an iterative, reflexive, and interconnected process of knowledge production. By drawing on a critical synthesis of scholarship on doctoral education, research design, methodological coherence, researcher development, supervision, ethics, and knowledge production, the paper conceptualises eight interdependent dimensions through which doctoral inquiry progresses from intellectual curiosity to original scholarly contribution. The framework's central proposition is that research quality is not simply the cumulative outcome of discrete methodological competencies but an emergent property of the coherence among intellectual problematisation, literature engagement, conceptual framing, research-question development, methodological reasoning, evidence generation and analysis, ethical and reflexive practice, and research management. The paper further demonstrates how this integrative perspective can inform doctoral supervision, curriculum design, research-methods teaching, institutional research training, doctoral progression, and approaches to research quality and international doctoral education. The IDRDF contributes theoretically by positioning integrative research judgement as a distinctive dimension of doctoral capability and by providing a systems-oriented account of how coherent research design supports credible and original knowledge production. The paper concludes by identifying empirical pathways for validating and refining the framework across disciplines and doctoral contexts.*

Keywords: Doctoral education, doctoral research design, evidence-based research; knowledge production, methodological coherence, research methodology.

INTRODUCTION

Doctoral research occupies a pivotal position within contemporary knowledge production, where universities are increasingly expected to produce research that is both academically rigorous and socially relevant. As the highest level of academic qualification, the doctorate is distinguished by its expectation of generating an original contribution to knowledge through systematic, ethical, and evidence-based inquiry. Therefore, doctoral research is not just an educational exercise but a fundamental mechanism through which universities advance scientific findings, inform policy, foster innovation, and address increasingly complex societal challenges (Munyangeyo, 2026). In this regard, the quality of research design has emerged as one of the most critical determinants of doctoral success that influences not only the credibility of research findings but also and mainly the originality, coherence, and impact of scholarly contributions.

The substantial transformation and internationalisation of doctoral education over recent decades have intensified scholarly and policy attention to the purposes, structures, and quality of contemporary doctoral provision. Doctoral education is increasingly characterised by greater international mobility, more diverse doctoral populations, evolving forms of supervision, collaborative and interdisciplinary research, and heightened expectations concerning employability, societal engagement, and research impact. Recent comparative scholarship indicates that these developments are reshaping not only the organisation of doctoral programmes but also the meaning and purposes of doctoral study itself (Jones et al. (2024); McKenna and van Schalkwyk, 2024). In the UK, for example, doctoral education has undergone substantial changes in its regulatory frameworks, institutional structures, programme configurations, candidature, supervision, and examination. Such changes have had significant implications for the roles and responsibilities of supervisors (Taylor and Wisker, 2023). Similarly, international perspectives demonstrate increasing diversity in doctoral models, candidate profiles, supervisory arrangements, research outputs, and relationships between doctoral education and academic and non-academic career trajectories (Jones et al., 2024).

These transformations challenge the adequacy of doctoral education models developed primarily around relatively stable disciplinary communities and predominantly individualised apprenticeship relationships. Contemporary doctoral researchers increasingly operate across disciplinary, institutional, cultural, and national boundaries and must develop capabilities that extend beyond disciplinary expertise and methodological competence. The growing prominence of interdisciplinary inquiry, international collaboration, digital scholarship, artificial intelligence, and diverse research careers requires doctoral education to cultivate more sophisticated forms of methodological judgement, reflexivity, collaboration, communication, and research integrity (Jones et al., 2024; Guarimata-Salinas, Carvajal, and Jiménez López, 2024; McKenna and van Schalkwyk, 2024). In this context, doctoral supervision itself is being reconceptualised. Recent international research identifies increasingly complex supervisory roles encompassing intellectual guidance, project management, researcher development, interpersonal support, intercultural competence, and preparation for diverse scholarly and professional trajectories (Guarimata-Salinas, Carvajal, and Jiménez López, 2024; Pinto, 2023).

The transformation is also evident in the growing recognition that doctoral education must respond simultaneously to the expectations of candidates, universities, research communities, employers, and wider society. Jones et al. (2024) argue that contemporary doctoral education is undergoing a significant transformation in response to changing societal expectations and candidate needs, while recent work on doctoral programme development highlights the need to connect doctoral experiences more explicitly with career readiness and the broader workforce ecosystem. At the same time, the increasing internationalisation of doctoral education introduces additional challenges concerning intercultural supervision, international research collaboration, equivalence, mobility, belonging, and the negotiation of different academic traditions (Jones et al., 2024; Pinto, 2023). These developments suggest that doctoral education can no longer be conceptualised adequately as the transmission of disciplinary research skills within a relatively bounded academic environment. Rather, it should be understood as a complex process of researcher formation situated within changing epistemic, institutional, technological, and societal contexts.

This paper argues that if doctoral researchers are expected to produce original knowledge while navigating increasingly complex methodological, interdisciplinary, ethical, technological, and professional environments, then how it is designed and delivered must extend beyond the discrete methodological techniques training.

What is required is the development of researchers capable of integrating research questions, theoretical perspectives, methodological choices, evidence, ethical reasoning, reflexivity, and scholarly contribution within coherent research designs. The changing conditions of doctoral education therefore provide an important rationale for the Integrated Doctoral Research Design Framework (IDRDF) proposed in this paper. The relevance of this framework is underpinned by the fact that despite considerable advances in research methodology and doctoral pedagogy, many doctoral candidates continue to experience significant difficulties in designing coherent research projects.

Doctoral researchers frequently encounter difficulties in formulating sufficiently focused and consequential research questions, translating those questions into appropriate methodological strategies, distinguishing methodological paradigms from specific research methods, and articulating the assumptions that underpin their research designs. Recent research demonstrates that the formulation of research questions is itself a complex developmental process that requires sustained dialogue, iterative refinement, and structured pedagogical scaffolding involving researchers, supervisors, and peers (Girard et al., 2025).

The difficulty extends beyond question formulation to the achievement of methodological fitness, which means the defensible relationship between the research problematics, research questions and scope, theoretical assumptions, methodological orientation, methods, knowledge claims and expected outcomes. Recent methodological scholarship explicitly cautions against treating methods as autonomous technical procedures, arguing instead that methodological choices must be evaluated in relation to the questions they are intended to answer and the contribution the resulting evidence can make to knowledge (Jacobsen and McKenney, 2024). Doctoral researchers may consequently struggle not because research methods are inherently

inaccessible, but because methodological reasoning requires them to coordinate several forms of scholarly judgement simultaneously.

These difficulties are compounded when research training presents methodological components as discrete bodies of knowledge rather than as interconnected elements of knowledge production. Recent scholarship on doctoral research-problem development similarly suggests that methodological guidance alone is insufficient: researchers must be supported in negotiating the conceptual, intellectual, and sometimes affective dimensions involved in defining a researchable and consequential problem (Girard et al., 2025). The need for such structured support is particularly salient in contemporary doctoral education, where supervisors increasingly undertake multiple roles encompassing intellectual guidance, methodological development, researcher formation, and support for increasingly diverse doctoral trajectories (Guarimata-Salinas, Carvajal, and Jiménez López, 2024).

The methodological literature offers substantial guidance on individual components of research design. Seminal contributions have clarified the distinctions among research paradigms, methodologies, methods, and analytical procedures while providing detailed frameworks for qualitative, quantitative, and mixed-methods inquiry (Creswell and Creswell, 2023; Crotty, 1998; Maxwell, 2012, 2021; Yin, 2018). Similarly, scholarship on literature reviews, research ethics, validity, trustworthiness, and research planning has generated sophisticated methodological guidance across disciplines. However, much of this literature examines these components independently, giving comparatively limited attention to the dynamic relationships through which they collectively shape rigorous knowledge production. Without fully understanding how the different elements of research design interact to produce coherent, credible, and original scholarship, the fragmentation reflects a broader tendency to conceptualise research design as a sequence of procedural decisions rather than as an iterative intellectual process. In practice, research questions evolve through engagement with existing scholarship; methodological choices are refined in response to theoretical and practical considerations; ethical issues emerge throughout the research lifecycle; and analytical insights frequently reshape earlier conceptual assumptions.

Furthermore, increasing interdisciplinarity, digital research environments, open science practices, research integrity requirements, and the growing use of artificial intelligence in scholarly work have further complicated doctoral research design. Researchers are expected not only to use appropriate methods but also to justify methodological decisions transparently, demonstrate ethical responsibility, ensure reproducibility where appropriate, and communicate findings that withstand scholarly scrutiny. These developments reinforce the need for doctoral education to move beyond procedural instruction towards conceptual models that explain how different dimensions of research design interact throughout the research process.

This paper addresses this need by reconceptualising doctoral research design as an integrated framework for evidence-based knowledge production. Rather than viewing research questions, literature review, methodology, methods, ethics, data analysis, and research planning as separate components, the paper argues that they constitute an interconnected and iterative system in which each element both informs and is informed by the others. Through a critical conceptual synthesis of contemporary scholarship on research methodology, doctoral

education, and knowledge production, the paper develops a holistic framework that explains how coherent research design enables the progression from intellectual curiosity to original scholarly contribution.

The paper seeks to answer three interrelated research questions:

1. How can research design be conceptualised as an integrated process of evidence-based knowledge production in doctoral research?
2. What relationships exist among research questions, literature review, methodological choice, ethics, data generation, analysis, and research planning?
3. What implications does an integrated conceptual framework have for doctoral education, research supervision and training?

The paper aims to make three main contributions to scholarship. First, it synthesises contemporary methodological and doctoral education literature into a coherent conceptual perspective that positions research design as an iterative rather than linear process. Second, it proposes an Integrated Doctoral Research Design Framework (IDRDF) that highlights the interdependence of the principal components of evidence-based inquiry. Third, it demonstrates how such a framework can strengthen doctoral supervision, research methods education, curriculum design, and the development of researchers capable of producing rigorous, ethical, and impactful scholarship across disciplinary contexts. In doing so, the paper further aims to contribute to ongoing international debates concerning doctoral education by shifting attention from the isolated teaching of research methods towards the development of integrated methodological reasoning as the foundation of original knowledge production.

2. Literature review

2.1. Doctoral research, knowledge production, and original contribution

Doctoral education's principal purpose extends beyond the transmission of existing knowledge to the production of new knowledge through original scholarly inquiry. Unlike undergraduate and taught postgraduate programmes, which mainly emphasise knowledge acquisition and professional competence, doctoral education is fundamentally concerned with developing independent researchers capable of generating theoretically informed, methodologically rigorous, and socially relevant contributions to their respective disciplines (Boud and Lee, 2009; Nerad and Evans, 2014). Consequently, the quality of doctoral research is increasingly recognised not just as an institutional concern but as a strategic determinant of national research capacity, innovation ecosystems, and global knowledge production.

The expansion of doctoral education over the past three decades has transformed both the scale and expectations of doctoral research. Universities worldwide have experienced unprecedented

growth in doctoral enrolments, driven by the increasing importance of research-intensive economies, internationalisation, technological advancement, and knowledge-based development (OECD, 2023). Simultaneously, governments, funding agencies, and higher education institutions increasingly expect doctoral graduates to demonstrate not only disciplinary expertise but also methodological competence, interdisciplinary collaboration, ethical responsibility, leadership, and the capacity to address complex societal challenges. Doctoral researchers are therefore expected to produce scholarship that satisfies rigorous academic standards while demonstrating relevance beyond traditional disciplinary boundaries.

This evolution reflects broader transformations in contemporary understandings of knowledge production. Gibbons et al. (1994) distinguished between knowledge production, which is characterised by discipline-based and academically driven inquiry, and the importance of interdisciplinary collaboration, contextual relevance, and socially distributed knowledge creation. Although this distinction has been debated and refined, it remains influential in illustrating the growing expectation that doctoral research should engage with complex real-world problems while maintaining scientific rigour (Nowotny, Scott and Gibbons, 2001). More recent scholarship similarly argues that doctoral education must prepare researchers to navigate increasingly interconnected research environments shaped by global collaboration, digital technologies, open science practices, and artificial intelligence, all of which require methodological flexibility and sophisticated research judgement (OECD, 2023).

Within this evolving landscape, originality remains the defining characteristic of doctoral research. Yet originality is frequently misunderstood as the production of entirely novel ideas detached from existing scholarship. Contemporary perspectives instead conceptualise originality as a meaningful contribution that extends, refines, challenges, or integrates existing knowledge through systematic investigation (Lee, 2019). Such contributions may involve developing new theoretical insights, refining conceptual frameworks, applying established theories to new contexts, introducing methodological innovations, synthesising fragmented literature, or generating robust empirical evidence that advances scholarly understanding. Originality is therefore inseparable from rigorous engagement with existing knowledge, which requires researchers to position their work critically within ongoing academic conversations rather than merely identifying unexplored topics.

Knowledge production itself has likewise become increasingly recognised as a socially situated and collaborative process rather than the outcome of isolated individual inquiry. Drawing upon sociocultural perspectives, knowledge is understood to emerge through interactions among researchers, scholarly communities, institutions, and broader social contexts (Wenger, 1998). Doctoral candidates therefore develop not only technical research skills but also scholarly identities through participation in disciplinary communities of practice, engagement with supervisors and peers, publication activities, conference participation, and international research networks. This perspective highlights that doctoral education involves learning how knowledge is constructed, evaluated, communicated, and legitimised within specific epistemic communities.

