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Mental Training Essentials: A Guide to Graduate Training and Academic Research

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Date: 2025-01-05T00:00:00+00:00

Abstract

This is a comprehensive guide for graduate student training and academic research, aimed at assisting graduate students and researchers in enhancing their research capabilities, critical thinking, and innovative capacity. The document elaborates in detail on multiple aspects, including the training programs of research institutes, research methods and objectives, the importance of literature review, the cultivation of research capabilities, and the role of supervising professors. It also introduces the essential components of academic works, the research process and timeline, techniques for reading journal papers, principles of critique and innovation, as well as the essentials of dissertation writing. Furthermore, through case studies, it demonstrates how to identify innovative opportunities in academic research and provides recommendations for managing research planning, progress, and risk. Applicable not only in academic domains but also widely in practical life and work, it helps readers address professional and personal life challenges.

Full Text

Preamble

This is a comprehensive guide to graduate training and academic research, designed to help graduate students and researchers enhance their research capabilities, critical thinking, and innovative capacity. The document elaborates on various aspects of graduate education, including training programs, research methodologies and objectives, the importance of literature review, cultivation of research skills, and the role of advisors. It also covers the essential components of academic works, research processes and timelines, strategies for reading journal articles, principles of critique and innovation, and guidelines for thesis writing.

Furthermore, through case studies, it demonstrates how to identify opportunities for innovation in academic research and provides recommendations for managing research planning, progress, and risks. The guide is applicable not only to academia but also to practical life and work contexts, helping readers address professional and personal challenges.

1. Graduate Training

Graduate institutes play a crucial role in academic and professional development by offering meticulously designed training programs that help students and researchers enhance their research capabilities, critical thinking, and innovative capacity.

1.1 Research Methods and Objectives

Research methods constitute not merely technical skills but a fundamental mindset that requires scholars to explore the unknown and challenge existing paradigms. The primary objectives of research are twofold: first, to seek correct answers through rigorous literature search, screening, analysis, and synthesis, enabling researchers to distill scientific conclusions from vast amounts of information through critical evaluation; and second, to discover better solutions by building upon previous work, leveraging existing knowledge and experience to develop more efficient and practical innovations.

1.2 Application of Research Methods

The research methodologies cultivated in graduate school extend far beyond academia into practical life and professional contexts. In the workplace, these skills enable individuals to analyze patterns in investment or stock market fluctuations, evaluate the validity of news reports, and identify reliable medical information for informed decision-making. Similarly, in personal life, research methods assist in career path selection, family planning, and major life decisions through comprehensive analysis and evaluation of relevant factors.

1.3 Importance of Literature Review

Literature review is an indispensable component of graduate training that significantly enhances researchers' comprehensive capabilities. It develops critical capacity by exposing scholars to diverse perspectives and methodologies, fostering objective and holistic evaluation skills. Simultaneously, literature review stimulates innovation by helping researchers identify novel research 线索 from existing studies, thereby avoiding redundant work and opening new avenues for inquiry.

1.4 Advantages of Latecomer Countries

For latecomer countries, graduate training offers distinct advantages in leveraging literature review and knowledge integration to rapidly learn from advanced nations' experiences and technologies, thereby narrowing development gaps. By absorbing and adapting these achievements, such countries can achieve technological upgrading and innovation at lower costs and risks, enabling leapfrog development.

1.5 Cultivating Research Capacity

Graduate institutes systematically cultivate research capacity through structured coursework and practical activities. Researchers learn to efficiently search, screen, analyze, and synthesize literature, establishing a solid foundation for subsequent research. Through continuous training and practice, they develop essential analytical, evaluative, reasoning, interpretive, and self-critical abilities. Furthermore, graduate programs encourage scholars to identify innovative 线索 from existing literature and engage in creative thinking and practice, thereby nurturing truly innovative research talent.

1.6 Role of the Advisor

Advisors play a pivotal role in graduate training by guiding research progress, suggesting appropriate topics, courses, and resources based on students' interests and backgrounds to clarify research directions and objectives. They regularly organize discussion sessions that encourage active participation and expression of viewpoints, thereby enhancing critical thinking and literature review capabilities. Additionally, advisors provide personalized guidance tailored to individual circumstances, offering support in literature review methodologies, research concept development, risk assessment, and other aspects, ensuring comprehensive support throughout the research journey.

