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### Article

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#### ART AND SCIENCE OF RESEARCH FORMULATION: ANALYSIS OF RESEARCH TOPIC DEVELOPMENT, PROBLEM IDENTIFICATION, AND PROBLEM STATEMENT CONSTRUCTION

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#### Abstract

The formulation of research inquiries represents one of the most critical yet challenging aspects of scholarly investigation. This article examines the tripartite foundation of research development: the research topic/title, the research problem, and the research problem statement. Drawing upon recent scholarly literature from 2019 to 2025, this analysis explores how researchers can effectively navigate the complex process of transforming broad areas of interest into focused, investigable inquiries. The discussion synthesizes contemporary methodological frameworks including the FINERMAPS criteria, PICO framework, and problematization techniques to provide a comprehensive guide for emerging scholars. The article demonstrates that successful research formulation requires systematic progression from general topic identification through precise problem articulation, ultimately culminating in a well-crafted problem statement that establishes the theoretical significance and practical necessity of the proposed investigation. Understanding these interconnected elements is essential for producing rigorous, impactful scholarship that contributes meaningfully to existing knowledge bases.

**Keywords:** Research Formulation, Problem Development, Problem Statement, Problem Identification, Research Design, Science of Research, Research Topic.

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## **Introduction**

The initiation of any scholarly investigation hinges upon the researcher's ability to articulate clearly what they intend to study and why such study matters. According to Kehinde (2025), writing a clear and effective statement of a research problem is a critical first step for any researcher, particularly those beginning their academic careers. The research problem sets the stage for the study, guiding the direction of the work and establishing its relevance within the broader scholarly conversation. Despite its fundamental importance, the process of research formulation remains poorly understood by many emerging researchers, who often struggle to distinguish between general topics, specific problems, and the precise statements that frame their inquiries. The contemporary research landscape demands increasingly sophisticated approaches to problem identification and articulation. As noted by Kallio (2022), the problem-identification process prior to research initiation deserves careful attention, as it fundamentally shapes the trajectory and potential impact of the resulting scholarship. This observation is particularly salient in an era characterized by information abundance yet persistent knowledge gaps across disciplines. Researchers must develop the analytical skills necessary to identify meaningful problems amid vast expanses of existing literature, while simultaneously crafting problem statements that clearly communicate the significance and feasibility of their proposed investigations. This article provides a comprehensive examination of three interconnected elements that constitute the foundation of research formulation: the research topic and title, the research problem itself, and the research problem statement. Each component plays a distinct yet complementary role in establishing the parameters and significance of scholarly inquiry. By analyzing recent methodological literature and providing practical guidance, this article aims to demystify the research formulation process and equip scholars with the conceptual tools necessary to develop rigorous, impactful research projects.

## **The Research Topic and Title: Establishing the Foundation**

**Conceptualizing the Research Topic:** The selection of a research topic represents the first and perhaps most consequential decision in the research process. The research topic represents the broad domain within which a specific investigation will be conducted. According to Pardede (2018), the most important step of research is the formulation of research topic, which requires differentiating a research area of interest from a research problem. This differentiation is crucial because conflating these distinct levels of specificity often leads to research projects that lack focus or fail to make meaningful contributions to their respective fields. According to Lim (2023), choosing a good research topic for premier journals requires reliance on systematic methodology rather than intuition alone. The FINER methodology (an acronym representing Feasible, Interesting, Novel, Ethical, and Relevant) provides a structured framework for evaluating potential research topics. Zhang *et al.* (2023) emphasized the importance of aligning topic selection with appropriate methodological approaches, highlighting that the choice of topic fundamentally shapes the entire research trajectory. The process of topic selection should be guided by both intellectual curiosity and practical considerations. Researchers must identify areas where their expertise intersects with genuine gaps in existing knowledge. As suggested by the Lim (2023), research can contribute to advancing the field by contributing to an established line of theory and empirical research, establishing a new theory, being motivated by practical concerns, or addressing a lack of information about a particular problem or issue. This multifaceted

approach to topic selection ensures that research remains both theoretically grounded and practically relevant.