At the same time, recent scholarship has drawn attention to persistent challenges affecting doctoral research quality. Despite extensive methodological resources, many doctoral

candidates continue to encounter difficulties in translating broad research interests into coherent research designs capable of producing credible evidence. Common challenges include formulating researchable questions, aligning methodological choices with epistemological assumptions, critically synthesising literature, integrating ethical reasoning throughout the research process, and managing increasingly complex research projects (Girard et al., 2025; Wilmot, 2024). These difficulties contribute to delays in completion, methodological inconsistency, reduced research quality, and uncertainty regarding the nature of original contribution. Significantly, such challenges are reported across disciplines, suggesting systemic rather than individual shortcomings in doctoral research preparation.

A growing body of literature argues that these challenges arise partly because doctoral research training frequently treats methodological components as separate bodies of knowledge. Research methods, literature review, ethics, research planning, and data analysis are often taught independently, with relatively limited attention given to the conceptual relationships that connect them throughout the research process. Consequently, doctoral researchers may acquire procedural competence in individual techniques without developing an integrated understanding of how research questions, theoretical perspectives, methodological choices, evidence generation, and scholarly contribution mutually shape one another. This fragmentation can encourage a compliance-oriented view of research design in which methodological decisions are perceived primarily as procedural requirements rather than intellectual choices grounded in coherent research reasoning.

Emerging research on doctoral pedagogy increasingly advocates holistic approaches that emphasise methodological reasoning, critical reflexivity, and integrative thinking. Rather than conceptualising doctoral research as a sequence of discrete stages, these perspectives view research as an iterative process in which engagement with literature continuously informs research questions, methodological choices evolve in response to theoretical developments, ethical considerations permeate all phases of inquiry, and analytical insights reshape conceptual understanding. Such perspectives align with broader developments in educational research that emphasise adaptive expertise, reflective practice, and continuous learning throughout the research lifecycle (Everitt, 2024; Valentine and Farias, 2024; Else, 2025). Nevertheless, the literature offers comparatively few conceptual models that explicitly explain how these dimensions interact as an integrated system for producing original knowledge.

This paper argues that the absence of an integrative conceptualisation represents a significant gap in current scholarship. While considerable advances have been made in understanding individual aspects of doctoral research, less attention has been devoted to explaining how the intellectual, methodological, ethical, and organisational dimensions of research design collectively enable the transition from intellectual curiosity to credible scholarly contribution. Addressing this gap is particularly important given the increasing complexity of doctoral research environments, where researchers must navigate interdisciplinary inquiry, digital scholarship, research integrity requirements, open science practices, and rapidly evolving methodological innovations. Therefore, developing a comprehensive conceptual framework that integrates these interconnected dimensions offers the potential to strengthen doctoral education, improve methodological coherence, and enhance the quality and impact of doctoral research across diverse disciplinary contexts.

Conceptualising research design: Beyond methods and methodology

Research design is often misunderstood as a technical plan specifying procedures for data collection and analysis. While this interpretation captures an important dimension of research practice, it provides only a partial understanding of design as an intellectual process. Contemporary methodological scholarship increasingly recognises research design as the underlying logic that connects research questions, theoretical perspectives, methodological assumptions, evidence generation, and analytical strategies into a coherent approach to knowledge production (Maxwell, 2021; Creswell and Creswell, 2023). Thus, research design is not simply a description of what researchers do but an explanation of why particular decisions are appropriate for producing credible answers to particular questions.

The distinction between research design, methodology, and methods is therefore fundamental to doctoral research development. Methods refer to the specific techniques used to collect and analyse data, such as interviews, surveys, experiments, observations, statistical modelling, or document analysis. Methodology concerns the broader theoretical and philosophical principles that guide the selection and justification of those methods. Research design, however, represents the integrative structure within which these elements operate, providing the rationale that links the research problem to the evidence required to address it (Crotty, 1998; Maxwell, 2021). Failure to distinguish these concepts can lead doctoral researchers to adopt methods because they appear familiar or popular rather than because they are logically aligned with their research questions and epistemological assumptions.

Traditional approaches to research methods education have often emphasised procedural competence, teaching researchers how to conduct particular forms of inquiry. While such knowledge remains essential, methodological expertise requires more than technical proficiency. Researchers must also develop the capacity to make justified decisions about which approaches are appropriate, under what circumstances, and with what implications for knowledge claims. This distinction reflects the difference between possessing methodological skills and demonstrating methodological reasoning. Discussions of researcher development highlight that advanced research competence involves judgement, reflexivity, and the ability to adapt methodological choices in response to complex research contexts (Biesta, 2020; Staller, 2021).

The philosophical foundations of research design further demonstrate why methodological choices cannot be separated from broader assumptions about knowledge. Every research project embodies particular understandings of reality, knowledge, evidence, and explanation. Ontological assumptions influence how researchers conceptualise the phenomena they investigate; epistemological assumptions shape how knowledge about those phenomena can be generated and justified; and methodological decisions translate these assumptions into research practices (Crotty, 1998; Guba and Lincoln, 1994). For that reason, methodological coherence requires alignment between philosophical positioning, research questions, methods, analytical procedures, and interpretations of findings.

The concept of methodological alignment has become particularly influential in contemporary research methodology. Alignment refers to the degree of consistency among the components of a research design, ensuring that research questions can be meaningfully addressed through appropriate theoretical and methodological approaches. For example, a study seeking to understand lived experiences may require interpretive qualitative approaches, whereas research examining causal relationships may require designs capable of testing hypotheses through quantitative analysis. The issue is not whether one methodological approach is inherently superior to another, but whether the chosen design is appropriate for the knowledge claim being pursued (Creswell and Creswell, 2023; Greene, 2007).

This perspective challenges methodological hierarchies that position certain approaches as universally more rigorous than others. Debates surrounding qualitative, quantitative, and mixed-methods research have increasingly moved beyond oppositional arguments towards recognition that methodological choices should be determined by research purposes and epistemological commitments. Mixed-methods scholars, for instance, argue that combining qualitative and quantitative approaches can provide more comprehensive understandings of complex phenomena when integration is theoretically justified rather than simply used as a strategy for collecting more data (Johnson, Onwuegbuzie and Turner, 2007; Creswell and Plano Clark, 2023). Similarly, qualitative researchers have emphasised the importance of depth, contextual understanding, and meaning-making as legitimate forms of knowledge production rather than methodological limitations.

Research design is also inseparable from the process of defining and refining research problems. A common misconception among novice researchers is that research begins with a topic and proceeds directly towards selecting methods. However, experienced researchers recognise that meaningful research emerges through an iterative process of problematisation, conceptual clarification, engagement with scholarship, and refinement of questions. A broad interest area becomes a researchable problem only when it is positioned within existing knowledge debates and when a gap, tension, contradiction, or unresolved issue is identified. Research design therefore begins not with methods but with intellectual questioning and critical engagement with what is already known.

The literature review occupies a central role within this design process because it provides the intellectual foundation for determining what contribution a study can make. Rather than functioning as a background summary, the literature review enables researchers to identify conceptual relationships, theoretical tensions, methodological limitations, and unexplored areas of inquiry (Snyder, 2019; Torraco, 2016). Through systematic engagement with existing scholarship, researchers develop the conceptual positioning necessary to justify originality and establish the significance of their investigations. This understanding further reinforces the argument that research design represents a knowledge-building process rather than a procedural sequence.

Recent transformations in research environments have expanded the complexity of research design. Digital technologies, large-scale datasets, interdisciplinary collaboration, artificial intelligence-assisted research tools, and open science movements have created new opportunities while introducing additional methodological and ethical challenges. These

developments require doctoral researchers to possess broader design capabilities that extend beyond conventional methodological training.

Despite these advances, doctoral education continues to face challenges in supporting researchers to develop integrated understandings of design. Many doctoral candidates encounter research design as a collection of independent requirements: writing research questions, completing literature reviews, selecting methods, obtaining ethical approval, collecting data, and producing findings. Such fragmented approaches risk obscuring the intellectual relationships among these components. Hence, researchers may complete technically acceptable studies while struggling to articulate the deeper logic connecting their decisions and demonstrating how their research generates original knowledge.

This limitation reveals an important conceptual gap. Existing methodological literature provides sophisticated guidance on specific aspects of research design, yet there remains insufficient theoretical attention to how these elements function together as an integrated architecture of inquiry. Addressing this gap requires moving beyond a procedural understanding of research design towards a holistic perspective that recognises design as an iterative process of reasoning, justification, evidence generation, and contribution. Such a perspective provides the foundation for developing a conceptual framework that explains how doctoral researchers move from initial curiosity towards rigorous and meaningful scholarly contribution.

Research questions and methodological coherence

The formulation of research questions represents one of the most intellectually demanding stages of doctoral research because it determines not only what a study seeks to understand but also how knowledge about that phenomenon can be generated and justified. A research question is not merely a statement of interest or a reformulation of a research topic; it represents a carefully constructed intellectual problem that establishes the direction, boundaries, and logic of inquiry. Consequently, the quality of a doctoral study depends substantially on the extent to which research questions provide a coherent foundation for subsequent decisions concerning theory, methodology, methods, evidence, and interpretation (Maxwell, 2021; Agee, 2009).

Although research questions are often presented as an early stage in research design, contemporary methodological scholarship increasingly conceptualises question development as an iterative process rather than a preliminary administrative task. Researchers rarely begin with fully formed questions; instead, questions evolve through engagement with existing literature, theoretical perspectives, empirical observations, and emerging understandings of the research problem. This iterative process is particularly important in doctoral research, where candidates are expected to demonstrate not only competence in conducting research but also the ability to identify significant problems and position their work within broader scholarly debates (Lee, 2019). Developing a strong research question therefore requires intellectual negotiation between what is already known, what remains uncertain, and what contribution a study can realistically make.

A persistent challenge in doctoral research is the tendency to begin with a preferred methodology or data collection technique rather than allowing the research problem and questions to determine methodological choices. This phenomenon is sometimes described as the “method-driven” approach, where researchers select familiar or fashionable methods before establishing whether those methods are capable of addressing the underlying inquiry. Such approaches risk producing methodological incoherence because the relationship between research purpose and evidence requirements becomes secondary to procedural preference. In contrast, question-driven research design begins with the nature of the knowledge claim being pursued and selects methodological approaches that are appropriate for generating and evaluating that knowledge (Creswell and Creswell, 2023; Maxwell, 2021).

The relationship between research questions and methodological coherence can be understood through the principle of alignment. Alignment refers to the degree of consistency among the various components of research design, including research purpose, conceptual framework, research questions, methodology, methods, data sources, analytical procedures, and conclusions. When these components reinforce one another, the research design becomes logically coherent and capable of producing defensible knowledge claims. Conversely, misalignment occurs when elements of a study operate according to conflicting assumptions—for example, when interpretive research questions are approached through methods designed primarily for measurement, or when theoretical assumptions are incompatible with analytical strategies (Ravitch and Carl, 2020).

Methodological coherence is particularly significant because different research traditions make different assumptions about the nature of knowledge and evidence. Positivist approaches typically emphasise measurement, prediction, explanation, and causal relationships, whereas interpretivist approaches focus on meaning, context, experience, and social construction. Pragmatic approaches, meanwhile, prioritise the research problem and allow methodological choices to be guided by practical consequences and the nature of the inquiry rather than adherence to a single philosophical position (Morgan, 2014). None of these traditions provides a universally superior approach; rather, their appropriateness depends on the research question and the type of understanding the researcher seeks to develop.

The concept of coherence therefore requires doctoral researchers to move beyond debates about whether particular methods are inherently rigorous and instead focus on whether methodological decisions are justified in relation to the purpose of inquiry. A qualitative interview study, for instance, may provide highly credible knowledge when the objective is to understand participants’ experiences, interpretations, or meaning-making processes. Similarly, a quantitative design may be more appropriate when the purpose is to examine relationships among variables or evaluate patterns across populations. Mixed-methods designs can provide additional explanatory power when the integration of different forms of evidence is theoretically justified and contributes to a more comprehensive understanding of complex phenomena (Creswell and Plano Clark, 2023; Johnson, Onwuegbuzie and Turner, 2007).

Recent methodological scholarship has also emphasised the importance of distinguishing between methodological coherence and methodological rigidity. While alignment is essential, effective research design does not require researchers to follow predetermined methodological

formulas. Complex research problems often require adaptation, creativity, and reflexive decision-making. Particularly in interdisciplinary and applied research contexts, researchers may need to combine perspectives, revise questions, or modify approaches as new insights emerge. The challenge is not maintaining a fixed design but ensuring that adaptations remain theoretically and logically defensible throughout the research process (Tracy, 2020).

This perspective has important implications for doctoral researcher development. Becoming an independent researcher requires more than learning individual methods; it requires developing the capacity to reason through methodological choices. Doctoral candidates must learn to articulate why a particular research question matters, what assumptions underpin their approach, what evidence is necessary to answer the question, and how analytical decisions support the knowledge claims they ultimately make. These capabilities represent a form of methodological literacy that extends beyond technical competence and reflects deeper scholarly judgement.