2. Requirements of Academic Works

Academic works represent the written expression of research findings and must satisfy rigorous standards and requirements to ensure their scholarly value and credibility.

2.1 Requirements for Theses and Dissertations

As a crucial form of academic work, theses and dissertations must meet three key requirements. First, originality demands new discoveries, perspectives, or solutions that create novel knowledge or theory beyond existing research. Second, rigor requires the argumentation process to be supported by reliable evidence and strict logic through experiments, surveys, data analysis, and scientific reasoning to ensure valid conclusions. Third, objectivity necessitates that research

processes and conclusions remain free from personal bias and possess reproducible and verifiable characteristics.

2.2 Seven Requirements for Academic Works

Beyond the basic requirements for theses, academic works must satisfy seven additional criteria:

1. **Originality:** As the core value of academic work, this requires researchers to propose novel viewpoints, discoveries, or solutions.
2. **Reliable Evidence:** All arguments must be grounded in credible evidence from experiments, surveys, data analysis, or other rigorous sources.
3. **Critical Examination:** Works must undergo critical scrutiny to ensure reliability and validity, requiring deep analysis and evaluation of previous research to identify limitations and errors while offering new insights.
4. **Theoretical, Systematic, and Coherent:** Works must establish a solid theoretical foundation, form a complete theoretical system, and maintain internal consistency across all components.
5. **Objectivity and Reproducibility:** Research must remain objective, free from personal bias, and capable of verification and replication by other scholars.
6. **Clear Relationship with Academia:** Research topics, methods, and conclusions must connect explicitly with existing scholarship, contributing meaningfully to academic discourse.
7. **Clarity of Style:** The writing must be clear, precise, and properly formatted to enable accurate comprehension of arguments and conclusions.

2.3 Core Competencies for Academic Research

Academic research demands several core competencies essential for quality and efficiency. Innovation capacity drives progress by generating novel perspectives, discoveries, or solutions. Critical thinking enables deep analysis and evaluation of existing research to identify limitations and develop original insights. Literature review proficiency provides the foundational skill of efficiently searching, screening, analyzing, and synthesizing scholarly works to establish robust theoretical frameworks.

2.4 Common Problems in Low-Quality Papers

Low-quality papers frequently exhibit several characteristic problems. They often lack originality, merely replicating previous work without offering new insights. Their evidence is frequently insufficient or unreliable, failing to support claims due to inadequate experimentation, investigation, or data analysis. The argumentation process tends to be logically flawed with reasoning errors, reflecting poor critical thinking and literature review skills. Most significantly, such papers demonstrate an absence of critical thinking, simply accepting prior conclusions without rigorous evaluation.

2.5 Recommendations for Cultivating Research Capacity

To enhance research quality and efficiency, cultivating research capacity is paramount. Selecting a responsible, experienced advisor provides essential professional guidance to clarify research directions and improve quality. Creating a supportive learning environment with adequate resources and a positive academic atmosphere stimulates innovation and critical thinking. Most importantly, scholars must diligently master literature review and critical thinking methodologies, maintaining intellectual curiosity and sensitivity to new knowledge while continuously expanding their expertise.

3. Research Process and Timeline

Academic research is a systematic and complex endeavor requiring careful time management and clear objectives for each phase. This section outlines the research process and timeline.

3.1 Research Process

The research process encompasses the complete journey from advisor selection to thesis defense:

1. **Selecting an Advisor and Research Topic:** This foundational step requires choosing an experienced, responsible advisor and a topic aligned with personal interests, academic background, and career goals to ensure sustainability and practical value.
2. **Learning Literature Search and Screening Methods:** Mastering efficient search and screening techniques is essential for quickly locating relevant literature and enhancing research efficiency.
3. **Conducting Preliminary Literature Review:** Initial review establishes basic understanding of the research domain, laying groundwork for deeper investigation.
4. **Deepening Literature Review to Define Research Questions and Title:** Building on preliminary review, scholars must delve deeper to formulate specific research questions and a precise thesis title that ensures focus and innovation.
5. **Performing Comprehensive Literature Review:** This stage provides thorough understanding of research background, current status, and development trends to support research positioning and direction.
6. **Proposing Innovative Strategies and Research Concepts:** Based on literature analysis, researchers develop creative strategies and concepts that represent the core value of their work.
7. **Developing Theory, Integrating Evidence, and Testing Hypotheses:** Research concepts are transformed into theoretical frameworks with integrated evidence to test hypotheses and generate preliminary findings.
8. **Designing Exemplary Cases:** Cases demonstrate practical application value and real-world effectiveness of research outcomes.