**Methodological Approaches to Topic Selection:** Contemporary scholars have access to increasingly sophisticated tools for identifying promising research topics. Systematic literature reviews, citation network analyses, and emerging visualization platforms such as Connected Papers and Dimensions enable researchers to map existing knowledge landscapes and identify underexplored territories. These technological aids complement traditional approaches to topic identification, which emphasize deep engagement with primary literature and sustained reflection on the implications of existing findings. Jo, *et al.* (2023) proposed a methodology for strategic selection of priority research topics using bibliometric analysis. This approach identifies core subject topics within a research field by analyzing frequently studied themes, enabling researchers to position their work within established scholarly conversations while identifying innovative angles. The FINER criteria, as articulated by Vaidyanathan (2024), provide a comprehensive evaluative framework:

- i. **Feasibility:** The research must be practicable given available resources, time constraints, and technical capabilities
- ii. **Interest:** The topic should engage both the researcher and the broader scholarly community
- iii. **Novelty:** The research should contribute original knowledge or perspectives
- iv. **Ethical considerations:** The research must adhere to established ethical standards
- v. **Relevance:** The outcomes should benefit society or advance the field

Feryok (2019) offers a compelling perspective on topic selection strategies, noting that "no topic becomes a research study if it is not feasible." This pragmatic approach emphasizes the importance of realistic assessment during the selection phase, particularly for novice researchers who may lack extensive experience in their chosen domain.

### **Strategies for Identifying Research Topics**

Qiu *et al.* (2022) asserted that effective topic selection requires consideration of multiple factors including stakeholder input, evidence gaps, and potential impact. Vaidyanathan (2024) recommends several practical strategies for generating research ideas:

- i. Critical appraisal of articles through journal clubs
- ii. Discussion of ideas with peer opinion leaders and practitioners
- iii. Analysis of both positive and negative aspects of potential topics
- iv. Consideration of feasibility in terms of resources, technical support, and funding

The researcher must also evaluate whether their chosen topic permits viable sample sizes and whether laboratory partners necessary for outcome measurement are readily available. These practical considerations often determine whether a theoretically interesting topic can be successfully executed.

**Crafting the Research Title:** Once a topic has been identified and refined, researchers must articulate their focus through a carefully constructed title. The title serves as the initial point of contact between the research and its potential audience, making it a critical element of scholarly communication. According to guidance from the University of Southern California, effective titles in research papers must indicate accurately the subject and scope of the study, use words that create a positive impression and stimulate reader interest, identify key variables, and suggest relationships between these variables. Wang (2024) and Jiang and Hyland (2023) have established specific parameters for title construction. Research indicates

that shorter titles receive more citations, with most recommendations suggesting 10 to 15 words or between 31 and 40 characters (Habibzadeh & Yadollahie, 2010, Fumani, *et al.*, 2015, and Orbay, *et al.*, 2025). However, brevity must not come at the expense of clarity or informativeness. Titles should be descriptive rather than declarative, as descriptive titles allow readers to interpret findings impartially while providing complete information about article contents. The construction of effective titles follows systematic processes. Researchers should initially describe their paper in approximately three sentences, avoiding results and ensuring these sentences contain important scientific words that describe the main contents and subject. These sentences are then joined and refined to create a single, concise statement that accurately represents the study's focus. This iterative process ensures that titles capture the essence of the research while remaining accessible to the intended audience. Types of titles include:

- i. Descriptive or neutral titles, which present essential elements without revealing main results;
- ii. Declarative titles, which state the main finding directly; and
- iii. Interrogative titles, which pose the research question.

While each type has appropriate applications, descriptive titles are generally preferred in formal research contexts because they maintain scientific objectivity and allow readers to approach the findings with open minds. The use of subtitles has become increasingly common, particularly in social science research, to provide additional context or specify geographic, temporal, or methodological scope.

