



A FRAMEWORK OF RHETORICAL MOVES DESIGNED TO SCAFFOLD THE RESEARCH PROPOSAL DEVELOPMENT PROCESS

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ABSTRACT

Aim/Purpose	To provide a research proposal writing framework to help doctoral students argue and motivate their efforts at furthering the existing knowledge available to understand some phenomenon or theory.
Background	I discuss how the cognitive process theory of writing and the science writing heuristic can lead to a set of rhetorical moves and question prompts that students can use to develop the content of their research proposals.
Methodology	I searched the literature on research proposal writing and, more broadly, academic writing to locate teaching and learning concepts associated with my recent question prompt approach used to guide my doctoral students. I used search words such as “writing” and “question prompts.” My review led me to the cognitive process theory of writing and heuristic scaffolding. I searched further using keywords such as “rhetorical move” and “heuristic prompts.” I performed several iterations of literature searches and reviews.
Contribution	Instead of guiding a linearly developed research proposal that begins with an Introduction and proceeds to a Literature Review and then a Research Design and Methods section, the framework reveals a research proposal’s underlying logical flow and content by describing five rhetorical moves: establishing a topic question from an interesting phenomenon, establishing research opportunities, selecting a research question, providing a tentative solution, and establishing a plan to investigate the solution. Thus, the framework contributes to scholarship about how educators can facilitate independent reflection and broader problem-solving at the doctoral research proposal development stage. Particularly for the social sciences, it reveals the promise of the cognitive process theory of writing, dual problem space model of reflection, and heuristic scaffolding as valuable theoretical perspectives for the supervision of the planning phase of doctoral research.
Recommendations for Practitioners	Teachers and advisors may use the framework’s rhetorical moves and question prompts as cognitive scaffolds to help students navigate an ill-structured problem typical of doctoral research projects in the social sciences. The question type of

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scaffolding gives the research student more responsibility; rather than the thesis supervisor or advisor articulating a model or nominating the technique, they require the student to self-regulate and develop it independently. This helps deal with the oft-experienced circumstance in which the supervisor does not have time to interact directly and regularly with the student.

Keywords research proposal, pedagogy, problem, heuristic, cognitive, writing, scaffolding, doctoral

INTRODUCTION

For doctoral research, we need a research proposal writing framework to help students argue and motivate their efforts at furthering the existing knowledge available to understand some phenomenon or theory. This framework will support students' thinking and writing so that through their initial attempts at writing their thinking processes become visible and available for reflection. To this extent, I ask, "How can we foster independent critical thinking and reflective processes amongst research students during research proposal development?"

Higher education research supervisors guide their doctoral students to develop a dissertation research proposal. In the research proposal genre, this planning activity entails reflective activity around some limitations of current knowledge about a topic and the ways to gather this knowledge. Reflective skills help doctoral students go further than simply describing findings. These skills enable them to show that their findings advance, challenge, or change current knowledge. Because current knowledge is available in the extant literature, reflective processes become crucial during a literature review. Notably, imparting reflective practice to doctoral students can lead to self-regulated learning and independence (Calle-Arango & Ávila Reyes, 2022). Without their need for extensive supervision, students can use their reflective skills to sift content for their proposals and develop rhetorical skills to work this content into their proposals (Kirkpatrick, 2019). Specifically, students need to reflect on the logical flow from the topic to contemporary literature to a research problem to a research question to a research design and the methods to collect and analyse data.

Current literature abounds with guidance around research proposal writing limited to its structure and content (Faryadi, 2012; Gisbert & Chaparro, 2021; Heath & Tynan, 2010; Herrington et al., 2007; Kivunja, 2016). Typically, this literature guides one to write a proposal in the order of Introduction, Literature Review, Research Design, and Methods. This literature also provides the typical content that fits within each section. But this structure and content seldom represent the thinking and reflective process required to arrive at the final proposal. To get to the well-organized structure of the final proposal, even experienced faculty go through many iterations of developing the rationale for a research problem and solution. There is no clear path to a solution. Often, faculty may revise their working thesis several times. Some may do a pilot study before settling on a working thesis for their proposals. Likewise, research students will often confront problems with many unknowns; at the same time, they must view alternative solutions and ensure that their decision responds to multiple criteria for assessing a solution. Writing is not just a product but a means of thinking about the problem and the solution (Galbraith, 2009). Too much structure may hinder thinking when solving ill-structured scientific problems; too little can result in frustration or unproductive floundering (Reilly, 2020).

I argue that students develop more concrete and compelling research proposals when the content aligns with rhetorical moves. To implement this, I provide a framework of five rhetorical moves and related questions for students to address during their proposal writing process. The framework builds on earlier attempts at stimulating reflective processes in student writing (Flower & Hayes, 1981; Scardamalia et al., 1984) and recent attempts at applying these processes in the science writing heuristic and ill-structure problem solving (Ge & Land, 2003; Ge et al., 2016; Jang & Hand, 2017). Notably, the science writing heuristic goes beyond responding to the five traditional sections of a report:

purpose, methods, observations, results, and conclusions. Instead, students respond to prompts eliciting questioning, knowledge claims, methods, evidence, and description of data and observations. They also get to reflect on changes to their thinking (Akkus et al., 2007, p. 1748). Thus, my framework of rhetorical moves also steers students to the underlying reflective process of developing a research proposal.