9. **Drafting the Thesis:** Research findings are organized into a preliminary manuscript for subsequent revision and refinement.
10. **Preparing for Thesis Defense:** Scholars prepare defense materials and conduct mock presentations to ensure successful examination.

3.2 Time Planning

Effective time management is critical for successful research completion. A typical timeline allocates the majority of time to coursework, which provides foundational knowledge and skills. Literature review and critical thinking activities concentrate during winter and summer breaks, establishing the research foundation. Innovative strategies and research concepts develop primarily during summer months through focused effort. Theory development, evidence collection, and argumentation occur post-summer as the core research phase requiring substantial time investment. Finally, thesis writing, revision, and defense preparation take place after summer, culminating the research journey.

3.3 Keys to Thesis Quality

Thesis quality hinges on three critical factors: rigorous and reliable argumentation ensuring scientific validity; deep understanding of research questions coupled with critical thinking to generate innovative perspectives; and genuine originality that contributes new viewpoints, methods, or solutions to academia and practice.

3.4 Role of the Advisor

Advisors play indispensable roles throughout the research process by guiding progress according to individual circumstances and requirements, ensuring smooth advancement. They organize regular discussions that encourage active participation and viewpoint expression, thereby enhancing critical thinking and communication skills. Additionally, advisors provide personalized guidance on literature review methods, research concept development, and writing techniques, offering comprehensive support and safeguarding scholars' academic growth.

4. The Advisor and Development of Research Capacity

In academic research, advisors serve as crucial mentors who not only transmit knowledge but also guide the development of research capacity. The following details how advisors facilitate this cultivation.

4.1 Cultivating Critical Thinking Skills

Critical thinking represents a core research competency encompassing analysis, evaluation, reasoning, interpretation, and self-critique. Analysis enables deep

understanding of research problems; evaluation assesses methodological feasibility and result reliability; reasoning constructs logical arguments; interpretation clearly articulates viewpoints; and self-critique continuously refines research approaches. These skills must integrate with specialized knowledge, as effective critical thinking requires deep domain expertise. Cultivation occurs through coursework, literature review, and sustained advisor guidance that corrects deviations and elevates proficiency.

4.2 Literature Review and Critical Thinking

Literature review is inseparable from critical thinking, and together they enhance research capacity. Through literature review, scholars understand the strengths and limitations of various research methods, enabling more informed methodological choices. Critical thinking deepens comprehension of research problems by identifying gaps and errors in prior work. This synergistic process cultivates innovation capacity by uncovering new research perspectives and questions from existing scholarship, leading to novel solutions.

4.3 Role of the Advisor

Advisors are instrumental in developing research capacity by guiding research progress and creating reasonable plans tailored to individual circumstances. They facilitate regular discussion sessions that encourage intellectual exchange and 碰撞, thereby improving critical thinking and expression abilities. Recognizing that each researcher has unique characteristics and needs, advisors provide customized support in literature review techniques, research concept development, and writing skills, ensuring comprehensive assistance throughout the academic journey.

4.4 Considerations for Choosing an Advisor

Selecting an appropriate advisor is critical for research capacity development. Key considerations include alignment between the advisor's research direction and interests with the student's academic passions and career plans, ensuring deep engagement and productive outcomes. Different advisors possess varying research styles and mentoring approaches—some emphasize theoretical derivation while others focus on empirical analysis—so students should choose based on their own needs. Finally, an advisor's academic reputation and experience serve as important indicators of their scholarly caliber and mentoring ability, positively influencing the student's academic growth and professional development.

5. Relationship Between Research Topic and Thesis Title

In academic research, the relationship between research topics and thesis titles functions like a compass and map, guiding scholars through unexplored territo-

ries. This section examines topic selection, literature review importance, title determination, and innovation opportunities through case studies.