### **The Research Problem: From Topic to Investigable Inquiry**

**Defining the Research Problem:** The transition from broad topic to specific research problem represents a crucial narrowing process that determines the feasibility and significance of the proposed investigation. A research problem represents an existing uncertainty in an area of concern that points to a need for deliberate investigation. According to Kishore *et al.* (2019), formulating a research question aims to explore an existing uncertainty and indicates a need for systematic examination, making it essential to formulate good research questions that meet established quality criteria. The identification of a research problem represents the critical bridge between topic selection and research design. Rubenstein, Callan, *et al.* (2020) emphasize that problem identification is a strategic process requiring systematic approaches. According to Almusaed, *et al.* (2025a), identifying research gaps and choosing innovative research subjects requires thorough understanding of the approaches used to identify research gaps, such as systematic literature reviews, meta-analyses, and critical analysis of existing literature. The research problem emerges from the recognition that existing knowledge is incomplete, contradictory, or insufficient to address practical challenges.

Researchers must move beyond surface-level reading to identify inconsistencies, methodological limitations, and theoretical shortcomings in existing studies. This process involves examining the "Limitations" and "Future Directions" sections of published papers, analyzing trends in recent innovations, comparing results across different contexts, and consulting with domain experts. The concept of "gap spotting" has emerged as a systematic approach to problem identification. Winterberger and Saunders (2020) emphasize that after completing extensive literature reviews using gap-spotting techniques, researchers should examine existing theories and concepts to determine whether they have been tested in different contexts, whether additional variables remain unexplored, and how particular

anomalies exist within specific theoretical frameworks. This structured approach transforms problem identification from an intuitive process into a methodical investigation of the knowledge landscape.

**Characteristics of Well-Defined Research Problems:** Well-defined research problems possess specific characteristics that distinguish them from general topics or poorly formulated inquiries. The FINERMAPS framework provides comprehensive criteria for evaluating research problems: they must be Feasible, Interesting, Novel, Ethical, Relevant, Manageable, Appropriate, have Potential value, be Publishable, and Systematic. These criteria ensure that research problems are not merely intellectually stimulating but also practically achievable and capable of generating meaningful contributions to knowledge. Feasibility considerations encompass available time frames, required resources, and methodological accessibility. A research problem may be theoretically significant yet practically impossible to investigate given existing constraints. The Interesting criterion ensures that the problem engages both the researcher and the broader scholarly community, while the Novel requirement mandates that the investigation contribute something new rather than merely replicating existing studies. Ethical considerations have become increasingly prominent in research design, requiring that investigations protect participants and adhere to established moral standards. The distinction between researchable and non-researchable problems requires careful attention. According to established methodological guidelines, researchable problems are those that can be investigated through empirical observation and analysis, whereas problems based on value judgments or personal preferences fall outside the domain of systematic inquiry. This distinction helps researchers avoid pursuing questions that, however interesting, cannot be answered through scholarly methodologies.

**Sources of Research Problems:** Research problems can originate from multiple sources. Wong *et al.* (2022) identified several key sources as follows:

- i. Literature reviews and systematic reviews
- ii. Meta-analyses revealing insufficient conclusions
- iii. Clinical observations and practical dilemmas
- iv. Recommendations from previous studies
- v. Expert consultations and Delphi surveys

Bans-Akutey and Tiimub (2021) argue that rigorous literature reviews provide the most reliable means of identifying research gaps, as they expose deficiencies in existing literature rather than merely describing what is already known. This approach ensures that research problems are grounded in actual scholarly needs rather than researcher convenience.

**The SQUARE-IT Approach:** A significant advancement in research problem identification is the SQUARE-IT approach introduced in 2025. This framework provides a systematic method for aligning identified research problems with study objectives, research questions, and hypotheses. The approach emphasizes that researchers must focus on four main types of information from current literature and practice: theory, facts, opinions, and methods. The SQUARE-IT approach consists of seven components:

- i. **Specific:** The problem must be explicit, relevant, and unambiguous
- ii. **Quantifiable:** Variables must be measurable using valid instruments
- iii. **Usable:** The problem should be relevant to specific audiences
- iv. **Anticipated:** The problem should clearly define study objectives

- v. **Restricted:** Variables and methodology must be reasonably confined
- vi. **Eligible:** The problem should align with existing evidence and priorities
- vii. **Testable:** The problem must lead to facts rather than opinions

This comprehensive framework addresses the challenge acknowledged by McGuire (1997) in psychology regarding the lack of predefined procedures for generating research questions and hypotheses.