The importance of methodological coherence is further reinforced by contemporary concerns regarding research quality, transparency, and integrity. Across disciplines, debates about reproducibility, questionable research practices, data transparency, and research credibility have increased attention to the relationship between design decisions and knowledge claims. A coherent research design provides the foundation for demonstrating how conclusions are derived from evidence and why those conclusions should be considered trustworthy. In this sense, methodological coherence is not merely a technical feature of research design but an ethical commitment to producing accountable knowledge.

Despite the central importance of research questions and methodological alignment, doctoral training often provides limited explicit guidance on how these elements interact. Candidates may receive instruction on writing research questions, selecting methods, and analysing data, yet receive less support in understanding the intellectual connections among these decisions. This gap contributes to a fragmented understanding of research design in which methodological components are treated as sequential requirements rather than interconnected elements of scholarly reasoning.

The literature therefore suggests the need for a more integrated conceptualisation of doctoral research design. Such a framework should position research questions as the central organising principle while recognising the reciprocal relationships among conceptual framing, literature engagement, methodological choices, evidence generation, ethical reasoning, and knowledge contribution. By placing methodological coherence at the centre of research design, doctoral education can move beyond teaching researchers how to conduct studies towards developing researchers who understand why particular forms of inquiry generate particular forms of knowledge.

Research questions function as the intellectual anchor of doctoral research, establishing the direction and logic through which knowledge claims are constructed. However, their effectiveness depends on their integration with broader elements of research design. The challenge for doctoral education is therefore not simply to improve researchers' ability to

formulate questions or apply methods independently, but to cultivate an integrated understanding of how questions, methods, evidence, and interpretation interact within the process of knowledge production. This argument provides a critical foundation for the development of an integrated doctoral research design framework.

Literature review as knowledge construction

The literature review represents one of the most intellectually significant yet frequently misunderstood components of doctoral research. Traditionally, new researchers often approach the literature review as a preliminary activity whose primary purpose is to demonstrate familiarity with existing scholarship before proceeding to empirical investigation. However, contemporary methodological scholarship increasingly challenges this instrumental understanding by positioning the literature review as a central mechanism through which researchers construct knowledge, identify intellectual problems, establish theoretical positioning, and justify original contributions (Snyder, 2019; Torraco, 2016). In doctoral research, the literature review is therefore not simply a summary of previous studies but an analytical process through which researchers enter existing scholarly conversations and negotiate the significance of their own contributions.

The central function of a doctoral literature review is to establish the relationship between existing knowledge and the proposed research contribution. Originality does not emerge from a complete absence of previous scholarship; rather, it develops through critical engagement with what is already known, what remains contested, what limitations exist within current explanations, and what possibilities remain unexplored (Boote and Beile, 2005; Ridley, 2012). This understanding challenges a common misconception that a research gap refers merely to an underexplored topic. A meaningful gap is instead an intellectual problem arising from tensions, contradictions, theoretical limitations, methodological weaknesses, contextual absences, or unresolved debates within existing knowledge. Identifying such gaps requires researchers to move beyond information gathering towards critical interpretation and synthesis.

This shift from information collection to knowledge construction reflects broader epistemological understandings of scholarship. Knowledge production is not a cumulative process in which researchers simply add new findings to an existing body of facts. Rather, scholarly knowledge develops through interpretation, critique, comparison, and reconfiguration of existing ideas. Researchers contribute by examining relationships among concepts, questioning established assumptions, applying theories in new contexts, or generating alternative explanations for existing phenomena. The literature review therefore functions as a space where researchers construct the intellectual foundation necessary to define problems and justify inquiry.

The distinction between a descriptive and analytical literature review is particularly important in doctoral education. A descriptive review reports what previous researchers have written, often organising studies chronologically or thematically without examining deeper relationships among ideas. While such reviews may demonstrate breadth of reading, they provide limited evidence of scholarly engagement. In contrast, an analytical literature review

evaluates arguments, compares perspectives, identifies conceptual patterns, examines methodological choices, and develops a reasoned interpretation of the state of knowledge within a field (Torraco, 2016; Snyder, 2019). The analytical review demonstrates that the researcher is capable of participating in disciplinary conversations rather than merely reporting them.

Recent scholarship on evidence synthesis further reinforces this perspective by highlighting the importance of systematic and transparent approaches to reviewing literature. Although systematic reviews are particularly prominent in evidence-based fields such as health sciences and education, the principles of transparency, justification, and methodological rigour are increasingly relevant across doctoral research contexts. Researchers are expected to explain how literature was identified, selected, evaluated, and synthesised, thereby demonstrating that their understanding of existing scholarship is based on a rigorous process rather than selective engagement (Snyder, 2019). However, rigour should not be confused with mechanical accumulation of sources. The purpose of reviewing literature is not to demonstrate the quantity of materials consulted but to develop a coherent argument about the current state of knowledge and the need for further investigation.

The literature review is also fundamental to theoretical development. Through engagement with existing scholarship, researchers identify relevant concepts, theoretical traditions, and analytical perspectives that shape how research problems are understood. A well-developed literature review therefore provides the foundation for conceptual frameworks by clarifying relationships among constructs and explaining why particular theoretical approaches are appropriate. In this sense, literature review and theory development are closely interconnected: theories guide interpretation of existing knowledge, while critical engagement with literature enables researchers to refine, challenge, or extend theoretical perspectives.

This relationship is particularly significant in doctoral research because doctoral contributions frequently involve conceptual advancement rather than only empirical discovery. A doctoral thesis may contribute by refining a theoretical model, developing a new conceptual framework, challenging dominant interpretations, or integrating previously disconnected bodies of knowledge. Such contributions depend heavily on the researcher's ability to synthesise literature critically and demonstrate how their work advances existing debates. The literature review consequently serves as the intellectual bridge between existing scholarship and original contribution.

Furthermore, literature engagement contributes to methodological decision-making. Existing research provides insight into how particular phenomena have been investigated, which approaches have generated valuable knowledge, and where methodological limitations remain. By analysing previous studies, researchers can identify appropriate research strategies, avoid unnecessary repetition, and justify methodological innovations. Thus, the literature review is not separate from research design; it actively informs research questions, conceptual frameworks, methodological choices, and interpretations of evidence.

The increasing complexity of contemporary research environments has further expanded the role of literature reviews. Interdisciplinary research, global knowledge networks, digital scholarship, and rapidly expanding publication ecosystems require researchers to navigate diverse sources, perspectives, and epistemological traditions. Doctoral researchers must increasingly demonstrate the ability to integrate knowledge across disciplinary boundaries while maintaining conceptual clarity. This requires key skills in searching, evaluating, synthesising, and communicating scholarship, including skills that are central to researcher development and academic identity formation (Brew, 2001; Wellington, 2010).

However, despite its central importance, many doctoral researchers continue to experience difficulty in conducting effective literature reviews. Common challenges include producing overly broad reviews, relying on summary rather than analysis, failing to establish theoretical connections, insufficiently identifying gaps, and treating literature as evidence for predetermined arguments rather than as a resource for developing inquiry. These challenges partly reflect the way literature review is often positioned within research training, as a chapter to be completed rather than as an ongoing intellectual process that evolves throughout the research lifecycle.

Contemporary perspectives increasingly recognise that literature engagement continues throughout research rather than ending once the initial review is written. As empirical findings emerge and theoretical understanding develops, researchers revisit existing scholarship to refine interpretations, compare findings, and position contributions more effectively. This iterative relationship between literature and research reinforces the broader argument that doctoral research design is dynamic rather than linear. The literature review continuously shapes and is reshaped by research questions, methodological decisions, analysis, and emerging knowledge claims.

Despite extensive scholarship on literature review practices, an important conceptual limitation remains. Existing discussions often focus on how to conduct effective reviews, evaluate sources, or synthesise evidence, but less attention has been given to positioning literature review as an integrated component of the broader architecture of research design. When separated from research questions, methodology, ethics, and analysis, literature review risks becoming an isolated academic exercise rather than a mechanism for knowledge construction.

This paper therefore argues that literature review should be reconceptualised as one of the central intellectual processes through which doctoral researchers transform curiosity into contribution. Within an integrated research design framework, literature engagement provides the foundation for identifying meaningful problems, constructing theoretical positions, justifying methodological choices, and demonstrating originality. Recognising the literature review as knowledge construction rather than information accumulation strengthens the coherence of doctoral research and enables researchers to produce contributions that are theoretically informed, methodologically justified, and positioned within broader scholarly debates.

Ethics, reflexivity, and research integrity in doctoral research

Ethics represents a fundamental dimension of doctoral research design because the production of knowledge is inseparable from questions of responsibility, power, relationships, and consequences. Traditionally, research ethics has often been understood primarily as a regulatory process concerned with obtaining institutional approval, protecting participants, ensuring informed consent, and minimising potential harm. While these requirements remain essential, contemporary scholarship increasingly argues that ethical research practice extends beyond compliance with formal procedures. Ethics is now understood as an ongoing intellectual and relational commitment embedded throughout the research process, influencing how research problems are formulated, how evidence is generated, how participants are represented, and how knowledge claims are communicated (Israel and Hay, 2006; Resnik, 2020).

This broader understanding is particularly important within doctoral research because doctoral candidates are not merely collecting information; they are participating in the construction and circulation of knowledge. Decisions regarding what questions are considered important, whose perspectives are prioritised, which forms of evidence are recognised as legitimate, and how findings are interpreted all involve ethical and epistemological considerations. Consequently, research design cannot be considered fully coherent if ethical reasoning is treated as separate from methodological and conceptual decisions. Rather, ethical considerations should shape the entire architecture of inquiry from the initial formulation of research questions to the dissemination and application of findings.

The evolution of research ethics reflects broader changes in understandings of the relationship between researchers and research participants. Earlier models of research ethics were strongly influenced by biomedical traditions that emphasised protection from harm, confidentiality, and procedural safeguards. While these principles remain foundational, social science and interdisciplinary research have expanded ethical debates to include issues of power, representation, participation, cultural sensitivity, positionality, and justice (Tracy, 2020). Particularly in qualitative, participatory, indigenous, and community-based research traditions, ethical practice requires researchers to critically examine their own assumptions and relationships with those involved in the research process.

Reflexivity has therefore become an increasingly important concept in contemporary research methodology. Reflexivity refers to researchers' critical awareness of how their identities, experiences, assumptions, values, institutional positions, and theoretical commitments influence the research process. Rather than attempting to eliminate researcher influence, reflexive approaches acknowledge that knowledge production is situated and that researchers play an active role in shaping what becomes known (Finlay, 2002; Berger, 2015). For doctoral researchers, developing reflexive capacity is essential because it enables them to recognise how methodological choices and interpretations are shaped by particular perspectives and contexts.

The importance of reflexivity is particularly evident in debates concerning epistemological positioning. All research involves choices about what counts as evidence, how phenomena are

conceptualised, and which forms of knowledge are considered credible. These choices are rarely neutral. They reflect disciplinary traditions, theoretical assumptions, cultural contexts, and institutional expectations. Reflexive research design therefore requires doctoral researchers to articulate not only what they are investigating but also how their assumptions influence the ways in which they investigate it. This strengthens methodological transparency and enhances the credibility of knowledge claims.

Research integrity represents another critical dimension of ethical doctoral research. International attention to research integrity has increased substantially due to concerns regarding plagiarism, data fabrication, selective reporting, authorship disputes, reproducibility challenges, and pressures associated with competitive academic environments. Contemporary frameworks emphasise that research integrity involves a culture of responsible conduct characterised by honesty, transparency, accountability, fairness, and respect throughout the research lifecycle (ALLEA, 2023). For doctoral researchers, these principles are not merely institutional requirements but essential components of developing professional scholarly identities.

The growing influence of digital technologies and artificial intelligence has further expanded ethical considerations in research design. Artificial intelligence tools are increasingly used for literature searching, data analysis, translation, coding assistance, writing support, and knowledge synthesis. While these technologies offer significant opportunities for improving research efficiency, they also introduce challenges related to authorship, intellectual responsibility, algorithmic bias, data privacy, transparency, and the reliability of generated outputs (UNESCO, 2023). Doctoral researchers must therefore develop new forms of digital research literacy that enable them to use emerging technologies critically and responsibly rather than treating them as neutral technical instruments.

Open science movements have similarly reshaped expectations regarding research transparency and accountability. Practices such as open access publication, data sharing, preregistration, transparent reporting, and reproducible workflows seek to strengthen public trust in research and improve the accessibility of knowledge. However, open science also raises important ethical questions concerning participant confidentiality, intellectual property, unequal research capacities, and the potential exploitation of vulnerable communities. Responsible research design therefore requires balancing commitments to transparency with obligations to protect participants and respect diverse knowledge contexts (Nosek et al., 2015).

Within doctoral education, these developments highlight the limitations of approaches that position ethics as a discrete stage occurring after research design decisions have already been made. In many doctoral programmes, ethics training is concentrated around institutional review processes, with candidates completing approval requirements before beginning data collection. Although necessary, this procedural approach risks reducing ethics to administrative compliance rather than cultivating ethical reasoning as a continuous research competence. A more integrated approach recognises that ethical questions emerge throughout the research process: when defining research problems, selecting participants, choosing methods, interpreting findings, representing communities, and communicating conclusions.