5.1 Choosing a Research Topic

Selecting a research topic marks the starting point that determines direction, depth, and potential impact. An excellent topic should challenge existing knowledge boundaries with innovative potential to contribute substantively to academia or practice. Researchers should choose domains where they possess sufficient background knowledge, enabling faster immersion, better literature comprehension, and higher efficiency. Personal interest serves as the intrinsic motivation that sustains commitment and perseverance when facing challenges.

5.2 Literature Review on Research Topics

Literature review is essential after topic selection, providing comprehensive understanding of the research landscape to inform positioning and innovation. Systematic review reveals a topic's origins, development, current hotspots, and future trends, helping scholars locate their work within the academic genealogy and identify entry points. This process also uncovers promising sub-topics or unresolved issues hidden in methodological limitations, theoretical gaps, or underexplored areas, offering opportunities for significant contributions.

5.3 Choosing a Thesis Title

The thesis title concisely expresses research content and purpose, serving as the first element to attract readers and reviewers. An effective title should be clear, specific, and operational, accurately conveying core content while guiding practical research. Like the research topic, the title must demonstrate innovation and contribution potential to capture interest. Title selection should leverage the researcher's background knowledge to ensure feasibility and depth, while personal interest remains crucial for maintaining motivation and overcoming obstacles.

5.4 Case Study on Open Science Issues

Open science exemplifies the relationship between research topics and titles. As a significant trend emphasizing openness, transparency, and reproducibility, open science research advances scientific progress and enhances credibility. The field contains numerous controversies, such as balancing openness with privacy protection and ensuring reproducibility. Representative papers provide methodological references and inspiration. As research evolves, it becomes more specialized, shifting from macro-level policy studies to micro-level practical explorations and integrated analyses. This diversification produces varied titles like "Research on Open Science Data Sharing Mechanisms" or "Impact of Open Science on Research Integrity," expanding research breadth and depth.

5.5 Opportunities for Innovation

Innovation drives academic progress, and several approaches can identify opportunities in open science or other fields. Interdisciplinary method borrowing provides fresh perspectives—for instance, applying computer science techniques to develop more efficient open science tools. Literature review reveals gaps and limitations in prior work that serve as innovation 线索. Combining different research sub-topics creates new perspectives, such as integrating open science with research integrity or science communication to explore interconnections and mechanisms, thereby expanding research horizons and generating novel contributions.

6. Reading Strategies for Journal Articles

Journal articles are vital vehicles for academic exchange and knowledge dissemination. Mastering effective reading techniques is essential for graduate students and scholars.

6.1 Differences Between Undergraduate Reading and Journal Article Reading

Undergraduate reading primarily involves textbooks, which differ significantly from journal articles in method and difficulty. Textbooks are designed for beginners with self-contained, systematic content and accessible language, providing foundational frameworks and conceptual explanations. In contrast, journal articles target domain experts with dense content, specialized terminology, and complex expressions that report cutting-edge findings and require advanced background knowledge and reading proficiency.

6.2 Spiral Reading Method

Given the complexity of journal articles, the spiral reading method offers an effective strategy through multiple rounds of engagement:

1. **Skim to grasp theme and background:** Quickly review the title, abstract, and introduction to understand the research topic, context, and significance, helping determine relevance to your interests.
2. **Supplement background knowledge:** After initial familiarization, consult popular science articles or textbook chapters to fill knowledge gaps and better comprehend specialized terminology and theoretical frameworks.
3. **Read deeply into methods and results:** With adequate background knowledge, carefully examine the main content, particularly methodology and findings—this is key to understanding the paper's core contribution.
4. **Read cited references:** When encountering unfamiliar concepts, consult cited works to further complete your background knowledge and contextual understanding.

5. **Reread to understand difficulties:** After preliminary reading and reference consultation, revisit the paper to focus on previously challenging sections, gradually mastering complex ideas through repeated engagement.

6.3 Understanding Journal Article Structure and Characteristics

Understanding journal article structure enhances reading efficiency. The abstract provides a brief overview of purpose, methods, results, and conclusions for quick assessment. The introduction presents research questions, background, significance, and contributions to guide readers into the topic. The main content details methodology, results, and analysis—the paper’s core. The conclusion summarizes findings and implications while acknowledging limitations. References reveal the paper’s scholarly foundation and enable further background development.