Question prompts are often used in cognitive scaffolds to help students navigate an ill-structured problem domain that presents multiple solutions (Demetriadis et al., 2008). Students who receive question prompts related to problem representation, solution formulation, justification, and monitoring/evaluation outperform those without prompts (Ge & Land, 2003). Because doctoral researchers face problems with multiple solutions, they are likely to also benefit from question prompts while developing their research proposals.

The article does not contain an explicit Methods section. The literature review formed a crucial step in the method I used to develop the framework of rhetorical moves designed to scaffold the research proposal development process. To set off the literature search, I relied on the question prompt approach I currently use to guide my doctoral students. Often, after many iterations of applying these question prompts to interrogate the research literature, my students have independently identified a research problem suitable for graduate studies. I used search words such as “writing” and “question prompts” to arrive at the reflective writing theory and heuristic tools that underpin my framework. These are presented in the following section, which elaborates on the reflective or cognitive process of writing before moving on to a review of heuristic scaffolding with question prompts. I then present my framework before discussing it.

RESEARCH PROPOSAL WRITING AS A COGNITIVE PROCESS

Developing a research proposal is a planning activity in scientific inquiry. In this inquiry, learning often begins with a phenomenon, a topic, or a challenge that requires scientific investigation to explain, discover properties of a given domain, or address a particular challenge (Pedaste et al., 2015). Students may revisit the original challenge or task to ensure that the initial research questions and hypotheses align with the problem. This is an iterative process.

The writing of the proposal can be represented as a reflective or cognitive process that includes back-and-forth movement between content and rhetorical problem spaces (See the dual problem space model of reflection in Scardamalia et al., 1984.). Whereas the content space comprises knowledge such as definitions, existing findings, and points of view, the rhetorical space comprises mental representations or plans to compose text and communicate this knowledge to readers. Within the content space, research students develop their idea by recalling lessons about theory and methods and reading literature about the phenomenon of interest to arrive at a certain point of view about the topic: an argument about some problem deserving of one’s research efforts. Within the rhetorical space, doctoral students reflect on how to best communicate their research idea to the advisor and committee members who evaluate the research proposal (Druschke et al., 2018). Essential rhetorical practices include a persuasive written argument that a researchable question is connected to certain knowledge available in the existing literature and a strategy to conduct informative investigations (Chen & She, 2015). The inquiry must lead to a fresh understanding of the phenomenon. Often this may be difficult because many students have yet to develop skills in information gathering, argumentation, and decision-making (Glazewski & Hmelo-Silver, 2018; Ju & Choi, 2018; Stefaniak & Tracey, 2014).

Students may differ in their approach. In developing the content space, a student may begin with a topic and define a tentative problem before reviewing the literature on that problem and arriving at several assertions. Students will continue revising the content until they clearly state the problem. Out of this exercise, students develop a clear research question. Then the student shifts to the rhetorical space to devise a way to express an assertion about a research problem through writing (Gouvea et

al., 2022). The student's rhetoric must convince the advisor and other research committee members about the validity of the assertion that a particular research question has not been posed before or has not been adequately answered and that it is worth one's time and effort to seek and analyze information to answer this question.

To set off a cognitive or reflective writing process, advisors should not mentor students to tackle the content and rhetorical problems in a linear, staged manner. The back-and-forth movement between content and rhetorical spaces gives rise to two-way interaction between thinking about the topic and communicating one's thinking about the topic (Bereiter & Scardamalia, 1987; Galbraith & Baaijen, 2018; Klein, 2004). For example, when students reflect on a crucial term in their written work and realise that it may not be understood, they may return to the content space to seek a definition. Addressing this twofold problem is best accomplished through an iterative and recursive cognitive process across three elements: the task environment, the writer's long-term memory, and the writing process itself (Flower & Hayes, 1981).

The task environment comprises the rhetorical problem and the writer's ongoing text (Hayes & Nash, 1996). The ongoing text emerges as soon as writing begins. It extends the task because the writer's choice of words will limit the options of text that follows. Long-term memory comprises the writer's knowledge of the topic and audience. This is akin to the content space. The writing process itself includes steps in planning, translating, and reviewing. Within this process are several cognitive subprocesses.

THE TASK ENVIRONMENT

A central task of a student researcher is to address the rhetorical problem. This problem is defined by the writing assignment, the audience, and the student's goals (Flower & Hayes, 1980). The writing assignment, in this instance, is a research proposal, and its audience is the research committee. A central goal of doctoral students is to convince the committee that their research idea is worth their time and effort. To set off the student's thinking about this problem, advisors use a combination of research proposal guidelines, rubrics, and written feedback on proposal drafts. The rubric, for example, may provide the sections and their pertinent aspects to convey to readers. For example, a rubric will convey to students that the Introduction of a research proposal must contain text about the practical and theoretical background of a problem, an exact problem, and a question delineated into a few objectives. After all these attempts, students often realise that conveying a research problem in the Introduction section is essential but continue struggling with developing it.