The integration of ethics into research design also strengthens methodological quality. Ethical and methodological decisions are closely connected because choices that affect participant relationships, data collection strategies, analytical procedures, and representation influence the credibility of research outcomes. For example, insufficient attention to participant perspectives may produce incomplete interpretations; failure to consider cultural contexts may generate inappropriate conclusions; and lack of transparency in analytical decisions may weaken trust in findings. Ethical awareness therefore contributes directly to research rigour rather than functioning as an external limitation imposed on research activity.

Despite growing recognition of these issues, doctoral research training often continues to separate methodological competence from ethical development. Candidates may receive extensive instruction on research methods while receiving comparatively less support in developing reflexive and ethical decision-making capabilities. This separation reinforces the fragmented understanding of research design identified throughout this review. If doctoral researchers are expected to produce responsible and impactful knowledge, ethical reasoning must be integrated with questions, theory, methods, evidence, analysis, and dissemination.

This paper therefore argues that ethics, reflexivity, and research integrity should be conceptualised as foundational elements of integrated doctoral research design. Rather than representing additional obligations imposed upon researchers, they constitute principles that shape the legitimacy, credibility, and social responsibility of knowledge production. An integrated framework must therefore position ethical reasoning alongside methodological coherence and intellectual contribution, recognising that rigorous research is not only about producing valid evidence but also about producing knowledge responsibly.

From fragmentation to integration: Identifying the research gap

The preceding review demonstrates that doctoral research design is supported by a substantial and sophisticated body of scholarship addressing research methodology, knowledge production, literature synthesis, methodological alignment, ethics, and researcher development. Existing literature has generated valuable insights into individual components of scholarly inquiry and has provided doctoral researchers with extensive guidance on formulating questions, selecting methods, analysing evidence, and demonstrating research quality. However, despite these important contributions, a significant conceptual limitation remains: doctoral research design is still frequently understood through fragmented perspectives that treat its constituent elements as separate methodological requirements rather than interconnected dimensions of an integrated knowledge production process.

This fragmentation is evident across several areas of scholarship. Methodological literature has produced detailed frameworks for qualitative, quantitative, and mixed-methods research, yet these approaches often focus primarily on methodological choice and procedural implementation rather than the broader intellectual architecture that connects research problems, questions, evidence, and contributions (Creswell and Creswell, 2023; Maxwell, 2021). Similarly, literature on doctoral education has examined supervision, researcher identity formation, completion challenges, and research training, but comparatively less attention has

been devoted to explaining how doctoral researchers develop the capacity to integrate multiple dimensions of research design into a coherent process of inquiry (Boud and Lee, 2009; Lee, 2019).

The consequences of this fragmentation are significant. When research design is presented as a collection of separate tasks, which are writing a proposal, conducting a literature review, selecting methods, obtaining ethical approval, collecting data, analysing findings, and writing conclusions, doctoral researchers may perceive research as a linear sequence of compliance activities rather than an iterative intellectual process. Such an understanding can limit their ability to recognise the reciprocal relationships among research questions, theoretical perspectives, methodological choices, evidence generation, and knowledge contribution. The result may be technically competent research projects that lack conceptual coherence or fail to clearly demonstrate how they advance existing scholarship.

A central limitation within current approaches is the insufficient theorisation of research design as a process of knowledge construction. Although scholars acknowledge the importance of alignment, coherence, and reflexivity, these concepts are often discussed within specific methodological traditions rather than integrated into a comprehensive framework applicable across disciplinary contexts. Therefore, doctoral researchers are frequently required to assemble their own understanding of how different research components relate to one another. While developing such intellectual independence is an important objective of doctoral education, insufficient conceptual scaffolding may create unnecessary uncertainty, particularly for researchers navigating complex interdisciplinary or emerging fields.

Furthermore, existing discussions often underestimate the dynamic and recursive nature of research design. Traditional representations of research frequently suggest a progression from topic selection to research questions, literature review, methodology, data collection, analysis, and conclusions. While this sequence may be useful pedagogically, it does not adequately reflect the reality of scholarly inquiry. In practice, research develops through continuous interaction among different components: literature engagement reshapes questions; methodological decisions influence conceptual interpretations; empirical encounters challenge theoretical assumptions; and ethical considerations transform research practices. A more accurate understanding of doctoral research design therefore requires a model that captures these relationships rather than reinforcing a linear progression.

The need for integration has become increasingly urgent due to transformations in contemporary research environments. Doctoral researchers now operate within contexts characterised by interdisciplinarity, international collaboration, digital scholarship, artificial intelligence, open science, complex ethical challenges, and growing expectations for societal impact. These developments require researchers to demonstrate not only technical methodological competence but also the ability to make informed, transparent, and responsible decisions throughout the research lifecycle. An integrated understanding of research design is therefore essential for preparing doctoral graduates capable of producing credible knowledge in rapidly changing academic and societal contexts.

This conceptual gap also reflects broader debates about the purpose of doctoral education. Historically, doctoral training has often been structured around disciplinary apprenticeship, where candidates develop expertise through close engagement with supervisors and research communities. While this model remains valuable, contemporary doctoral education increasingly emphasises the development of independent researchers who possess transferable capabilities, including critical reasoning, methodological judgement, ethical awareness, collaboration, and the ability to communicate research beyond disciplinary boundaries (Nerad and Evans, 2014; OECD, 2023). Developing these capabilities requires moving beyond fragmented research skills towards a more holistic understanding of how scholarly inquiry is designed and executed.

Addressing this gap requires reconceptualising doctoral research design as an integrated system of interconnected processes. Such a perspective positions research questions, literature engagement, conceptual framing, methodology, methods, ethics, evidence generation, analysis, and research management not as independent stages but as mutually informing elements of knowledge production. Within this framework, research design becomes the mechanism through which researchers transform initial curiosity into a justified research problem, a coherent inquiry strategy, credible evidence, and an original contribution to knowledge.

Accordingly, this paper proposes an Integrated Doctoral Research Design Framework (IDRDF) that conceptualises doctoral inquiry as an iterative and reflective process of evidence-based knowledge construction. The framework responds to the identified gap by bringing together insights from research methodology, doctoral education, knowledge production theory, and research ethics into a unified conceptual model. Its central premise is that high-quality doctoral research emerges not from the mastery of isolated research techniques but from the researcher's ability to understand and manage the relationships among different dimensions of inquiry.

The proposed framework makes three contributions to existing scholarship. First, it advances methodological theory by reconceptualising research design as an integrated intellectual architecture rather than a procedural sequence. Second, it contributes to doctoral education research by offering a conceptual tool that can support research training, supervision, and curriculum development. Third, it contributes to debates on responsible knowledge production by demonstrating that methodological coherence, ethical responsibility, and scholarly contribution are fundamentally interconnected rather than separate objectives.

By addressing the fragmentation identified in existing literature, the framework developed in this paper provides a foundation for understanding doctoral research design as a dynamic process of intellectual reasoning, methodological decision-making, ethical reflection, and knowledge creation. The following section develops this conceptual framework in detail, explaining its theoretical foundations, core dimensions, and implications for doctoral research education.

METHODOLOGY AND THEORETICAL FRAMEWORK

Research design

This study adopts a theory-building conceptual research design to develop the Integrated Doctoral Research Design Framework (IDRDF). The study does not generate or analyse primary empirical data. It rather undertakes a theoretically informed synthesis of existing scholarship to identify conceptual relationships that can support a new explanatory framework for doctoral research design. This distinction is important because conceptual research constitutes a legitimate form of scholarly inquiry in which theoretical advancement can result from the systematic integration, reinterpretation, clarification, and extension of existing knowledge rather than from the accumulation of new empirical observations (Jaakkola, 2020; MacInnis, 2011).

The methodological purpose of the study is therefore generative rather than confirmatory. It does not seek to test predetermined hypotheses or establish causal relationships through empirical observation. Instead, it asks how existing bodies of scholarship can be brought into a theoretically coherent relationship to explain a problem that remains insufficiently conceptualised: how doctoral researchers move from an initial intellectual interest towards a rigorous, ethically defensible, and original contribution to knowledge. The study consequently treats doctoral research design not as a technical sequence of methodological decisions but as a complex architecture in which intellectual problematisation, literature engagement, conceptualisation, research-question development, methodological reasoning, evidence generation and analysis, ethics, reflexivity, research management, and scholarly contribution interact dynamically.

This positioning is consistent with established accounts of conceptual scholarship. Jaakkola (2020) distinguishes conceptual research from conventional literature review by emphasising its capacity to develop new conceptual relationships through theory synthesis, theory adaptation, typology development, or model building. Similarly, MacInnis (2011) argues that conceptual contribution involves more than summarising existing ideas: it requires the development of new ways of organising, connecting, or extending knowledge that generate explanatory or theoretical value. The present study adopts this stronger conception of conceptual scholarship. Its objective is not to reproduce an established account of doctoral research but to reconceptualise the relationships among its constituent processes.

The research design can therefore be characterised as integrative conceptual theorising. The framework is developed through the convergence of scholarship across several fields, including doctoral education, research methodology, research design, methodological coherence, knowledge production, literature engagement, research ethics and integrity, reflexivity, researcher development, and doctoral supervision. These literatures were considered not as isolated knowledge domains but as theoretically complementary bodies of scholarship capable of illuminating different dimensions of the same underlying phenomenon: the development of researchers capable of producing credible and original knowledge.

This approach is particularly appropriate because contemporary doctoral research increasingly involves methodological plurality, interdisciplinary inquiry, collaborative research, international supervision, and diverse forms of scholarly output. Recent work demonstrates that doctoral research practices can involve methodological complexities that require researchers to make underlying assumptions explicit rather than treating methodological procedures as self-evidently rigorous (Cruickshank and Brewster, 2024). The need to articulate relationships among research questions, assumptions, methods, evidence, and claims therefore provides a substantive rationale for an integrative conceptual approach.

The resulting framework is consequently not presented as a universal prescription for doctoral research. Rather, it is proposed as a theoretically grounded explanatory architecture capable of organising diverse research traditions while preserving epistemological and methodological plurality.

Conceptual synthesis and integrative theorising

The methodological logic of the study is grounded in conceptual synthesis. Conceptual synthesis differs from a conventional narrative review because its purpose is not primarily to report what the literature says but to examine how concepts, assumptions, and theoretical propositions across bodies of literature can be related in ways that generate explanatory insight. The analytical task therefore involves moving from *description* to *comparison*, from *comparison* to *integration*, and from *integration* to *theoretical proposition*.

This distinction is central to the methodological credibility of the present study. The literature was not treated as a collection of findings from which a consensus could simply be extracted. Instead, it was approached as a heterogeneous intellectual field containing complementary insights, different levels of analysis, disciplinary assumptions, conceptual overlaps, and unresolved tensions. Such an approach is consistent with Jaakkola's (2020) account of conceptual theory building, in which the contribution of a conceptual article depends upon the explicit logic through which existing theoretical resources are combined and transformed. It also reflects MacInnis's (2011) argument that conceptual advancement involves identifying meaningful relationships among ideas and using those relationships to produce novel theoretical understanding. The synthesis proceeded through four iterative and mutually informing analytical stages.

The first involved conceptual mapping. Relevant and influential scholarship was identified across the domains underpinning doctoral research design, with particular attention to doctoral education and supervision, research methodology and design, research-question development, literature review and knowledge positioning, methodological coherence, research ethics and integrity, reflexivity, researcher development, and scholarly contribution. The literature base combined foundational theoretical scholarship with recent research in order to retain conceptual depth while ensuring that the resulting framework reflects contemporary transformations in doctoral education.

The second stage involved critical comparison and differentiation. Concepts were examined across disciplinary and methodological traditions to identify convergence, divergence, complementarity, and conceptual gaps. Particular attention was given to questions such as: Which dimensions of doctoral research are consistently treated as interconnected? Which are generally presented as discrete competencies? Where do established approaches privilege methodological technique over methodological reasoning? How are ethics, reflexivity, and project management positioned in relation to research quality? And how is the transition from research activity to original scholarly contribution conceptualised?

The third stage involved integrative theorising. Concepts identified as theoretically related were brought together into a higher-order explanatory structure. The purpose was not to collapse disciplinary distinctions but to establish the relationships necessary to conceptualise doctoral research as an integrated process. At this stage, the analysis moved beyond identifying individual dimensions towards examining their functional interdependence. For example, research-question development was considered in relation to literature engagement and conceptual framing; methodological reasoning in relation to the questions and evidence required; ethical reasoning in relation to research design and knowledge claims; and scholarly contribution in relation to the iterative interaction among literature, theory, evidence, and reflexivity.

The fourth stage involved framework refinement and theoretical plausibility testing. The emerging IDRDF was repeatedly examined against the broader literature to identify omissions, conceptual redundancies, ambiguous boundaries, and relationships that required clarification. This iterative process served as a form of internal theoretical checking. A dimension was retained where it represented a substantively distinct component of doctoral knowledge production and where its relationship with other dimensions could be theoretically justified. Conversely, concepts that represented overlapping manifestations of a broader construct were consolidated to avoid unnecessary fragmentation.

The sequence of building the IDRDF: and integrative methodological process.