6.4 Understanding Journal Article Reading Strategies

Effective reading strategies improve comprehension and efficiency. Approach reading with specific questions in mind, focusing on sections that address these queries. Consult related literature to fill knowledge gaps as they arise. Most importantly, read critically by evaluating research methods and results—consider whether assumptions are reasonable, methods scientific, and findings reliable. This critical stance enables assessment of a paper’s contribution and limitations while identifying potential research opportunities.

7. Comprehensive Literature Review and Fieldwork

In academic research, comprehensive literature review and fieldwork are complementary components that together advance scholarly inquiry.

7.1 Purpose of Comprehensive Literature Review

Comprehensive literature review establishes the foundation of academic research by providing thorough understanding of a topic’s status and development trends. It enables scholars to grasp fundamental concepts, theoretical frameworks, methodologies, and major findings, forming holistic understanding. The process identifies promising sub-topics that are underexplored or controversial, offering valuable research opportunities. Additionally, it facilitates the formation of preliminary research concepts by revealing prior approaches and inspiring new directions.

7.2 Overview of Review Papers and Monographs

Review papers and monographs are indispensable resources in literature review. Review papers typically introduce research themes from macro perspectives, systematically summarizing prior work, major viewpoints, and conclusions to

provide comprehensive overviews. Monographs offer deeper theoretical and methodological examinations of specific domains, providing detailed frameworks and empirical analyses. Teaching papers target graduate students with introductory professional knowledge, while doctoral dissertations contain extensive literature reviews and methodologies that reveal cutting-edge developments and advanced research techniques.

7.3 Search Methods for Review Papers and Monographs

Effective search methods are essential for obtaining high-quality review materials. Researchers should employ multiple keywords related to core concepts, theories, and methods to broaden search scope. Academic databases serve as primary channels, offering retrieval functions and filters for efficient location and download of relevant works. While web resources such as academic websites and forums may provide free access, their reliability varies considerably and requires careful screening.

7.4 Key Points for Reading Review Papers

Reading review papers effectively requires strategic approaches. Initial skimming of titles, abstracts, introductions, and conclusions helps assess relevance and determine whether deeper reading is warranted. Critical reading evaluates methodological and substantive quality by examining assumptions, scientific rigor, and result reliability, thereby developing academic judgment. Throughout this process, researchers should record important information—viewpoints, methods, data—to build a personal reference library for future citation and consultation.

7.5 Fieldwork and Experiments

Fieldwork and experiments are essential practical components that complement literature review. They provide direct understanding of research subjects' actual conditions, revealing aspects that literature might overlook. These activities can spark new research concepts when encountering unexpected problems or phenomena. Fieldwork and literature review mutually reinforce each other—the former provides empirical grounding while the latter offers theoretical context, together generating robust research perspectives and conclusions.

8. Thesis Title and Research Scope

Defining the thesis title and research scope during the initial research phase is crucial, as it establishes direction, framework, depth, and breadth for the entire project.

8.1 Shaping Academic Questions

Shaping academic questions involves transforming real-world problems into researchable inquiries—a fundamental starting point for scientific work. Researchers must use professional knowledge and insight to extract academically valuable questions from practical issues, accurately grasping problem essence and clarifying objectives. Simplification and abstraction make problems more universal and researchable by eliminating secondary factors and highlighting core contradictions. This process requires precise academic terminology and theoretical models to describe and explain phenomena, enhancing scholarly rigor and providing theoretical support for empirical investigation.

8.2 Types of Topics and Question Formats

Research questions adopt various formats depending on purpose and need. Causal questions examine relationships between variables, such as investigating how AI revolution impacts employment market structures. Other types include descriptive questions (e.g., current AI development status), explanatory questions (e.g., reasons for rapid AI advancement), and normative questions (e.g., policy recommendations for healthy AI development). Each type serves distinct research purposes, requiring appropriate selection based on specific contexts.