Typically, students can write about the research problem space by answering three questions: "What do we know? What don't we know? What remains to be known?" This is akin to Swales's (1990) rhetorical moves: text segments that show the development of one's argument. These moves involve 'Establishing a Territory,' 'Identifying a Niche,' and 'Addressing the Niche.' In establishing a territory, the student must claim the centrality of their topic, provide general background, and review previous research. In establishing a territory, the student attempts to answer the question, "What do we know about this topic?" In identifying a niche, the student must problematize the previous research by making a counterclaim, identifying a gap, or raising a question. In identifying a niche, the student is prompted to reflect by the questions on what we do not know about this topic or how we can change, challenge, or advance the existing knowledge about this topic. Then in move three—addressing the niche—one states the research question or purpose and describes how one will conduct the research. For the eventual research report, move three also includes revealing the findings and arguing how these findings change, challenge, or advance knowledge and practice (Grant & Pollock, 2011).

With a larger view of the rhetorical problem, writers examine how to influence the audience. Those with a limited view of the rhetorical problem may confine themselves to searching for facts about a particular topic. A simple goal will be to follow the conventional features of the research proposal

genre. One might pay attention to the number of pages and font size and even consider the various headings of a research proposal. While some students may align their goals to the rhetorical structure of the research proposal, others may set out to impact the research agenda of scholars or the ideas of practitioners and policymakers in a transformative way. As we might predict from how writers progressively fill in their image of the audience, writers also build a progressive representation of their goals as they write.

The above process occurs iteratively. Thus, the task environment extends to include the growing text in the proposal. This text represents the student's knowledge or content space and affects how the student makes the next rhetorical move. Students reflect on the emerging content and set goals to elaborate and strengthen their rhetorical moves giving rise to revised or new blocks of text. Often, they may deal with this text by returning to the literature to recall and clarify their ideas. Notably, the existing academic literature serves as an external form of cognitive remembering.

THE LONG-TERM MEMORY

Internally, the writer's long-term memory exists in one's mind; externally, it is available in books and journals (Freiman, 2015). In Scardamalia et al.'s (1984) dual problem space model of reflection, long-term memory is essential to address the content problem space: students' knowledge about the phenomenon of interest, academic writing, and the various research designs and methods. They can also draw on their understanding of multiple audiences, such as one's advisor, the thesis committee, scholars, policymakers, and practitioners. This knowledge feeds into the rhetorical problem space, where students must think about communicating this knowledge.

Students can access this knowledge from their memory of prior coursework or by reading and re-viewing research articles and books: the literature review. For example, reading about certain concepts and methods in research literature may trigger the student's knowledge of certain theories and methods. When students develop this knowledge, they can generate a concrete research idea, plan their rhetorical moves, and start the first draft and subsequent review and revision of the ongoing text. Because students can retrieve knowledge about the research problem and various research methodologies, long-term memory applies to the entire research proposal.

THE WRITING PROCESS

The writing process includes planning, translating, reviewing, and monitoring (Flower & Hayes, 1981; Hacker et al., 2009; Kallestinova, 2017). To plan, the writer generates and organizes ideas and then sets goals. Students generate ideas from their long-term memory facilitated by a literature review. Students compose a text to make rhetorical moves easily for well-organized ideas in memory. But in many instances, ideas remain fragmented and contradictory. Often the information is not well adapted to the rhetorical move. Then planning also involves organizing the information to structure ideas in line with a rhetorical move. For example, within the organizing process, the writer might identify categories, search for subordinate ideas that develop a current topic, and search for superordinate ideas that include or subsume the current topic (Dovey, 2010; Flower & Hayes, 1981; Wojtowycz, 2011). This process involves more than ordering the text. It involves a creative activity in which students can present a new concept or claim.

The beacon for organizing ideas arises from another subprocess of planning: goal setting. Goals are procedural and substantive. Procedural goals are essentially the instructions people give themselves to carry out the process of writing a research proposal. Substantive or content goals and plans, on the other hand, specify all things the writer wants to say or to do to an audience. Some goals, usually ones having to do with organization, can specify both content and process. For example, a writer may have a particular opening statement for a paragraph in mind.

From a procedural perspective, the rhetorical moves of the research proposal genre are pretty specific and do not require elaborate rhetorical planning. The rhetorical moves for a research proposal

genre also have a hierarchy or order. This confines planning to a limited network of goals and reduces the cognitive load that a student must bear. Nevertheless, some students may go beyond these conventional requirements and set higher-level goals to influence or transform segments of their audience, for example, scholars and teachers, policymakers, and practitioners.

Students need to go beyond organising to translating their ideas to influence their audience. The translating process involves students following the best practices of English writing. Apart from paying attention to spelling and grammar, students convey their ideas through diagrams, metaphors, analogies, and similes (Baake, 2012). A valuable way to develop paragraphs is to provide examples and illustrations of the idea conveyed in the topic sentence. Students are also encouraged to translate their synthesis of the existing literature into conceptual diagrams. Successful translation helps the student's audience to "see" their ideas. For an exemplar, advisors may demonstrate extracts of Brian Greene's writings about complex ideas in science (See, for example, "The fabric of the cosmos: Space, time, and the texture of reality"; Greene, 2008).