This procedure of building the IDRDF is particularly important because conceptual frameworks can easily become descriptive taxonomies that enumerate familiar concepts without establishing explanatory relationships among them. The objective of the present methodology was therefore to move beyond categorisation towards relational theorisation. The IDRDF is intended to explain not merely *what doctoral researchers do* but *how and why the different dimensions of doctoral inquiry need to interact to support coherent knowledge production*.

The methodological process underpinning the development of the IDRDF is conceived as an iterative sequence of interconnected analytical activities rather than a linear progression. It begins with literature mapping, through which relevant scholarship on doctoral education, research design, methodology, knowledge production, ethics, reflexivity, and researcher development is identified and conceptually organised. This is followed by critical comparison, examining convergences, divergences, complementarities, and unresolved tensions across

these bodies of scholarship. The analysis then progresses to conceptual integration, bringing theoretically compatible concepts into a coherent explanatory structure. Through relational theorising, attention shifts from individual concepts to the relationships among them and their contribution to coherent doctoral knowledge production. The emerging framework is subsequently subjected to iterative refinement, which involves repeated examination against the wider literature to enhance conceptual clarity, internal coherence, and theoretical plausibility. This process culminates in framework development and the formulation of propositions that provide a foundation for subsequent empirical investigation and validation.

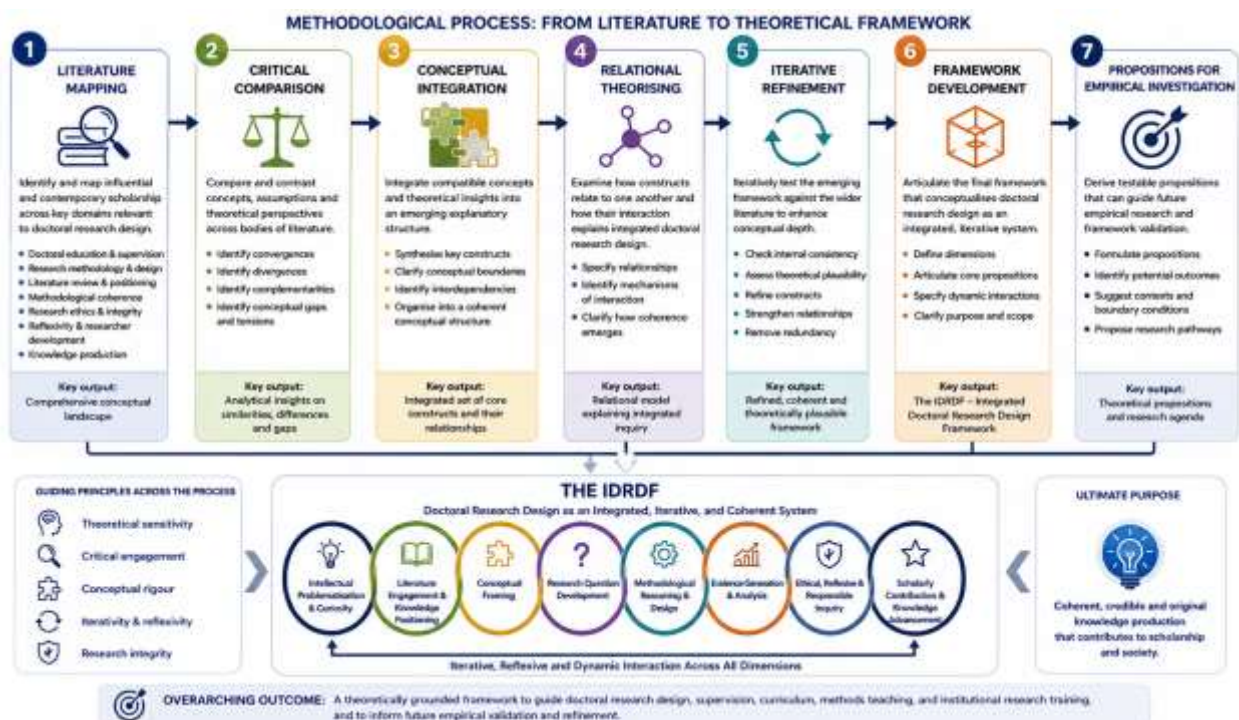


Figure 1: Methodological process

This process also reflects the iterative character of research design itself. The framework was not constructed through a strictly linear progression in which each conceptual decision was permanently fixed before the next was undertaken. Instead, relationships identified at later stages prompted reconsideration of earlier conceptualisations. This recursive logic is consistent with the paper's broader theoretical proposition that doctoral research design itself is an iterative process rather than a linear sequence of predetermined methodological tasks.

The methodology therefore establishes an important correspondence between **how the framework was developed** and **what the framework argues about doctoral research**: both are understood as processes of iterative integration, critical reflection, and progressive refinement.

Theoretical architecture of the framework

The IDRDF is situated at the intersection of three complementary theoretical orientations: research-design coherence, doctoral researcher development, and knowledge production.

The first orientation concerns coherence in research design. Methodological choices cannot be evaluated adequately in isolation from research questions, theoretical assumptions, evidence requirements, analytical strategies, and intended knowledge claims. Recent doctoral research-methods scholarship illustrates the practical importance of making methodological assumptions explicit, particularly where innovative or collaborative approaches challenge conventional understandings of research rigour (Cruickshank & Brewster, 2024). The IDRDF extends this logic by treating coherence as a property of the entire research architecture rather than merely the relationship between methodology and methods.

The second orientation concerns doctoral researcher development. Doctoral education is increasingly understood as a process through which researchers develop intellectual independence, methodological judgement, reflexivity, and the capacity to make defensible scholarly decisions. Contemporary scholarship on doctoral supervision similarly demonstrates that supervisory practice encompasses a broader set of intellectual and developmental functions than traditional apprenticeship models imply. The IDRDF therefore conceptualises the doctoral researcher not simply as a recipient of methodological knowledge but as a developing agent of research design who progressively acquires the capacity to integrate multiple forms of scholarly reasoning.

The third orientation concerns knowledge production. The purpose of doctoral research is not merely to execute a technically competent study but to generate a defensible contribution to knowledge. This requires a relationship between existing scholarship and new inquiry: the literature establishes what is already known and where uncertainties, tensions, omissions, or alternative interpretations remain; conceptual framing provides a means of interpreting those issues; methodology establishes how appropriate evidence can be generated or interrogated; analysis transforms evidence into interpretable findings; and reflexive reasoning enables the researcher to evaluate the boundaries and implications of resulting claims.

The IDRDF brings these orientations together through a relational rather than additive model. Its dimensions should therefore not be interpreted as eight independent competencies whose simple accumulation guarantees research quality. Instead, the framework proposes that their interaction generates an emergent property, which is an integrative research judgement, through which doctoral researchers learn to make, justify, evaluate, and revise interconnected research decisions.

This theoretical position constitutes the principal conceptual innovation of the framework. The literature already contains substantial scholarship on individual elements of doctoral research. The distinctive contribution of the IDRDF lies in theorising the integration of those elements as a core doctoral capability and as a condition of coherent knowledge production.

Methodological limitations and boundaries of the framework

Several methodological limitations necessarily accompany this conceptual approach. First, the IDRDF is a theory-building proposition rather than an empirically validated model. Its explanatory claims have not yet been tested through longitudinal studies of doctoral researchers, comparative programme evaluations, or experimental investigations of research-training interventions. Consequently, the framework should not be interpreted as establishing causal relationships between integrated research design and outcomes such as doctoral completion or research quality.

Second, conceptual synthesis necessarily involves selective interpretation. Although the study draws upon scholarship from multiple methodological and disciplinary traditions, no conceptual synthesis can exhaustively represent the full diversity of doctoral research. Alternative theoretical configurations may therefore be possible, and subsequent research may identify dimensions, relationships, or boundary conditions not captured by the present framework.

Third, the IDRDF operates at a deliberately abstract level. This enables application across qualitative, quantitative, mixed-methods, interdisciplinary, and practice-based research, but abstraction necessarily reduces attention to discipline-specific epistemological conventions. The framework should consequently be regarded as integrative but not prescriptive. Its purpose is to support reasoning about relationships among research decisions, not to impose a universal sequence or methodological hierarchy.

Fourth, the framework primarily addresses the intellectual architecture of doctoral research and cannot, by itself, explain the full range of structural conditions shaping doctoral trajectories. Funding, supervisory capacity, institutional resources, disciplinary cultures, employment conditions, personal circumstances, inequalities, and national doctoral policies may substantially influence research development and completion. These contextual factors fall outside the principal analytical scope of the framework, although they provide important conditions within which it operates.

These limitations define rather than diminish the contribution of the study. Conceptual frameworks are valuable partly because they make theoretical relationships sufficiently explicit to become empirically examinable. The IDRDF therefore provides a research agenda as much as a theoretical model. Its propositions can be subjected to empirical scrutiny through studies examining whether and how integrated research-design education influences doctoral researchers' methodological judgement, research-question development, supervisory interactions, research quality, progression, and scholarly contribution.

The Integrated Doctoral Research Design Framework (IDRDF)

The preceding literature review demonstrates that scholarship on doctoral research has generated extensive knowledge concerning individual dimensions of research design, including research questions, methodological approaches, literature review, ethical conduct, research

integrity, and researcher development. Collectively, these contributions have significantly advanced methodological understanding and doctoral education. However, the review also revealed an important conceptual limitation: existing scholarship predominantly addresses these dimensions separately, with comparatively limited attention devoted to explaining how they interact as an integrated system for producing original knowledge.

This paper argues that doctoral research should be understood not as a sequence of independent methodological decisions but as a dynamic process of knowledge construction in which intellectual, theoretical, methodological, ethical, and organisational dimensions continuously shape one another. Accordingly, the Integrated Doctoral Research Design Framework (figure 2) synthesises insights from research methodology, doctoral education, knowledge production theory, and responsible research into a coherent model of evidence-based scholarly inquiry.

The framework advances a holistic understanding of research design by positioning doctoral inquiry as an iterative process that transforms intellectual curiosity into original scholarly contribution through the continuous interaction of eight interconnected dimensions. Rather than replacing existing methodological frameworks, the IDRDF integrates them within a broader conceptual architecture that explains how coherent research design enables rigorous knowledge production.

Theoretical foundations of the IDRDF

The IDRDF is informed by four complementary theoretical traditions.

First, it draws upon research design theory, which conceptualises research design as the logical structure connecting research questions, evidence, and knowledge claims rather than merely a procedural plan for conducting research (Maxwell, 2021; Creswell and Creswell, 2023). From this perspective, methodological quality depends on coherence among the different components of inquiry.

Second, the framework builds upon knowledge production theory, particularly scholarship emphasising that knowledge is socially constructed, contextually situated, and generated through interaction among researchers, scholarly communities, and wider society (Gibbons et al., 1994; Nowotny, Scott and Gibbons, 2001). Doctoral research is therefore viewed as participation in ongoing scholarly conversations rather than the isolated production of information.

Third, the framework incorporates perspectives from doctoral education and researcher development, which emphasise that becoming an independent researcher involves developing methodological judgement, critical reasoning, reflexivity, and scholarly identity rather than simply mastering research techniques (Boud and Lee, 2009; Lee, 2019). Doctoral education is consequently understood as a developmental process in which researchers progressively integrate conceptual, methodological, and professional competencies.

Finally, the framework is informed by contemporary scholarship on responsible research and research integrity, recognising that rigorous knowledge production requires transparency, ethical reasoning, reflexivity, accountability, and responsible engagement with emerging technologies and open science practices (ALLEA, 2023; UNESCO, 2023). Research quality is therefore conceptualised as encompassing both methodological rigour and ethical responsibility.

Together, these theoretical traditions support an integrated understanding of research design that extends beyond procedural methodology to encompass the intellectual processes through which credible and impactful knowledge is produced.

Core dimensions of the Integrated Doctoral Research Design Framework

The Integrated Doctoral Research Design Framework (IDRDF) conceptualises doctoral research as an interconnected architecture comprising eight analytically distinguishable but functionally interdependent dimensions. These dimensions represent the principal intellectual, conceptual, methodological, evidential, ethical, reflexive, organisational, and contributory processes through which doctoral knowledge is developed and established. Although each dimension has a distinct analytical purpose, none operates independently or in a strictly sequential manner. Rather, doctoral research progresses through continuous movement between these dimensions as researchers refine their questions, reconsider theoretical assumptions, evaluate methodological choices, generate and interpret evidence, and reassess the nature and significance of their emerging contribution. The framework therefore conceptualises doctoral inquiry as recursive, iterative, and reflexive, with developments in one dimension potentially prompting revision in others. This relational structure is central to the IDRDF: research quality is understood not simply as the successful completion of individual research tasks, but as the product of coherence, alignment, and critical integration across the research process.



Figure 2. The Integrated Doctoral Research Design (IDRDF): From curiosity to scholarly contribution.

Dimension 1. Intellectual curiosity and problem identification

Doctoral inquiry begins with intellectual curiosity. However, curiosity alone is insufficient to justify research. Through engagement with scholarship, professional practice, policy challenges, or societal needs, curiosity is progressively refined into a clearly defined research problem that warrants systematic investigation. Problem identification therefore represents the transition from personal interest to scholarly significance.