8.3 Tailoring and Creativity in Research Scope

Tailoring research scope involves determining specific content and boundaries through creative design to achieve focused, in-depth investigation. Temporally, researchers select appropriate timeframes—for AI revolution studies, this might involve examining key stages like the textile, steel, computer, or internet revolutions to understand evolution patterns. Spatially, representative cases or regions are chosen, such as comparing open science practices across the UK, US, and Germany. Additional limitations may include specific populations, organizations, or contexts, like examining educational opportunities for children from impoverished families in youth scientist studies, which enhances precision and relevance.

8.4 Systematic Connections and Innovation Opportunities

Exploring systematic connections between research sub-topics and identifying innovation opportunities involves examining logical relationships and interdependencies. Theoretical connections might link “open access” to “research integrity” and subsequently to “public trust in science.” Systematic connections could form complete theoretical frameworks, such as integrating land policy origins, development, and responses into a comprehensive employment theory. Innovation emerges from these connections—for instance, examining psychological impacts of mandatory policies on faculty research sharing in data rights studies—expanding research horizons and providing new solutions for practice.

9. Essentials of Critique and Innovation

Critique and innovation are fundamental to advancing knowledge and solving problems in academic research and practice.

9.1 Principles and Perspectives for Synthesizing Critique

Critique requires objective, comprehensive examination of existing research to identify problems and drive knowledge forward. Researchers should encompass literature from all positions and schools to ensure balanced, impartial evaluation. Special attention must be paid to methodological limitations such as sampling bias and measurement error. Critique should analyze conclusions' applicability across temporal, spatial, and contextual conditions to assess generalizability. Additionally, it must evaluate theoretical contributions—how findings modify, expand, or challenge existing theories—and address ethical considerations including informed consent and privacy protection.

9.2 Discarding and Integrating

Following critique, researchers must discard and integrate ideas to form more promising research directions. Low-value or infeasible concepts should be eliminated to avoid wasting resources, allowing focus on viable directions. Promising ideas should be integrated into comprehensive, systematic research frameworks that merge diverse approaches. Finally, research scope and priorities must be adjusted according to objectives and methods to ensure relevance and effectiveness.

9.3 Critical Thinking and Self-Critique

Critical thinking and self-critique are essential researcher qualities. Scholars should regularly review and evaluate their own methods and conclusions to identify weaknesses and correct errors promptly. Continuous learning through academic training and literature reading expands perspectives and enhances critical abilities. Maintaining an open mindset to accept diverse viewpoints enriches research approaches and fosters innovation.

9.4 Integrating Methods and Problem Characteristics

Method selection requires comprehensive consideration of foundational assumptions, applicability, implementation difficulty, performance, and interference factors. Each method operates on specific assumptions (e.g., linear systems, normal distribution, perfect competition) that determine suitability. Implementation costs—including time, financial resources, and technical difficulty—must be weighed against benefits. Performance under normal conditions (accuracy, reliability, stability) serves as key evaluation criteria, while potential interference factors like sampling error and noise require careful control.

9.5 Most Efficient Innovation Strategies

Innovation does not always require starting from scratch; improving existing methods can be equally effective. Researchers should identify limitations in current approaches and seek improvement opportunities. Combining strengths from different methods can yield superior hybrid solutions. The most efficient strategy involves selecting or combining methods based on research objectives to optimize efficiency and quality.

9.6 Critique and Innovation in Institutional Research

Institutional research in social sciences advances through critique and innovation. This involves analyzing institutional differences across countries or regions, comparing advantages and limitations of various systems, examining mechanisms and influencing factors of institutional change, and designing new institutional solutions to address specific problems by considering issue characteristics, existing limitations, and feasibility.

9.7 Case Study: Housing Justice

Examining housing justice in Suzhou illustrates institutional critique and innovation. The analysis begins with Suzhou's current housing conditions and problem origins, then introduces successful models from Germany and Singapore. The key challenge involves exploring how German housing institutions might be adapted to Suzhou's context to address local housing justice issues.

9.8 Case Study: UK Apprenticeship System

The UK apprenticeship system case demonstrates institutional improvement through comparative analysis. After examining current UK apprenticeship problems, the analysis introduces Germany's successful model. The focus then shifts to how UK apprenticeships might be reformed—considering institutional design, training content, and mentor-mentee relationships—to enhance quality and effectiveness based on German experience.