Renewed organising and translating may arise from a reviewing process where students evaluate and revise text and ideas (Allal & Chanquoy, 2004). Still, this process can interrupt the writing process at any time. The evaluative process involves reflective activity that moves between ongoing text or content and rhetorical problem spaces (Scardamalia & Bereiter, 1994). The student initiates a dialectic process when they reflect on their writing, detect a gap between their text and the rhetorical problem, and realizes that it requires a substantive change. For example, the student might reflect on why an advisor or a committee member might object or misunderstand assertions about the research problem and its significance. The student also reflects on whether the writing fits the demands of the research writing genre: the need to cite the source of ideas, state the question, and design and method, to qualify one's assertions. The student must also reflect on the clarity of the writing and decide to elaborate on certain content. This returns them to the content problem space. For instance, the student may recognize that the advisor and thesis committee members will not understand a key term. This triggers the need for a definition, which leads the student to return to the content space to analyse and select between available definitions. They then begin to revise their text.

Revising is a particularly intense cognitive operation, for it involves comparing the intended and instantiated text to identify discrepancies, diagnosing what and how in the text should be changed, and operating by selecting appropriate strategies to make the desired text modifications (Bereiter & Scardamalia, 1983; Fitzgerald, 1987). These revision processes distinguish expert and novice writers, as the latter are less able to detect, diagnose, and rectify the mismatch between their text's intended mental and actual representation.

Students cannot spend inordinate amounts of time on any one process. They need a strategy to decide when to move from one process to the next. Students must monitor their planning, translating, and reviewing processes. For example, some expert writers advise writing fast and editing slowly (LaRocque, 2003). Getting out a first draft may result in less planning and translating and more time to review. Students who adopt this strategy must carefully monitor their time in each process and decide when to move from one to another.

HEURISTIC SCAFFOLDING WITH QUESTION PROMPTS

To help students with reflective thinking within and between the rhetorical and content problem spaces, Scardamalia et al. (1984) proposed a self-questioning approach. Later, science writing heuristics and teaching ill-structured problem-solving have also relied on a scaffolding approach through questions (Byun et al., 2014; Cavagnetto, 2010; Hand, 2008; Jang & Hand, 2017). Questions can serve as valuable cues to help navigate rhetorical and content spaces to retrieve information from long-term memory, e.g., the research literature. Advisors can frame questions to help reorganize or adapt this information to fit the demands of the research proposal rhetoric. One way to organize these questions is through heuristic scaffolding.

Heuristic scaffolding is a proper pedagogical technique to help students think about and write their research proposals. A heuristic scaffold is an approach to empower students to learn and address problems independently (Holton & Clarke, 2006). A heuristic is a mental shortcut that helps people solve problems and make decisions quickly. As a result, it is not optimal and often leads to a “practical” short-term solution. It can test solutions rapidly and may suit an iterative and experiential problem-solving approach. Consequently, heuristic scaffolding is a suitable tool to approach writing as a problem-solving process.

Scaffolding techniques temporarily support students to empower them toward independent learning gradually. A scaffold is erected as a temporary structure to help build or modify another structure. In education, one uses scaffolding as a metaphor for the temporary support provided by the teacher for the completion of a task that learners find challenging (Palincsar, 1986; van de Pol et al., 2010). This structured support helps novice researchers not accustomed to the open-ended and ill-structured nature of problems characteristic of higher education knowledge-seeking research projects. An example of an ill structure problem lies in the senior thesis. Scaffolding allows the advisor to guide the research student to complete the thesis without revealing viable solutions.

Heuristic scaffolding may be operationalised through questioning, modelling, and prompting. Prompts can be framed as a statement or as questions. Using guiding questions to get the writer thinking about their topic can help generate ideas in the brainstorming phase of writing. Teachers scaffold students’ learning with difficulty activating long-term memory by asking a series of graduated questions (Tharp & Gallimore, 1991).

Advisors can design question prompts to serve procedural, elaborative, and reflective goals. Students use procedural prompts to complete specific tasks (King, 1991; Scardamalia et al., 1984). Elaborative prompts allow students to articulate their thoughts and elicit explanations. Reflective prompts encourage students to self-monitor their writing (E. A. Davis, 2000; King, 1991). For example, students might reflect on whether they are meeting the rhetorical goals of research proposal writing.

Question prompts do not require direct guidance from an advisor. They can be designed into a “hard” scaffold such as a guide or rubric (Saye & Brush, 2002). A hard scaffold does not require the presence of an advisor and fosters independent thinking while acknowledging the developmental status of the student. In contrast, soft scaffolds provide dynamic and spontaneous support based on learner responses.

Question prompts effectively guide students to solve ill-structured problems typical of scientific inquiry. Students who received question prompts from their instructors related to four problem-solving stages—problem representation, solution formulation, justification, and monitoring/evaluation—outperformed those without prompts (Ge & Land, 2003). Examples of the several questions used in each stage include the following: What is the problem to solve in this task? What are possible solutions? What is the reason you choose this as the best solution? How would you persuade stakeholders with different opinions? In a study of three groups—one developed questions independently with some help from the instructor, the second relied on peers to build questions, and the third used instructor-generated questions—the instructor-generated questions helped students more than self and peer generated questions to navigate the ill-structured problem (Byun et al., 2014).

Advisors may use heuristics for scaffolding problem-solving skills that transcend specific content. Heuristics provide solutions to problems without telling or prescribing certain content to them. Students need not arrive at perfect research ideas and solutions. Instead, they discover preliminary ideas and solutions by returning to refine them iteratively and reflectively. It’s a framework to empower students to take small actions and gather momentum in their research journey.