**Narrowing and Focusing Research Problems:** Once a broad research problem is identified, narrowing and focusing become essential. Several strategies facilitate this process:

- i. **Aspect:** Focusing on one specific facet of the problem
- ii. **Components:** Breaking primary variables into smaller analytical units
- iii. **Methodology:** Selecting specific data collection approaches
- iv. **Place:** Reducing geographical scope
- v. **Relationship:** Examining connections between specific variables
- vi. **Time:** Restricting the study period
- vii. **Type:** Focusing on particular populations or phenomena

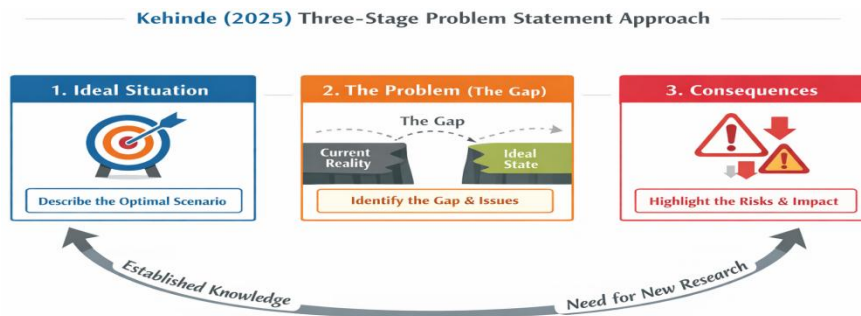
These strategies enable researchers to transform broad, unmanageable problems into focused, researchable questions that can be adequately addressed within resource and time constraints.

### **The Research Problem Statement: Articulating Significance and Scope**

**The Function of the Problem Statement:** The research problem statement serves as the foundation upon which the entire research edifice is constructed. According to Kehinde (2025), the statement of the research problem provides the essential context for understanding the significance, scope, and direction of the study. Kehinde further asserted that a problem statement is a crystallization (a focused expression) of the research problem that describes the vision for solution, suggests methods for solving the problem, and provides a hypothesis. This multifaceted function makes the problem statement perhaps the most critical element of the research proposal or introduction. In the same vein, Sauv  -Ciencewicki, *et al.* (2019) emphasize that the problem statement must include a succinct description of the current situation and its limitations. Furthermore, Almusaed *et al.* (2025b) note that formulating a problem statement requires serious consideration of the problem's context, stakeholders, and possible effects. A well-constructed problem statement not only identifies what is unknown but also establishes why this knowledge gap matters and how addressing it will advance the field.

Effective problem statements contain three essential components that work synergistically to establish the necessity and design of the proposed research. First, they summarize what existing literature says about the topic and how it informs the study design. Second, they identify what is missing in existing research and explain why addressing this gap matters for theory or practice. Third, they specify what study is required to contribute to scientific knowledge. These components ensure that problem statements are grounded in existing scholarship while clearly articulating the novelty and significance of the proposed investigation.

The structure of problem statements has been conceptualized through various frameworks.



Kehinde (2025) proposes a three-stage approach involving the outlining of the "ideal" situation, identification of the "problem" by focusing on the gap between ideal and current reality, and highlighting the "consequences" of leaving the problem unresolved. This structure creates a narrative arc that moves from established knowledge through identified deficiencies to the imperative for new research, providing readers with a clear rationale for the proposed investigation.

**Characteristics of Effective Problem Statements:** Effective problem statements share several characteristics identified in recent scholarly literature:

- i. **Clarity and Specificity:** According to Almahameed and Alajalein (2021), many researchers who lack the academic skills necessary to construct well-formed problem statements, often struggling with poor academic writing skills. Effective statements must clearly articulate the specific issue being addressed without ambiguity.
- ii. **Evidence-Based Foundation:** The problem statement must be supported by existing literature. As noted by Nyanchoka, *et al.* (2019), systematic reviews and scoping reviews represent the most common methods for identifying and reporting research gaps, with 73% of gap identification methods relying on these approaches.
- iii. **Significance and Relevance:** The problem must demonstrate clear importance to the field. Reed, *et al.* (2021) emphasize that research impact evaluation requires assessing both the significance and reach of research effects, suggesting that problem statements should anticipate potential impact.