Dimension 2. Knowledge construction through literature engagement

The literature review constitutes the intellectual engine of the framework. Rather than serving as a background exercise, literature engagement enables researchers to identify conceptual relationships, evaluate competing explanations, recognise unresolved debates, and position their own investigations within existing knowledge. This process transforms information into scholarly understanding and establishes the foundation for originality.

Dimension 3. Conceptual framing and research questions

Research questions provide the organising logic of inquiry by defining what knowledge is sought and what constitutes appropriate evidence. Simultaneously, conceptual frameworks clarify the theoretical assumptions through which research problems are interpreted. Questions and conceptual framing therefore evolve together, each informing the refinement of the other throughout the research process.

Dimension 4. Methodological reasoning

The framework distinguishes methodological reasoning from methodological choice. Rather than selecting methods because they are familiar or fashionable, researchers justify methodological decisions according to the nature of the research questions, theoretical assumptions, and intended knowledge claims. Methodological coherence emerges through alignment among ontology, epistemology, methodology, methods, and analysis.

Dimension 5. Evidence generation and analysis

Evidence generation extends beyond data collection to encompass decisions regarding sampling, measurement, observation, documentation, interpretation, and analytical reasoning. Analysis is understood as an iterative process through which evidence is examined in relation to conceptual assumptions, allowing theoretical refinement as well as empirical interpretation.

Dimension 6. Ethics, reflexivity, and research integrity

Ethical reasoning permeates every dimension of the framework. Researchers continuously evaluate issues relating to participant welfare, positionality, transparency, accountability, data governance, responsible use of artificial intelligence, and research integrity. Reflexivity ensures that researchers critically examine how their assumptions influence both methodological decisions and knowledge claims.

Dimension 7. Research management and scholarly practice

Effective doctoral research also depends upon organisational competence. Project planning, resource management, milestone monitoring, collaboration, publication planning, and engagement with supervisory processes contribute directly to research quality and completion.

Research management is therefore conceptualised as an intellectual component of research design rather than merely an administrative activity.

Dimension 8. Original contribution and scholarly impact

The final dimension concerns contribution to knowledge. Within the IDRDF, originality is understood as the outcome of sustained interaction among all preceding dimensions rather than as a discrete endpoint. Contributions may be theoretical, methodological, conceptual, empirical, or practical, but each must demonstrate how the research advances existing scholarship while maintaining methodological and ethical credibility.

Dynamic relationships among the eight dimensions

The principal strength of the Integrated Doctoral Research Design Framework (IDRDF) lies not merely in the identification of eight constituent dimensions but in its conceptualisation of the dynamic relationships through which these dimensions collectively facilitate knowledge production. As illustrated in Figure 1, doctoral research is understood as an adaptive system characterised by continuous interaction, reciprocal influence, and iterative refinement rather than by the completion of sequential methodological stages. Consequently, the explanatory value of the framework derives from its capacity to illuminate how intellectual, conceptual, methodological, ethical, analytical, and organisational dimensions continuously shape one another throughout the research lifecycle.

This systemic perspective challenges conventional representations of doctoral research that implicitly assume a linear progression from topic selection to research completion. Although sequential models offer practical guidance for organising research activities, they often fail to capture the recursive nature of scholarly inquiry. In practice, experienced researchers rarely move through research design in a single direction. Instead, they repeatedly revisit earlier decisions as theoretical understanding develops, empirical evidence accumulates, methodological challenges emerge, and new intellectual questions arise. The IDRDF therefore conceptualises doctoral research as a process of continuous learning in which refinement is regarded as evidence of scholarly maturity rather than methodological inconsistency (Maxwell, 2021; Ravitch and Carl, 2020).

At the centre of the framework is the interaction between intellectual curiosity and problem identification. Curiosity initiates scholarly inquiry by motivating researchers to explore phenomena that appear theoretically, professionally, or socially significant. However, curiosity alone does not constitute a legitimate basis for doctoral research. Through sustained engagement with existing scholarship, preliminary observations, and disciplinary debates, broad interests are progressively refined into clearly articulated research problems. This refinement illustrates the first major feedback loop within the framework: literature engagement transforms curiosity into scholarly inquiry, while emerging understandings simultaneously reshape researchers' perceptions of the problem itself. Problem identification is therefore neither fixed nor completed at the outset of research but develops continuously throughout the investigative process.

The relationship between literature engagement and conceptual framing represents a second critical interaction. Literature does not merely provide background information; rather, it functions as the intellectual medium through which concepts are clarified, theoretical assumptions are examined, and alternative explanations are evaluated. As researchers engage critically with scholarship, conceptual frameworks evolve, enabling increasingly sophisticated interpretations of the research problem. Conversely, evolving conceptual understandings influence subsequent engagement with literature by directing attention towards previously overlooked theoretical perspectives, disciplinary conversations, or methodological debates. Literature review and conceptual framing therefore operate as mutually reinforcing processes that strengthen the theoretical foundations of inquiry.

This reciprocal relationship extends directly to the development of research questions. Rather than emerging independently from researchers' interests, research questions evolve through interaction among conceptual understanding, existing scholarship, and practical considerations. As theoretical perspectives become more refined, researchers frequently modify the scope, focus, or wording of their research questions to improve conceptual precision and analytical feasibility. Similarly, preliminary methodological considerations may reveal limitations requiring further refinement of the questions themselves. Within the IDRDF, research questions are therefore conceptualised as dynamic intellectual constructs that evolve alongside theoretical understanding rather than remaining static throughout the research process.

A further interaction occurs between research questions and methodological reasoning, constituting one of the framework's principal mechanisms of methodological coherence. The literature consistently emphasises that methodological choices should be determined by the nature of the research questions rather than by researchers' methodological preferences (Creswell and Creswell, 2023). The IDRDF extends this principle by demonstrating that methodological reasoning itself is iterative. Researchers frequently reconsider methodological strategies as conceptual understanding develops or as practical challenges arise during fieldwork. For example, initial plans for quantitative measurement may be supplemented by qualitative interviews when unexpected contextual complexity emerges. Conversely, qualitative exploration may generate hypotheses requiring quantitative examination. Such adaptations strengthen rather than weaken methodological rigour when they remain aligned with the evolving logic of inquiry.

The interaction between methodological reasoning and evidence generation further illustrates the adaptive nature of doctoral research. Evidence is not simply collected through predetermined procedures but is actively constructed through methodological decisions regarding sampling, observation, measurement, documentation, and analytical strategy. These decisions influence not only the quantity of available evidence but also the kinds of knowledge that can be generated. Consequently, evidence generation cannot be understood independently of methodological reasoning. Each informs the other throughout the research process, requiring researchers to remain responsive to emerging empirical realities while preserving conceptual coherence.

The relationship between evidence generation and analysis introduces another important feedback mechanism within the framework. Analysis is frequently presented as an activity that begins only after data collection has been completed. However, contemporary methodological scholarship increasingly recognises analysis as an iterative process occurring throughout research, particularly within qualitative and mixed-methods traditions (Tracy, 2020). Preliminary analytical insights often influence subsequent data collection by identifying areas requiring further investigation, revealing unexpected patterns, or exposing conceptual ambiguities. Similarly, quantitative studies may require additional analyses as initial findings generate new theoretical questions or reveal unforeseen relationships among variables. Within the IDRDF, evidence generation and analysis therefore operate as interconnected processes of progressive knowledge construction rather than as isolated stages.

Unlike many conventional models of research design, the IDRDF positions ethics, reflexivity, and research integrity as dimensions that intersect every component of the framework rather than functioning as independent stages. Ethical reasoning shapes decisions regarding research questions, participant selection, methodological design, data management, interpretation, dissemination, and societal application. Similarly, reflexivity encourages researchers to evaluate how their assumptions, disciplinary perspectives, positionalities, and institutional contexts influence each stage of inquiry. Research integrity reinforces these interactions by promoting transparency, accountability, and responsible scholarly practice. The framework therefore conceptualises ethics as an organising principle of research design rather than as an administrative requirement associated solely with institutional ethics approval.

The interaction between research management and the remaining dimensions also deserves particular attention. Conventional discussions frequently portray project management as a logistical activity separate from intellectual inquiry. However, doctoral research depends substantially upon effective planning, milestone management, resource allocation, supervisory engagement, publication strategy, and time management. These organisational processes influence opportunities for literature engagement, methodological refinement, evidence generation, and analytical reflection. Conversely, unexpected conceptual developments often require revisions to research plans and timelines. Research management is therefore best understood as facilitating the conditions under which intellectual inquiry can develop systematically rather than merely coordinating administrative tasks.

The culmination of these dynamic interactions is the emergence of original scholarly contribution, which the framework conceptualises as an emergent property rather than a predetermined outcome. Originality is frequently misunderstood as the discovery of entirely new phenomena or unprecedented ideas. The IDRDF instead demonstrates that originality most commonly emerges through sustained interaction among existing knowledge, theoretical refinement, methodological innovation, empirical evidence, and critical interpretation. Contributions may therefore take multiple forms, including conceptual clarification, theoretical extension, methodological development, contextual application, interdisciplinary synthesis, or practical innovation. What distinguishes these contributions is not their novelty alone but their capacity to advance scholarly understanding through coherent and credible reasoning.

Importantly, the dynamic relationships represented in the IDRDF reinforce the view that doctoral research is fundamentally a process of continuous knowledge construction rather than procedural implementation. Each dimension simultaneously influences and is influenced by other dimensions, creating an adaptive intellectual system capable of responding to emerging evidence, theoretical developments, methodological challenges, and ethical considerations. This recursive structure aligns with contemporary systems thinking, which recognises that complex outcomes arise from interactions among interconnected components rather than from isolated variables (Meadows, 2008; Checkland, 1981). By applying systems thinking to doctoral research design, the IDRDF provides a more comprehensive explanation of how rigorous and original scholarship is produced.

The dynamic relationships articulated within the framework also have important implications for doctoral education. Rather than teaching research methods as discrete competencies, doctoral programmes should cultivate researchers' capacity to understand and manage the interactions among conceptual, methodological, ethical, and analytical dimensions of inquiry. Developing such integrative reasoning equips doctoral candidates to navigate the complexity and uncertainty that characterise contemporary research environments. Consequently, the IDRDF contributes not only to methodological theory but also to broader debates concerning researcher development and doctoral pedagogy.

Conceptual propositions

The IDRDF gives rise to five interrelated conceptual propositions that collectively constitute the theoretical foundation of the framework and provide a basis for future empirical investigation. Taken together, these propositions advance the argument that doctoral research quality depends less on the mastery of isolated methodological techniques than on the capacity to integrate multiple dimensions of inquiry into a coherent architecture of knowledge production.

The first proposition is that doctoral research quality is strengthened when research design is conceptualised as an integrated system of interconnected dimensions rather than as a sequence of independent methodological tasks. Although doctoral researchers necessarily engage with distinct activities, including problem identification, literature review, methodological selection, data generation, analysis, and writing, the framework proposes that these activities derive their scholarly value from their relationships with one another. Research design should therefore be understood as a dynamic system in which changes to one dimension can require reconsideration of others. Such an understanding challenges linear representations of doctoral research and foregrounds the iterative character of knowledge production.

The second proposition is that methodological coherence emerges through alignment among research questions, conceptual framing, methodological reasoning, evidence generation, ethical practice, and analytical interpretation. Methodological quality cannot be established solely by demonstrating technical competence in the application of particular methods. Rather, methodological decisions must be defensible in relation to the questions being asked, the conceptual assumptions informing the inquiry, the nature of the evidence required, the ethical

conditions under which that evidence is generated, and the analytical procedures through which it is interpreted. Methodological coherence is therefore conceived as a relational property of the research design rather than as a characteristic of individual methods.

The third proposition concerns the nature of original scholarly contribution. The IDRDF proposes that originality should be understood as an emergent property of iterative engagement among existing scholarship, theoretical conceptualisation, empirical or textual evidence, and reflexive scholarly reasoning. Contribution does not arise automatically from the collection of new data or the application of sophisticated methods. Rather, it develops through the researcher's capacity to identify meaningful gaps or tensions in existing knowledge, interrogate them conceptually, generate and interpret appropriate evidence, and articulate how the resulting insights extend, challenge, refine, or reconfigure established understandings.

The fourth proposition is that ethical reasoning and research integrity are constitutive dimensions of research quality rather than procedural requirements confined to formal ethics approval. Ethical considerations influence how research problems are formulated, how participants or sources are engaged, how evidence is generated and represented, and how knowledge claims are communicated. Integrity, transparency, reflexivity, and responsible scholarly practice must consequently permeate the research process rather than appear as an administrative checkpoint preceding data collection. This proposition positions ethical reasoning as integral to the credibility, legitimacy, and social responsibility of doctoral knowledge production.

Finally, the IDRDF proposes that doctoral researcher development requires more than technical methodological competence. Doctoral researchers must progressively develop the capacity to exercise methodological judgement, integrate conceptual and empirical dimensions of inquiry, recognise relationships among research decisions, and reflect critically on the assumptions and consequences underlying their knowledge claims. The distinctive capability of the doctoral researcher is therefore not simply knowing how to conduct research, but being able to reason through the interconnected decisions that make research coherent, credible, ethical, and capable of generating an original scholarly contribution.