In developing research proposal writing skills, the student must formulate a problem and provide a design and corresponding method to locate a solution. Though the advisor may know about the research topic, they may not wish to give the student a research question. The advisor’s goal is to

impart skills to the student to problematize current knowledge about the topic and formulate their question independently. Both advisor and student are unlikely to know precisely what they will discover. However, the advisor has certain skills and knowledge to guide students to find the result independently.

GUIDING STUDENTS THROUGH THE RESEARCH PROPOSAL: A FRAMEWORK OF RHETORICAL MOVES AND QUESTION PROMPTS

Having highlighted the role of problem spaces and the value of heuristic scaffolding through question prompts, let us turn to a framework that scaffolds five rhetorical moves and respective question prompts to help students develop a research proposal (see Table 1). It is framed around three types of questions: a broad topic question (TQ), a more focused research question (RQ), and a set of objectives or investigative questions (IQs). These rhetorical moves and their respective questions help students approach developing a research problem and writing the plan to solve it as a problem-solving exercise. This problem-solving perspective makes heuristic scaffolding an appropriate tool to underpin a framework that can help students to develop their research proposal independently.

One begins the process with a broad topic, locating a situation one is concerned about, which can be used to raise a TQ. One then reviews the existing research literature to seek answers to the TQ. One must go further to analyse and critique these answers to address the TQ and arrive at a fresh perspective not already available in the current literature. One selects the critique one is more interested in pursuing in the field and converts this into a RQ. One then uses intuition or prior empirical and theoretical knowledge to develop a working thesis. One can choose to interrogate this working thesis inductively or deductively. Ideally, the working thesis may be delineated into several observable implications, which can be developed into hypotheses towards a deductive approach to the research design or framed as broad propositions if one wishes to take a more inductive approach. In any case, to set one's mind into an "inquiry" mode, both hypotheses and propositions can be reframed as objectives or IQs, which will help facilitate the thinking required for the research design. The research design can then be further detailed into methods for data collection and analyses.

Advisors can guide students through a scaffolding process where they first learn to develop their interest in some real-world phenomenon into a TQ. This TQ prompts a move to establish a second skill to analyse the research literature for available knowledge to adequately answer the TQ and identify a few limitations in this knowledge that can serve as opportunities for an empirical research study. With the skill to analyse the literature, the student can move on to the third skill to select and articulate a specific research problem and question. With the RQ in place, the student can develop a fourth skill to arrive at tentative solutions that can be delineated into research objectives or IQs that can serve as the basis for a research design. With this foundation in place, the student can then develop the fifth and final skill to select among research designs and respective methods. These skills help the student to think through the research proposal. It may be necessary to develop a separate intervention to teach the student how to write a research proposal. Table 1 shows how to scaffold these skills against rhetorical moves. It also shows the respective question prompts for each move. I propose applying the questions to three relevant empirical articles to develop these skills.

**Table 1. A framework for thinking about and writing a research proposal:
Rhetorical moves and content**

Rhetorical move	Content
Rhetorical move 1: Establishing a topic question from an interesting phenomenon	<ul style="list-style-type: none"> ▪ What is my topic about? the underlying real-world phenomenon. ▪ What concerns me about this phenomenon? ▪ Into what topic question can I translate this concern?
Rhetorical move 2: Establishing research opportunities	<ul style="list-style-type: none"> ▪ What primary research articles, preferably empirical, have studied aspects of my topic in the last five years? (author/s, year) ▪ What critical theoretical perspectives and empirical findings inform the answers to my topic question? <i>Necessary for the rhetorical move that establishes the field.</i> ▪ What aspects are not covered adequately in this study and require me to resolve through further research? Are the descriptions and explanations of the topic phenomenon incomplete in some way? Is there a counterargument you believe that one should pursue? Are there any overlooked explanations? <i>Necessary for the rhetorical move to identify a niche or problematize the field.</i> ▪ Which three of the above empirical research articles provide the most substantial opportunity to address my topic question? Why? ▪ <i>My review of the first empirical research article</i> <ul style="list-style-type: none"> ▪ Reference? ▪ What was the unit of analysis? (Individuals, firms, incidents, etc.) ▪ What was the research question or purpose? ▪ What theory or theories were used, if any? ▪ What research design was selected? (Case study, survey, case study plus survey, etc.) ▪ Describe the sample or cases selected. And the setting (country, sector, organization)? ▪ What methods were used to collect data (questionnaires, observation, unstructured interviews, documents, etc.)? Measures/scales/codes? ▪ What methods were used to analyze the data? ▪ What were the main findings (answers to the research question), and what are the corresponding implications for theory and management practice? For example, dimensions of the phenomenon, necessary and sufficient conditions, etc. ▪ Viewing the above answers, what are the strengths and weaknesses of this study in terms of being helpful for my topic question?