**Rhetorical and Linguistic Features:** Rustipa, *et al.* (2023) conducted a detailed analysis of the rhetorical structures, strategies, and linguistic features of problem statements written by undergraduate students. Their research revealed specific patterns in how effective problem statements are constructed, contributing to teaching models for academic writing instruction. The rhetorical structure typically follows a pattern of:

- i. Establishing the general context and importance of the research area
- ii. Identifying specific gaps, limitations, or contradictions in existing literature
- iii. Articulating the specific problem that the research will address
- iv. Justifying the significance and necessity of addressing this problem

**The PICO Framework and Problem Statement Development:** The PICO framework (representing Population, Intervention, Comparison, and Outcome) provides a structured approach to problem statement development, particularly in clinical and health-related research. According to recent scholarship on evidence-based practice, this framework helps ensure that research questions are specific, answerable, and clinically relevant. The framework has evolved to include additional elements:

- i. **PICOT**: Adding Timeframe for outcome assessment
- ii. **PICOMT**: Including Measurement specifications
- iii. **PECOT**: Replacing Intervention with Exposure for observational studies

These variations demonstrate the adaptability of structured frameworks to different research contexts while maintaining the core principle of precise problem articulation.

### **Crafting Effective Problem Statements**

The construction of effective problem statements requires careful attention to language, scope, and scholarly positioning. Problem statements should focus primarily on what existing knowledge has already established, as assertions not grounded in previously published studies constitute speculation rather than research-based inquiry. This emphasis on existing literature ensures that problem statements are rooted in the scholarly conversation rather than representing idiosyncratic interests. The scope of problem statements must be carefully calibrated to match the intended investigation. Statements that are too broad create unrealistic expectations and diffuse focus, while statements that are too narrow may fail to establish sufficient significance. According to Denney and Tewksbury (2013), researchers should ensure that their research questions (and by extension their problem statements) are not too narrow to guide robust research, as overly focused inquiries may lack sufficient literature to support and situate the research within broader contexts. Language choices in problem statements carry significant weight. Researchers should avoid jargon and ensure that problems are easy to understand from the start, focusing on making the core issue immediately apparent. This accessibility does not mean oversimplification; rather, it requires the sophisticated ability to communicate complex issues clearly. The problem statement should be clear and concise, presenting the core problem in language that can be understood by scholars outside the immediate discipline.

### **Integration and Synthesis: From Title to Investigation**

**The Developmental Trajectory of Research Formulation:** The progression from research topic to problem statement follows a developmental trajectory that transforms general interests into specific, investigable inquiries. This trajectory begins with the identification of broad areas of interest, proceeds through the narrowing of focus to specific topics, identifies gaps or problems within those topics, and culminates in the articulation of precise problem statements that frame the proposed investigation. Understanding this trajectory helps researchers appreciate that research formulation is not a single act but a process of progressive refinement. The initial stages of this trajectory involve extensive literature review and conceptual exploration. Researchers must immerse themselves in existing scholarship to understand what has been studied, how it has been studied, and what remains unknown or contested. This immersion enables the identification of "information gaps" - areas where existing knowledge is incomplete, inconsistent, or absent. The recognition of these gaps provides the foundation for problem identification, as researchers begin to see where their contributions might add value to existing conversations. As the trajectory progresses, researchers must make strategic decisions about scope and focus. The research topic must be narrowed sufficiently to permit comprehensive investigation within available resources, yet remain broad enough to ensure significance and generalizability. This balancing act requires sophisticated judgment and often benefits from consultation with mentors, peers, and disciplinary experts who can provide perspective on the viability and importance of proposed research directions

### **The Sequential Relationship**

The relationship between research topic, research problem, and problem statement is sequential and cumulative. The topic provides the broad domain of inquiry; the problem identifies the specific gap or issue within that domain; and the problem statement articulates the precise focus and justification for the research. McMeekin, *et al.* (2020) emphasize that methodological frameworks provide structured approaches to this progression, though they note the lack of consistent definition regarding what constitutes a "methodological framework." Their scoping review revealed significant variation in how researchers conceptualize and apply these frameworks.