Implications of the framework

The Integrated Doctoral Research Design Framework provides a conceptual foundation for strengthening doctoral education, research supervision, and methodological training. By emphasising integration rather than fragmentation, it encourages supervisors and doctoral programmes to support researchers in understanding the relationships among intellectual curiosity, theoretical development, methodological reasoning, ethical responsibility, evidence generation, and scholarly contribution.

The framework also provides a basis for curriculum development by shifting research methods education from procedural instruction towards methodological reasoning and knowledge construction. Furthermore, it offers a theoretical lens through which future empirical studies

can investigate doctoral researcher development, supervision practices, methodological decision-making, and research quality across disciplinary and international contexts.

Accordingly, the IDRDF advances a comprehensive conceptualisation of doctoral research design that reflects the complexity of contemporary knowledge production while remaining sufficiently flexible to accommodate diverse methodological traditions. It therefore represents a theoretical contribution that extends existing scholarship by integrating previously fragmented dimensions of doctoral research into a unified explanatory framework.

DISCUSSION

Positioning the IDRDF in relation to established approaches

The Integrated Doctoral Research Design Framework (IDRDF) contributes to doctoral education scholarship by addressing a conceptual problem that remains insufficiently resolved across established approaches: the tendency to conceptualise doctoral research through partially independent dimensions rather than as an integrated process of knowledge construction. The framework does not seek to displace established approaches to research design, doctoral supervision, researcher development, or methodological training. Rather, its contribution lies in bringing these perspectives into a common conceptual architecture and specifying the relationships through which they collectively support the development of original, rigorous, and responsible scholarship.

Conventional research-design approaches provide essential foundations for the IDRDF. Methodological frameworks developed around qualitative, quantitative, and mixed-methods inquiry have established the importance of alignment among research questions, methodological assumptions, methods, evidence, and analysis. The IDRDF extends this principle beyond methodological alignment by incorporating literature engagement, reflexivity, ethics, research management, and scholarly contribution into the same architecture. In this respect, methodological coherence becomes a system-level property rather than a characteristic confined to the relationship between questions and methods. The framework consequently shifts attention from the selection of appropriate methods to the broader question of whether the entire research design is intellectually and ethically coherent.

The distinction is important because methodological competence does not necessarily produce methodological judgement. A doctoral researcher may be capable of conducting interviews, administering surveys, undertaking statistical analysis, or applying qualitative coding procedures while remaining uncertain about why a particular method is appropriate for the research problem. The IDRDF addresses this distinction by conceptualising methodological reasoning as an integrative capability through which researchers connect questions, conceptual assumptions, evidence requirements, analytical strategies, and anticipated knowledge claims. This resonates with contemporary methodological scholarship that increasingly emphasises methodological fit and the relationship between research purpose and design rather than the procedural mastery of individual methods.

The framework also differs from linear models of doctoral research. Sequential representations can be pedagogically useful because they help novice researchers understand the broad organisation of a research project. However, they risk implying that research proceeds from one completed stage to another. The IDRDF instead conceptualises doctoral inquiry as recursive. Literature can reshape research questions; questions can require methodological reconsideration; emerging evidence can challenge theoretical assumptions; ethical concerns can require changes to data collection; and analysis can generate new questions. This conceptualisation is consistent with the changing landscape of doctoral education identified in recent scholarship, which describes movement away from a relatively simple apprenticeship model towards more structured, collaborative, interdisciplinary, and professionally diverse forms of doctoral education (McKenna and van Schalkwyk, 2024; Taylor, 2025).

The IDRDF also complements emerging approaches to doctoral supervision. Research increasingly demonstrates that supervision can no longer be adequately represented as a dyadic relationship in which an experienced scholar transmits disciplinary knowledge to an apprentice. McKenna and van Schalkwyk's (2024) scoping review of 81 studies identified an international movement towards more collaborative and structured supervisory models, with potential benefits for throughput, interdisciplinary research, research foundations, and the mitigation of isolation and power asymmetries. Similarly, Guarimata-Salinas, Carvajal, and Jiménez López (2024), drawing on evidence from data collected from 116 countries, encompassing 47 different languages and 55 distinct labels from Africa, America, Asia, Europe, and Oceania, identified 18 functions associated with doctoral supervision. The study demonstrates the breadth and complexity of contemporary supervisory practice.

The distinctive contribution of the IDRDF in this context is to provide supervisors with an integrative diagnostic framework. Rather than asking only whether a candidate is making satisfactory progress, supervisors can use the framework to examine relationships among the candidate's research problem, questions, conceptual framework, methodology, evidence, ethics, analysis, project management, and anticipated contribution. Difficulties that appear to be located in one area may consequently be diagnosed as problems of alignment elsewhere. For example, persistent problems with data collection may originate not in technical incompetence but in an insufficiently focused research question; difficulties in analysis may reflect inadequate conceptual framing; and delays in completion may result from a research design that is too expansive for the available time and resources.

The IDRDF therefore adds a relational dimension to existing models of doctoral development. Its central proposition is that doctoral capability is not simply an accumulation of competencies but an increasing capacity to integrate competencies into coherent scholarly judgement.

Implications for doctoral supervision

The framework has significant implications for doctoral supervision because it reframes supervision from the correction of individual research tasks towards the development of integrative research judgement. Contemporary supervisors increasingly operate across multiple functions, including intellectual guidance, methodological advice, project management,

researcher development, pastoral support, and preparation for diverse professional trajectories (Guarimata-Salinas, Carvajal, and Jiménez López, 2024). The IDRDF provides a conceptual structure through which these functions can be coordinated rather than treated as unrelated supervisory responsibilities.

One practical implication is that supervisory conversations should increasingly focus on relationships among research components. Instead of asking a candidate whether the literature review is complete, for example, supervisors could ask how the literature has changed the research questions, what theoretical assumptions have emerged, and whether the methodology remains appropriate. Similarly, discussions of methodology should extend beyond method selection to consider the relationship between the methodological approach, evidence requirements, analysis, and intended contribution.

This is particularly important given evidence that supervisory relationships evolve throughout the doctoral journey. Thomas, Packer and Dolan (2024) found that both doctoral researchers and supervisors perceive changes in supervisory relationships over time, highlighting the multifaceted and developmental nature of supervision. The IDRDF supports this developmental orientation by allowing supervisory priorities to change as the candidate moves from problem identification towards increasing independence, methodological sophistication, analysis, and contribution.

The framework also supports more distributed and collaborative approaches to supervision. Where doctoral projects are interdisciplinary or internationally collaborative, no single supervisor may possess expertise across every dimension of the candidate's research. The IDRDF can therefore provide a shared conceptual language through which supervisory teams, doctoral committees, methodological specialists, and research-development professionals coordinate their contributions.

This is consistent with the increasing interest in co-supervision and team-based models internationally. Recent scholarship identifies a shift away from exclusively hierarchical supervisory relationships towards more collaborative models, although it also cautions against allowing managerial concerns for efficiency and throughput to displace intellectual quality (McKenna and van Schalkwyk, 2024). The IDRDF is therefore not a mechanism for increasing surveillance of doctoral candidates; rather, it is intended to support more purposeful and intellectually substantive supervision.

Implications for doctoral curricula

The IDRDF has equally important implications for the design of doctoral curricula. A persistent challenge in doctoral education is the fragmentation of research training into discrete workshops or modules, such as literature searching, qualitative methods, quantitative methods, research ethics, academic writing, statistics, and project management. Although each may provide valuable knowledge, the cumulative curriculum does not necessarily demonstrate how these capabilities interact in the construction of a doctoral research project.

The IDRDF suggests a shift from a skills-accumulation model towards an integrated research-design curriculum. Rather than teaching methodological components exclusively as separate subjects, doctoral programmes could organise research training around authentic research-design problems. Candidates might, for example, begin with a research problem and progressively develop a research question, conceptual framework, methodological rationale, ethical strategy, evidence plan, analytical approach, and project timeline. Each component could then be revisited as subsequent decisions reveal tensions or require refinement.

Such an approach would make doctoral training more closely resemble actual scholarly practice. It would also enable candidates to understand that research competence involves not merely knowing *how* to conduct particular procedures but being able to justify *why* those procedures are appropriate within a particular research architecture.

This curricular implication is particularly timely given the transformation of doctoral education internationally. Recent mapping of doctoral education and supervision research shows increasing attention to shorter doctoral models, collaborative approaches, teaching components, and practice-oriented problem-solving, indicating that the traditional apprenticeship model is being supplemented by more diverse forms of doctoral provision (Tresidder et al., 2025). The IDRDF offers a flexible architecture capable of accommodating these diverse models without prescribing a single disciplinary or institutional format.

Implications for research methods teaching

The implications for research-methods teaching are particularly direct. The framework suggests that doctoral methods education should move from method transmission to methodological reasoning.

Traditional methods teaching necessarily introduces techniques: how to construct a questionnaire, conduct an interview, analyse qualitative data, perform statistical tests, or manage a dataset. These forms of procedural knowledge remain indispensable. However, doctoral-level methodological competence requires an additional layer of reasoning: the capacity to establish whether a method is epistemologically, theoretically, practically, ethically, and analytically appropriate for a particular research question.

The IDRDF therefore suggests that methods teaching should repeatedly place techniques within the larger architecture of research design. A qualitative-methods session, for example, could explicitly connect epistemological assumptions, research questions, sampling, data generation, interpretation, reflexivity, and claims of contribution. A quantitative-methods session could similarly connect constructs, measurement, research questions, sampling, statistical inference, validity, and interpretation.

This approach would help address the recurring difficulty among doctoral researchers of distinguishing method, methodology, and research design. More importantly, it would cultivate the form of integrative judgement that distinguishes doctoral research from technical research assistance.

Implications for institutional research training

At institutional level, the IDRDF implies that doctoral research training should be understood as a system rather than a collection of services. Universities frequently distribute responsibility for doctoral development across graduate schools, faculties, schools, libraries, research offices, ethics committees, careers services, and individual supervisors. Such distributed provision can generate substantial resources but may also create fragmentation from the candidate's perspective.

An institutional application of the IDRDF would involve mapping existing doctoral-development provision against its eight dimensions and identifying areas of duplication, omission, or weak integration. For example, research-methods provision may be strong while project management and research integrity are treated separately; academic writing may be well supported while conceptual development receives limited institutional attention; or ethics may be effectively regulated but insufficiently integrated into methodological training.

The framework therefore offers institutions a potential quality-enhancement tool. It could support programme review, supervisor development, doctoral milestone design, training needs analysis, and evaluation of the coherence of doctoral provision.

This institutional dimension is particularly relevant in the context of the substantial changes documented in UK doctoral education. Taylor and Wisker (2023) demonstrate that changes to national frameworks, institutional structures, doctoral programmes, candidacy, supervision, and examination have been far-reaching, with particularly significant consequences for supervisors. The implication is that institutional responsibility for doctoral quality can no longer rest primarily on individual supervisor–candidate relationships.

Implications for doctoral completion

An important but more cautious implication concerns doctoral completion. The IDRDF does not claim that integrated research design automatically causes timely completion. Such a claim would require empirical testing. Nevertheless, the framework provides a plausible conceptual explanation for how stronger research-design integration could reduce avoidable sources of delay.

Poorly bounded research problems, excessively broad research questions, inappropriate methodological choices, insufficient access to evidence, unclear analytical strategies, and weak project planning can create cumulative delays. By requiring researchers to examine these relationships early and revisit them systematically, the IDRDF may help identify design-related risks before they become structurally embedded in the project.

Recent research reinforces the importance of viewing doctoral progression as a complex process rather than a purely individual matter. Alves et al. (2024), for example, examine withdrawal, re-enrolment, and dropout as an interrupted doctoral journey rather than treating non-completion simply as candidate failure. More recent work has also begun to examine the

relationship between supervisory responsibilities and time-to-degree, reinforcing the importance of supervisory and institutional conditions in completion outcomes.

The IDRDF consequently reframes completion as partly a matter of research-design sustainability. A research project should be intellectually ambitious but also feasible within the available time, resources, expertise, access conditions, and ethical constraints. This brings research management into the conceptual core of doctoral design rather than treating it as an administrative afterthought.

Implications for research quality

The framework also offers a broader conceptualisation of research quality. Conventional approaches frequently assess quality through criteria associated with particular methodological traditions, such as validity and reliability in quantitative research or credibility, transferability, dependability, and reflexivity in qualitative research. These criteria remain valuable, but the IDRDF proposes that quality should additionally be evaluated through integrative coherence.

Under this conception, a high-quality doctoral project should demonstrate a defensible relationship among the research problem, questions, theoretical framing, methodology, evidence, analysis, ethics, and contribution. A study may employ technically sophisticated methods yet remain conceptually weak if the methods do not answer the research questions. Conversely, a relatively modest methodological design may produce a significant contribution if it is exceptionally well aligned with the research problem and theoretical purpose.

This perspective also accommodates responsible research. Research integrity, transparency, reflexivity, and ethical accountability are not external constraints on quality; they are dimensions of quality itself. This becomes increasingly important as doctoral researchers engage with artificial intelligence, digital data, open research practices, interdisciplinary collaboration, and new forms of scholarly communication.

The framework therefore shifts the evaluative question from *Was the correct method used?* towards *Is the research architecture sufficiently coherent, justified, ethical, and generative to support the knowledge claims being made?* This is a more appropriate question for doctoral-level scholarship because it evaluates the intellectual logic connecting the components of inquiry.