Rhetorical move	Content
	<ul style="list-style-type: none"> ▪ How might any further research address the above strengths and weaknesses? Anticipate your potential findings from your fieldwork with a thought experiment to answer this. ▪ Which of the above aspects deserving further research do I choose to design a study? ▪ <i>My review of the second and third empirical research articles (see above sub-questions)</i>
Rhetorical move 3: Selecting a research question	<ul style="list-style-type: none"> ▪ Which aspects deserve further research do I wish to design a study? ▪ What research question do I pose to trigger best an information-gathering exercise related to this aspect?
Rhetorical move 4: Providing a tentative solution	<ul style="list-style-type: none"> ▪ What is an answer/ solution (working thesis) to the above research question that I wish to explore or test? ▪ Is there a theory or two informing this solution? Name and describe these briefly. ▪ What are the observable implications of this working thesis? ▪ Should I explore and/or test these implications? ▪ What is my related research aim/purpose? ▪ What IQs or objectives will lead me to explore certain aspects of my working thesis? ▪ What are the hypotheses and related conceptual framework if I choose to test my working thesis? ▪ How might my potential findings advance, change, or challenge current knowledge about my topic? ▪ Will my readers understand? Do I need to elaborate and give an example?
Rhetorical move 5: Establishing a plan to investigate the solution	<ul style="list-style-type: none"> ▪ What is my unit of analysis? ▪ Research Design: To help answer my investigative research questions or test my hypotheses, what is the nature of the data/evidence that I need? ▪ Research Design: Should I search for answers to the IQs using a single, small N, or large N case approach? Does this mean I conduct a single case study, experiment, multiple case study, survey, or a case study plus survey, etc.? For the latter, what is a preferred sequence? ▪ Sampling/Case selection: Where will my study be located? Why? Who will I select to participate in my research? Why? Will I choose them randomly or purposively according to any central aspects deserving inquiry? What selection criteria will I use to select cases? How are these criteria related to the study issues?

Rhetorical move	Content
	<ul style="list-style-type: none"> ▪ Am I likely to have difficulty gaining access to participants? What strategy will I use to source/recruit participants? Will it be wise for me to conduct a pilot on just one or two participants before I spend effort accessing all participants? ▪ What data collection methods correspond to my research design? Questions, observations, etc. ▪ How will this data help answer specific sub-questions/objectives? (reflect on the breakdown of the research problem into its manageable components: variables and concepts embedded in the main question and any sub-questions/objectives) ▪ What methods will I use to analyze the data corresponding to each component of my research design? ▪ How will each specific analytical method lead to the potential findings /conclusions that can help answer my research question? (Again, reflect on the variables and concepts embedded in the main question and any sub-questions/objectives)

Questions address the prior rhetorical moves in attempting to arrive at content. For example, a question about answers available to a topic question provides content and facilitates communication about what knowledge is currently available.

RHETORICAL MOVE 1: ESTABLISHING A TOPIC QUESTION FROM AN INTERESTING PHENOMENON

A helpful strategy to start the thinking process to address the rhetorical move and respective content involves converting the concern about some real-world situation into a topic question (TQ). This question can put the student into an inquiry frame of mind and may be instrumental in reviewing the student's research literature review. While some students may be familiar with the theory and have identified a theoretical problem in the literature from the outset, most students begin with an interest in some real-world concern. This concern serves as a compelling background to the TQ. For example, students concerned with the increase in pollution through the rise of manufacturing industries in a developing country may ask, in an exploratory fashion, "What influences a country's environmental quality, or how can one increase the quality of the nation's natural environment?"

RHETORICAL MOVE 2: ESTABLISHING RESEARCH OPPORTUNITIES

Once the TQ puts students into an inquiry mode, they can begin exploring answers in the existing research literature and identify a few research opportunities which can be used to identify a research problem. The key to arriving at a RQ deserving of one's time and effort is to ensure that it is not trivial and has not been answered already. One uses the existing research literature to "listen" for alternative answers to the TQ. Available answers, notwithstanding their limitations, provide the content and the basis to make a rhetorical move akin to Swales's (1990) "establishing a territory." This conveys to readers the knowledge available about the phenomenon of interest and sets the scene for a research problem (see Locke & Golden-Biddle, 1997). To ensure that the student reflects deeply on the existing knowledge, we use the prompt, "What critical theoretical perspectives and empirical findings inform the answers to the topic question?" (See Grant & Pollock, 2011).

To assist students in establishing a research opportunity akin to “establishing a niche” (Swales, 1990) or “problematizing a situation” (Locke & Golden-Biddle, 1997), we prompt them to identify aspects not covered adequately in the respective past study. They can resolve this through further research of their own. We also prompt them to identify incomplete descriptions and explanations. Other prompts include “Is there a counterargument you believe one should pursue? Are there any overlooked explanations?”

Alternative answers are likely not just for explaining the phenomenon of interest but also for describing it. Thus, one can begin to locate limitations in existing knowledge by evaluating current descriptions and explanations of the phenomenon embedded in the TQ. Challenging one’s assumptions about the meaning of the phenomenon of interest and the validity of whether indeed such a phenomenon is taking place in the situation the student is concerned about should be the starting point in answering the TQ. In other words, though it might be helpful to develop theories about why the phenomenon occurs if the premise is wrong, one must be wary of expending time and effort explaining a non-existent phenomenon (de Vaus, 2001).

In Table 1, I prompt students to examine literature from the last five years. Then, for an in-depth review, I encourage them to select the three articles that begin with the most substantial empirical insights about the phenomenon of interest. For beginning researchers, it’s best if these articles are empirically based. Students can then critique and learn about research designs, data collection, and analysis methods. Thus, one includes prompts about research design and methods used to arrive at existing knowledge.

Again, students may require a prompt to reflect on the specific article for an opportunity to go out into the field. One can then prompt the student to reflect on the strengths and weaknesses of this prior study in terms of helping address the TQ. The student is then encouraged to reflect on how further research could address the above strengths and weaknesses. The student is also nudged into selecting a particular opportunity.