10. Essentials of Literature Review

Literature review is indispensable in academic research, yet efficiently navigating vast scholarly resources presents a significant challenge. This section presents techniques for accelerated literature review to help researchers quickly master topics and identify innovation opportunities.

10.1 Keyword and Literature Search Techniques

Effective literature search begins with strategic keyword selection. Researchers should employ diverse keywords related to core concepts, theories, and methods to expand search scope and avoid missing important sources. Academic

databases and search engines are essential tools—databases offer authoritative, peer-reviewed literature while engines provide rapid access to related materials. Tracking citation patterns reveals influential works; frequently cited references often contain core theoretical frameworks essential for comprehensive review.

10.2 Phase 1: Macro-level Understanding of Major Dimensions, Perspectives, and Schools

After initial literature collection, researchers should skim titles, abstracts, and introductions to quickly grasp main issues and controversies, forming holistic understanding. Analyzing strengths and weaknesses of different viewpoints reveals complexity and diversity, providing multiple research angles. This macro-level comprehension clarifies research direction and supports subsequent in-depth investigation.

10.3 Phase 2: In-depth Exploration of All Dimensions and Methodological Characteristics

Following macro-level understanding, researchers must engage in deep reading to comprehend methodological details and limitations. This involves analyzing applicability conditions and scope of different methods to inform selection decisions. Creating a “methods-problem characteristics comparison table” helps organize and compare method features visually, facilitating informed methodological choices.

10.4 Phase 3: Synthesis, Gap Assessment, and Innovation Strategy Development

In the final phase, researchers should deeply read key literature to understand methods and conclusions thoroughly. This enables comprehensive grasp of current status and trends. Critical analysis identifies existing literature’s shortcomings and improvement spaces in methodology, theory, and analysis. Based on this assessment, researchers formulate concrete innovation strategies—such as proposing new methods, theoretical frameworks, or empirical analyses—to achieve breakthroughs and contribute new knowledge.

11. Planning, Progress, and Risk Management of Research

Thorough planning, continuous progress tracking, and effective risk management are essential before undertaking any research project.

11.1 Evaluating Ideas and Setting Direction

Research begins with evaluating ideas and establishing direction. Researchers must assess multiple concepts for academic value and practical feasibility, determining which holds greatest potential. Promising ideas are then integrated

into a coherent research scheme with clear logic and objectives, covering background, purpose, problem statement, hypotheses, and expected outcomes. Finally, core goals and research direction must be explicitly defined to guide the entire project.

11.2 Inventorying Evidence and Planning Methods

After establishing direction, researchers must inventory existing evidence and questions to plan methods and procedures. Comprehensive analysis of prior work—including literature review, methodological assessment, and result verification—identifies strengths and weaknesses to inform research positioning. Based on objectives, researchers select appropriate methods (quantitative, qualitative, or mixed) and develop data collection, processing, and analysis plans. A detailed research plan with timeline, tasks, responsibilities, and deadlines ensures effective time and resource management.

11.3 Assessing Feasibility, Risks, and Backup Plans

Researchers must comprehensively evaluate feasibility, expected outcomes, risks, and contingency plans. This involves assessing operational viability, costs, and time requirements, adjusting plans if necessary. Potential risks and challenges—from data collection difficulties to methodological limitations—should be identified early with mitigation strategies prepared. Despite thorough planning, unforeseen problems may arise, necessitating backup plans that include alternative methods, data sources, or analytical approaches to ensure research continuity.

12. Revisiting and Strengthening Arguments

During the final research stage, consolidating and strengthening content becomes crucial for enhancing thesis quality and academic impact through updated literature, value assessment, conflict resolution, and methodological optimization.

12.1 Updating Literature and Inventorying Content

Staying current with academic developments and supplementing recent literature is fundamental to strengthening research. Scholars must maintain keen awareness of new theories, methods, and technologies to integrate latest findings. After updating literature, comprehensive analysis identifies existing research limitations and improvement spaces, clarifying the study's academic positioning and informing future innovation.

12.2 Measuring Academic Value: Principles for Assessing Thesis Quality

Academic value determines a thesis's influence and recognition. Impact is measured by breadth and intensity—excellent theses should influence academia

broadly and guide practice, evidenced by citation counts, journal placement, and practical application. Innovation difficulty also determines value; greater methodological, theoretical, or empirical breakthroughs yield higher scholarly worth.