### **Common Challenges and Solutions**

Several challenges commonly arise during this foundational phase:

- i. **Topic Breadth:** Researchers often select topics that are too broad for meaningful analysis. The solution lies in iterative narrowing using the strategies discussed above, particularly focusing on specific aspects, populations, or timeframes.
- ii. **Problem Ambiguity:** Vague problem statements fail to provide clear direction. The SQUARE-IT approach and FINER criteria offer systematic methods for ensuring specificity and clarity.
- iii. **Literature Synthesis:** Integrating existing literature to justify the problem requires sophisticated analytical skills. Baako, *et al.* (2022) recommend systematic literature review approaches to ensure comprehensive gap identification.

### **The Role of Research Gaps**

Research gaps serve as the primary drivers of new research initiatives. Yangailo and Mpundu (2023) conducted a systematic literature review to identify major research gaps, demonstrating that gap identification requires systematic analysis of multiple databases and careful synthesis of findings. The identification of research gaps should not be merely descriptive but analytical identifying not just what is unknown, but why this lack of knowledge matters and how addressing it will advance understanding or practice.

### **Common Pitfalls and Strategies for Avoidance**

Despite the availability of methodological guidance, researchers frequently encounter pitfalls in the research formulation process. One common error is the confusion of research topics with research problems, leading to investigations that describe rather than analyze, or that summarize rather than contribute new knowledge. According to Pardede (2018), researchers must distinguish between research areas, topics, and problems to ensure that their inquiries are appropriately focused and methodologically sound. Another frequent pitfall involves the formulation of problem statements that are not grounded in existing literature. Problem statements that fail to demonstrate familiarity with existing scholarship or that ignore relevant studies undermine the credibility of the proposed research and risk duplicating existing work. Comprehensive literature reviews are essential for avoiding this pitfall, as they establish the foundation upon which problem statements are constructed. Researchers also struggle with scope calibration, proposing investigations that are either too ambitious to be completed within available constraints or too limited to make meaningful contributions. The FINER criteria provide valuable guidance here, helping researchers evaluate whether their proposed problems are Feasible, Interesting, Novel, Ethical, and Relevant before committing to extensive investigation. Regular consultation with advisors and peers throughout the formulation process can help identify scope issues before they become intractable problems.

## **Conclusion**

The formulation of research inquiries (encompassing the development of research topics and titles, the identification of research problems, and the construction of research problem statements) represents a foundational competency for scholarly investigation. As this analysis has demonstrated, each element plays a distinct yet interconnected role in establishing the parameters, significance, and feasibility of research projects. The research topic provides the broad domain of inquiry; the research problem identifies specific gaps or uncertainties within that domain; and the problem statement articulates these elements in a formal declaration that justifies and guides the proposed investigation. Contemporary methodological scholarship offers robust frameworks for navigating the research formulation process. The FINERMAPS criteria provide comprehensive standards for evaluating research problems, while frameworks such as PICO assist in translating problem statements into specific, investigable questions. Participatory approaches emphasize the importance of stakeholder involvement in problem identification, ensuring that research addresses genuine needs. Visualization and analysis tools enable more systematic approaches to literature review and gap identification. For emerging researchers, mastery of research formulation requires both theoretical understanding and practical application. The guidance presented in recent scholarship emphasizes that problem statements must be clear, concise, grounded in existing literature, and capable of communicating significance to diverse audiences. Researchers should approach formulation as an iterative process, beginning early and refining continuously as their understanding of the literature and their specific focus evolves.

The importance of effective research formulation cannot be overstated. Well-formulated research problems provide the foundation upon which rigorous, impactful scholarship is built. They ensure that investigations are feasible, significant, and capable of contributing meaningfully to existing knowledge. As the scholarly landscape continues to evolve, with increasing emphasis on interdisciplinary research and practical application, the ability to identify and articulate research problems effectively will remain an essential competency for researchers across disciplines. Future developments in research methodology will likely continue to refine our understanding of problem identification and statement construction. Emerging technologies, including artificial intelligence and advanced data analytics, promise new tools for literature review and gap identification. However, the fundamental principles articulated in contemporary scholarship (the necessity of grounding research in existing literature, the importance of clear communication, and the imperative of addressing genuine knowledge gaps) will remain constant. Researchers who master these principles will be well-positioned to produce scholarship that advances understanding and addresses the complex challenges facing contemporary society.

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