RHETORICAL MOVE 3: SELECTING A RESEARCH QUESTION

There are rare cases where a RQ is not rooted in current literature (Ahlstrom, 2017). Some RQs arising from new phenomena may be exploratory and require little theoretical grounding (Christensen & Carlile, 2009). From the above attempts to answer the TQ, one realizes that students can explore the literature and identify several problematizations around their topic. Therefore, it can be valuable to prompt the student to reiterate one of the problematizations to provide a brief background to the RQ. This is akin to Swales’s (1990) third rhetorical move: occupying the niche.

The RQ should be interesting and address something that needs to be better understood because past research did not fully answer the question or address critical aspects of the study (M. S. Davis, 1971; Konrad, 2008; Sparrowe & Mayer, 2011). Notably, the final RQ must make explicit a unit of analysis. In the social sciences, this might refer to individuals, groups, organizations, social phenomena, policies, and principles. For example, from a TQ “What influences a country’s environmental quality,” or “How can one increase the quality of the nation’s natural environment?”, based on several answers available in the literature, a student might ask, “How does economic development reduce a country’s environmental quality?” In this instance, the unit of analysis is a country.

RHETORICAL MOVE 4: PROVIDING A TENTATIVE SOLUTION

For students to manage the scope of a research project, developing just one preferred solution into the best available explanation is advisable. But if students do not consider alternative explanations before rejecting them, it becomes difficult to defend a preferred explanation. The preferred explanation should be one that other agents in the discourse can contest: readers and future researchers, for example. Ideally, student literature reviews should articulate at least two explanations. These are akin to working theses or tentative solutions. Notably, a working thesis has observable implications that

can be explored or tested. Each implication may be formulated as an objective, question, or hypothesis. A preferred thesis presents several implications that can be observed in the real world. Such implications can be translated into a set of IQs, which can serve as a basis for a research design for an empirical study.

It is acceptable for students to speculate to get started. Gordon (2003) recommends crafting rather than defining the problem. After a pilot study that explores or tests a working thesis, students might be in a better position to return to refine the working thesis and the objectives or IQs and sometimes even the RQ. Coming up with that working thesis early in the research process prevents random research because students would have an idea of where their research is going. One can assure students that their thesis statements could change as they analyse the available information, but it is essential to have a specific and excellent starting point.

RHETORICAL MOVE 5: ESTABLISHING A PLAN TO INVESTIGATE THE SOLUTION

For students to answer the IQs, they design a research study. The first important question before seeking answers to IQs is, “What is my unit of analysis?” This might refer to individuals, groups, organizations, social phenomena, events, policies, and principles. Then one can ask, “Should I search for answers to the IQs using a single, small-N, or large-N case approach? And what aspects of the IQs do I use to select case/s?” By case, I mean the unit of analysis, such as an individual. While a single or small-N study may include qualitative analysis, a large-N case study includes quantitative analysis. Regarding actual methods, one asks, “Should I gather data using a questionnaire, a structured or loosely structured interview, actual observations, an analysis of existing documents, or unobtrusive methods? And then, to produce the required answers: how will I analyse the data I have gathered?”

Alternative research designs include experiments, case studies, and longitudinal or cross-sectional surveys (de Vaus, 2001). And contrary to popular thinking about research methodology, the above data collection methods can be applied in any of the above research designs: questionnaires, interviews (structured or loosely structured), observations, analyses of documents and artifacts, or unobtrusive methods.

Notably, all the above designs include a “case” in some form. You can select a single case to conduct a process type analysis, a multiple case study to include both processes within cases and variations in variables between cases, or a large number of cases as in a cross-sectional or longitudinal type survey (Reddy, 2020). Typically, one will use qualitative methods to analyse a single or small number of cases and quantitative methods to analyse a large number of cases. One will need to highlight the number of cases necessary to address the research problem and how to select these cases. For example, in a small N study, readers ask whether the cases are chosen so that their similarities and differences illuminate the RQ. More generally, while one may use purposive sampling for a small number of cases, one can use random sampling for a large number of cases. Typically, one uses a large-N design to test the theory that one may develop from a single or small-N case study. Making the rationale for doing this explicit raises the study’s value as a scientific inquiry.

DISCUSSION AND CONCLUSION

This article aims to answer the question “How can we foster independent critical thinking and reflective processes amongst research students during research proposal development?” Many graduate students struggle to transition to independent research. Graduate faculty acknowledge this (Lovitts, 2005, 2008), but it is a struggle to figure out the mechanism of developing a rationale for research if all one must rely on are rubrics and guides displaying the structure and content of the research proposal. Typically, this includes a structure from Introduction to Literature Review to Research Design and Methods.

One needs guidance about the cognitive or reflective process underlying the rationale from topic to research problem to RQ to research design and corresponding methods. Often, higher education institutions expose students to a proposal's structure and format before delivering instruction about the thought process. For example, though the problem statement and RQ are in the Introduction, it takes several iterations of reviewing literature about a topic to arrive at a RQ that justifies one's time and effort to get out into the field. Through the literature review, students can discover if solutions to the RQ are readily available. We wish to train students to conduct empirical research that will result in knowledge not readily available in extant literature. To develop this new knowledge, students can benefit from understanding the rhetorical moves of a research proposal. I argue that when content is aligned with rhetorical moves, students will develop more compelling research proposals and increase their efficiency in completing their research projects.