12.3 Paradigm Shifts and Academic Conflicts

Academic research inevitably encounters paradigm shifts and conflicts that challenge content consolidation. Quantitative science emphasizes empirical methods and objective evidence, while qualitative research focuses on conceptual critique and innovation, highlighting researcher subjectivity and interpretation. These differing approaches may generate conflicts. Additionally, academic evaluation involves inherent subjectivity influenced by reviewer preferences, disciplinary consensus, and traditions, potentially creating discrepancies in assessing scholarly value.

12.4 Consolidating and Strengthening Content: Implementation

After updating literature and assessing value, researchers must consolidate content to strengthen their work. This involves removing repetitive or insignificant material to create more focused, powerful arguments. New evidence and arguments should supplement existing work to enhance persuasiveness. Finally, optimizing research methods and technical routes improves efficiency and accuracy, elevating the thesis's scholarly value and impact.

13. Essentials of Thesis Writing

The thesis represents a major academic achievement that demonstrates research capability and serves as a foundation for future careers. This section outlines essential writing principles.

13.1 Style, Tone, and Purpose

Thesis writing requires appropriate style, tone, and clear objectives. Language should be clear, concise, and objective, avoiding verbosity and subjective speculation. Critical writing goes beyond reporting findings to analyze problems deeply, offering original perspectives based on literature review. The thesis must feature systematic organization—including introduction, main body, and conclusion—to facilitate reader comprehension and demonstrate logical progression.

13.2 Abstract, Content, and Literature Review

The abstract, introduction, and literature review form the thesis framework. The abstract independently summarizes content, methods, and results, enabling readers to grasp main contributions without reading the full text. The introduction details background, problem statement, methodology, and findings, sit-

uating the research within its scholarly context. The literature review analyzes existing work to provide theoretical justification, identifying gaps and establishing the study's contribution.

13.3 Main Theories and Findings

Main theories and findings constitute the thesis core, demonstrating scholarly level and contributions. Researchers must articulate primary theories and methods—including frameworks, hypotheses, and experimental designs—with logical coherence. Results require rigorous data analysis presented empirically and objectively. Finally, findings must be interpreted theoretically to explain academic significance, depth, and potential to stimulate scholarly attention and discussion.

13.4 Exemplary Cases and Discussion

Exemplary cases and discussion demonstrate practical application and significance. Researchers should design representative cases that reflect typical situations and research problem characteristics. Case results require in-depth analysis to prove feasibility and effectiveness. Finally, discussing application value with forward-looking, practical suggestions provides useful references for relevant fields.

14. Past Questions and Committee Expectations

Understanding common defense questions and committee expectations is crucial for doctoral candidates preparing for their oral examinations.

14.1 Twelve Common Defense Questions

Defense committees typically explore twelve core areas: research motivation and problem awareness; problem formulation and conceptualization; research architecture and design; methodological rationale and limitations; evidence acquisition means; sample selection and scope; derivation and interpretation of main conclusions; generalization and application of results; academic contributions; self-evaluation of findings; post-research plans; and additional questions based on the candidate's specific work. These questions assess comprehensive academic abilities and qualities.

14.2 Eight Core Competencies for Doctoral Degree

Doctoral education demands eight core competencies: innovation capacity for generating new theories and methods; academic rigor adhering to ethical standards; critical thinking for deep analysis; mastery of specialized knowledge; ability to publish research findings; capacity to analyze and evaluate one's own work; thesis quality meeting academic standards; and strong oral defense per-

formance. These competencies ensure graduates can make substantial scholarly contributions.

14.3 The Making of a Doctor

Doctoral education originated in medieval European universities as teaching qualifications and evolved into certifications of academic excellence as science and education systems developed. The doctorate's core lies in critical thinking and independent research capabilities, enabling graduates to produce innovative results. Doctors serve as primary forces in scientific research, driving progress through deep investigation, new theories, and methodological advances. The doctoral training process itself promotes scientific heritage and development, creating scholars who advance both knowledge and practice.

Note: Figure translations are in progress. See original paper for figures.

Source: ChinaXiv — Machine translation. Verify with original.