Implications for international doctoral education

The international dimension of doctoral education further strengthens the relevance of the IDRDF. Doctoral education increasingly involves international candidates, cross-border supervision, cotutelle arrangements, multinational research teams, international examination, and interdisciplinary collaborations. Jones et al. (2024) identify substantial international diversity in doctoral admission, programme structures, supervision, examination, funding, outputs, and labour-market trajectories.

These developments mean that doctoral researchers cannot be assumed to enter programmes with homogeneous understandings of research design. Epistemological assumptions, conventions of academic writing, supervisory expectations, understandings of originality, and relationships between researchers and participants may vary across educational and cultural contexts.

The IDRDF offers a potentially useful shared conceptual language for navigating such differences. Rather than assuming that one methodological tradition represents the universal model of rigorous research, it focuses on relationships among research questions, theoretical assumptions, evidence, ethics, and contribution. This creates space for methodological pluralism while retaining expectations of intellectual coherence.

The issue is particularly important for international doctoral supervision. Pinto (2023), for example, found that international doctoral students emphasised intrapersonal, interpersonal, communicative, academic, and research qualities in their expectations of supervisors, highlighting the importance of intercultural dimensions of supervisory practice. The IDRDF can complement such work by providing a framework through which supervisors and candidates can make implicit assumptions about research design more explicit and discuss them systematically.

Internationalisation also requires the framework itself to remain critically reflexive. An integrated model should not become another universalising template imposed upon diverse doctoral traditions. Its value lies precisely in providing a flexible architecture within which different epistemologies and methodologies can be articulated and justified. The framework should therefore be understood as integrative but not prescriptive.

Theoretical significance of the IDRDF

Taken together, these implications establish the principal theoretical significance of the IDRDF. Existing approaches have made important contributions to methodological design, doctoral supervision, researcher development, and research quality. The IDRDF adds a systems-level conceptualisation of their interdependence.

Its central theoretical proposition is that doctoral research quality is an emergent property of the relationships among intellectual problematisation, conceptualisation, methodological reasoning, evidence, ethics, reflexivity, research management, and scholarly contribution. This proposition moves the discussion beyond the conventional distinction between *research skills* and *research supervision* and towards a more integrated account of how doctoral researchers become capable producers of knowledge.

The framework consequently contributes at three levels. At the theoretical level, it reconceptualises research design as an integrated architecture of knowledge production. At the pedagogical level, it provides a basis for redesigning doctoral curricula and methods education around integrative reasoning. At the institutional level, it provides a potential framework for

aligning supervision, researcher development, quality assurance, and doctoral programme design.

Importantly, the framework remains a conceptual proposition rather than an empirically validated model. Its value therefore lies not in claiming that the eight dimensions constitute the only possible architecture of doctoral research but in offering a theoretically grounded model that can be examined, challenged, adapted, and refined through future research.

The broader argument is that doctoral education should prepare researchers not merely to conduct research, but to reason through research. This distinction captures the central contribution of the IDRDF. In an increasingly complex research environment, doctoral graduates require more than methodological repertoires. They require the intellectual capacity to connect questions with evidence, methods with epistemological assumptions, literature with originality, ethics with research quality, and research management with scholarly ambition. The IDRDF provides a conceptual architecture for developing precisely this form of integrated scholarly judgement.

CONCLUSION

This paper has argued that doctoral research design should be understood not as a linear sequence of methodological tasks, but as an integrated, iterative, and reflexive process of knowledge production. The argument emerged from a conceptual synthesis of scholarship on doctoral education, research design, methodological coherence, researcher development, supervision, ethics, and knowledge production. From this synthesis, the paper developed the Integrated Doctoral Research Design Framework (IDRDF), which conceptualises doctoral inquiry through the dynamic interaction of eight dimensions: intellectual curiosity and problem identification, literature engagement, conceptual framing and research-question development, methodological reasoning, evidence generation and analysis, ethics and research integrity, reflexivity and research management, and original scholarly contribution. The framework's central proposition is that these dimensions should not be treated as discrete competencies but as mutually constitutive elements of a coherent research architecture.

The significance of this proposition lies in its response to a persistent tension within contemporary doctoral education. Doctoral researchers are increasingly expected to produce original knowledge while simultaneously navigating complex methodological, interdisciplinary, ethical, technological, international, and professional environments. Yet research training can remain fragmented, with methodological techniques, literature searching, academic writing, ethics, project management, and researcher development frequently offered as separate forms of provision. Recent scholarship similarly identifies the formulation and refinement of research questions as a complex developmental process requiring structured scaffolding, dialogue, and iterative engagement rather than one-off methodological instruction (Girard et al., 2025). The IDRDF responds to this problem by shifting the emphasis from competence accumulation to competence integration.

Theoretical contribution

The principal theoretical contribution of the paper is therefore the conceptualisation of integration as a distinctive dimension of doctoral research capability. Existing approaches have generated sophisticated accounts of individual components of research quality, methodological design, doctoral supervision, and researcher development. The IDRDF does not dispute these contributions. Instead, it proposes that their explanatory power can be strengthened by examining the relationships among them.

This distinction is important. The framework is not simply a checklist of things doctoral researchers should consider. Its theoretical claim is stronger: the quality and originality of doctoral research emerge from the coherence of the relationships among its constituent dimensions. A research question cannot be evaluated independently of the conceptual problem from which it emerges; methodology cannot be assessed independently of the question it is intended to answer; evidence cannot be interpreted independently of the theoretical and analytical framework through which it becomes meaningful; and scholarly contribution cannot be established independently of the literature against which originality is demonstrated. Similarly, ethical judgement and reflexivity cannot be confined to administrative stages but must permeate the production and interpretation of knowledge.

This systems-oriented conceptualisation extends conventional understandings of methodological coherence. It proposes that coherence should be understood at the level of the whole research architecture, encompassing intellectual, conceptual, methodological, empirical, ethical, analytical, organisational, and contributory dimensions. Such a position is particularly relevant to contemporary doctoral education, where research projects increasingly cross disciplinary and institutional boundaries and where doctoral supervision itself encompasses a wider range of intellectual and developmental functions (Guarimata-Salinas, Carvajal, and Jiménez López, 2024; McKenna and van Schalkwyk, 2024).

The framework also contributes to theorising the development of research questions. Rather than treating the research question as a fixed starting point, the IDRDF conceptualises question development as an iterative process through which researchers progressively establish the scope, significance, feasibility, and theoretical implications of an inquiry. This is consistent with Girard et al.'s (2025) argument that learning to formulate research questions is a complex doctoral learning process requiring sustained scaffolding and interaction. The IDRDF extends this insight by situating question development within a broader system in which questions continuously interact with literature, theory, methodology, evidence, ethics, and emerging findings.

The framework consequently advances a view of doctoral education in which the ultimate objective is not simply to produce researchers who know research methods, but researchers who can reason through research. This distinction is theoretically consequential because it identifies integrative judgement as a form of doctoral-level knowledge in its own right.

Practical implications

The practical implications of the IDRDF extend across the doctoral ecosystem. For supervisors, the framework provides a shared diagnostic language through which candidates' progress can be discussed in terms of relationships among research components rather than isolated outputs. Supervisory conversations can therefore move from questions such as whether a literature review is "finished" towards more intellectually consequential questions: How has the literature reshaped the research problem? Does the methodology remain appropriate? What kind of evidence is necessary to substantiate the anticipated contribution? What assumptions underpin the interpretation of that evidence?

This is particularly significant given the expanding complexity of contemporary doctoral supervision. Recent research demonstrates that doctoral supervisors perform multiple functions extending well beyond disciplinary expertise, while international doctoral education increasingly requires supervisors to negotiate linguistic, cultural, disciplinary, and institutional diversity (Guarimata-Salinas, Carvajal, and Jiménez López, 2024; Pinto, 2023). The IDRDF provides a potentially useful integrative structure within which these supervisory functions can be coordinated.

For doctoral curricula, the framework supports a movement away from isolated research-methods provision towards research-design learning. Doctoral programmes could use authentic research problems as the organising principle for training, enabling candidates to move repeatedly between questions, conceptualisation, methodology, evidence, ethics, analysis, and contribution. Such an approach would more closely reflect the actual iterative nature of research and would help candidates understand methodological choices as acts of scholarly reasoning rather than technical selection.

For institutions, the framework provides a potential basis for evaluating the coherence of doctoral provision. Graduate schools, faculties, libraries, research offices, ethics structures, careers services, and supervisory teams could map their provision against the IDRDF dimensions to identify gaps and unnecessary duplication. This is increasingly important as doctoral education becomes more structured and internationally diverse. Recent scholarship documents substantial changes in doctoral education models, supervision, outputs, examination, funding, and internationalisation, demonstrating that doctoral provision can no longer be understood solely through the traditional supervisor-candidate dyad (Jones et al., 2024).

The framework may also contribute indirectly to doctoral completion. It does not claim that integrated research design causes timely completion—a proposition requiring empirical investigation. Rather, it suggests that early identification of poorly bounded research problems, methodological misalignment, inadequate evidence strategies, unrealistic project scopes, and insufficient project management may reduce avoidable sources of delay. In this sense, research-design sustainability becomes an important dimension of doctoral progress: ambitious research must remain feasible within the available temporal, methodological, ethical, and material conditions.

Finally, the framework has implications for research quality. It proposes that quality should not be reduced to technical compliance with methodological procedures. Instead, doctoral research should demonstrate a defensible relationship among its research problem, questions, theoretical assumptions, methodology, evidence, analysis, ethical commitments, and contribution. The IDRDF therefore provides a basis for evaluating quality through integrative coherence, while retaining the methodological criteria appropriate to different research traditions.

Limitations

Several limitations should be acknowledged. First, the IDRDF is a conceptual framework, not an empirically validated model. Its eight dimensions and proposed relationships have been derived through conceptual synthesis rather than tested through longitudinal doctoral data. The framework should therefore be regarded as a theoretically informed proposition requiring empirical examination rather than as an established causal model.

Second, the framework necessarily abstracts across disciplinary and epistemological differences. Although this provides portability across qualitative, quantitative, mixed-methods, and interdisciplinary research, it also risks underrepresenting important differences between research traditions. What constitutes coherence, evidence, originality, validity, or reflexivity may vary substantially across disciplines. The IDRDF should consequently not be interpreted as prescribing a universal methodological sequence.

Third, the framework does not explicitly model the structural conditions in which doctoral research occurs. Funding, institutional resources, supervisory workload, employment conditions, visa and mobility arrangements, caring responsibilities, disciplinary cultures, and inequalities in access to research resources can substantially influence doctoral trajectories. A framework centred on research design cannot, by itself, account for all such structural determinants.

Fourth, the framework's emphasis on integration should not inadvertently be interpreted as an argument for greater standardisation. One of the strengths of doctoral education is its epistemic diversity. The purpose of the IDRDF is therefore to establish a principled architecture for reasoning, not a uniform template for conducting research.

Future research

These limitations establish a substantial empirical research agenda. Firstly, the IDRDF should be subjected to expert validation involving doctoral supervisors, doctoral researchers, graduate-school leaders, and methodological specialists across disciplines and national contexts. Delphi studies or expert-consensus research could examine whether the eight dimensions adequately represent doctoral research design and whether additional dimensions are required.

Secondly, longitudinal research should investigate whether explicit use of the framework improves doctoral researchers' ability to formulate research questions, justify methodological choices, identify design weaknesses, and articulate original contributions. Such studies could

compare doctoral cohorts receiving conventional research-methods training with cohorts receiving explicitly integrated research-design education.

Thirdly, future research should examine whether the framework has measurable implications for doctoral progression and completion. This should be undertaken cautiously, since completion is shaped by multiple individual, supervisory, institutional, and structural factors. Research could nevertheless investigate whether stronger research-design coherence is associated with fewer major design revisions, more effective milestone progression, reduced project scope changes, and improved completion trajectories.

Fourthly, the framework should be tested across different national and institutional contexts. International doctoral education encompasses substantial diversity in programme structures, supervision, examination, funding, mobility, and research cultures (Jones et al., 2024). Comparative research could therefore determine whether the IDRDF operates similarly across different doctoral systems or requires culturally and institutionally situated adaptations.

Finally, future research should investigate how the framework operates in emerging research environments characterised by artificial intelligence, multilingual scholarship, open science, digital methods, interdisciplinary collaboration, and new forms of doctoral output. The rapid development of these environments makes the integration of methodological, ethical, technological, and epistemological reasoning increasingly important. Recent scholarship already points towards the need to rethink doctoral research training and supervision in response to changing research practices and institutional expectations (Elsey, 2025).

The strongest proposition of this paper is that the defining capability of the doctoral researcher is not simply knowing what research methods exist or how individual methods are applied, but understanding why particular research decisions belong together, how they influence one another, and how their integration enables credible claims to new knowledge. If empirically validated, the IDRDF could provide a basis for redesigning doctoral supervision, curricula, research-methods education, institutional researcher development, and approaches to doctoral research quality. Its ultimate value will therefore be determined not by its adoption as a fixed model, but by its capacity to stimulate more coherent, reflexive, inclusive, and intellectually rigorous approaches to doctoral knowledge production.

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