This article proposes a pedagogical strategy involving heuristic scaffolding with question prompts to guide the thinking and writing of research proposals and increase the efficiency and effectiveness of doctoral research. I provide a framework with five rhetorical moves to scaffold the proposal development and respective questions to develop the content against each move. The rhetorical moves help students think of their proposal regarding a problem and a corresponding solution. While scaffolded instruction has been discussed extensively for teaching, it has been used less in the research student and supervisor interaction.

I rely on the cognitive process theory of writing (Flower & Hayes, 1981) to view the writing of a research proposal at the doctoral level. I integrate into theory Scardamalia et al.'s (1984) delineation of a reflective writing process into rhetorical and content problem spaces. To navigate these spaces, I put forward five rhetorical moves, each with elaborative question prompts. The questioning strategy aims to help research advisors guide students' attention and ensure they elaborate their rhetorical moves. In particular, the rhetorical moves help advisors scaffold the research writing process. The idea developed here follows the science writing heuristic, which relies on a scaffolding approach through questions (Cavagnetto, 2010; Hand, 2008; Jang & Hand, 2017). Students who receive question prompts significantly outperform those without prompting (Demetriadis et al., 2008; Ge & Land, 2003). Notably, the cognitive demands required to respond to such a question offer a potential heuristic to facilitate argumentation of a better quality (Chin & Osborne, 2010).

The first move in the article's framework involves establishing a TQ. This is important to translate a broad topic into a question that can put the student into an inquiry frame of mind. I've positioned move two as "establishing a research opportunity." This is akin to Swales' (1990) moves one and two: establishing a territory and a niche. It is akin to Locke and Golden-Biddle's (1997) sequence of establishing and problematizing the intertextual fields from the research literature. Move three—selecting a RQ—is akin to Swales' move three on "occupying a niche." This requires the student to make a definitive choice amongst the research problems identified while attempting to locate answers to the TQ. These problems serve as opportunities for empirical research. The student may convert just one option into a RQ or combine several opportunities into a more extensive RQ.

The rhetorical moves toward the research proposal must go beyond simply occupying a niche or problematizing the intertextual field. A research proposal requires students to describe a clear plan to answer the RQ. "Learners need to conceptualize the problem by questioning and generating hypotheses" (Ge et al., 2016, p. 6). The article, therefore, introduces two more moves: providing a tentative solution and establishing a plan to investigate this solution. To improve the efficiency of the research process, I have come up with move four: providing a tentative solution. This is akin to formulating a working thesis that limits the scope of the research project. This helps manage the time and budget required for a student project. Again, this necessitates a shift from convergent thinking to iterative thinking and inquiry within the broader problem space. The working thesis also provides the benefit of specific and explicit implications observable in the real world that the student must investigate. This allows students to develop a concrete research design and method to collect and analyze

information from the real world. Thus move five requires students to establish a plan to investigate the implications of the working thesis.

IMPLICATIONS FOR PEDAGOGY

Supervision pedagogy can impact supervision effectiveness (Golde, 2010; Guerin & Aitchison, 2021; Kaur et al., 2022). Because the rhetorical moves and questions help meet specific criteria, the framework developed here may serve as an inquiry rubric that details the indicators of effective scientific inquiry. These rubrics can be used formatively, from the beginning of the investigation, for reflection on progress, and summatively during final evaluations. The debate around this framework and empirical tests of its application may further graduate supervision as “pedagogy” (Gravett, 2021). Ultimately, this framework can foster independent scientific inquiry through problem-solving and meta-cognitive and project management skills.

For higher education, we wish to foster independence. Question prompts are helpful for research projects in higher education to encourage independence. They are suitable for the oft experienced circumstance in which the supervisor does not have time to interact directly and regularly with the student. Question prompts help the students decompose the proposal and focus their efforts. The question type of heuristic scaffolding gives the research student more responsibility; rather than the thesis supervisor or advisor articulating a strategy or nominating a technique, they require the student to develop it independently.

Advisors may design prompts into a “hard” scaffold such as a guide or rubric (Giacumo & Savenye, 2020; Saye & Brush, 2002). A hard scaffold does not require the presence of an advisor and fosters independent thinking while acknowledging the developmental status of the student. Eventually, question prompts become internalized by students for future use to build knowledge or solve problems without an advisor’s assistance (Holton & Clarke, 2006). Question prompts can help students set specific goals, plan their activities, and monitor their performance during the problem-solving process (Burbules & Berk, 1999; Tawfik et al., 2020; Wirth & Leutner, 2008).

Scaffolds are removed once learners develop the required competency. Though each rhetorical move may serve as a scaffold if supervisors segment the proposal into the five moves, at a graduate level where we wish to promote independence, I recommend the entire framework of moves be used as a scaffold. Graduate students need to feel empowered with control and responsibility over the overall process and see how their work contributes and progresses to the final accepted research proposal. For supervisors to facilitate this process, it is helpful to get students to write first drafts of the proposal to fit within the logic of the five rhetorical moves rather than the required structure of a final proposal. Thus, the scaffolding process may proceed from one draft to the next. In the first stage, in preparation for a substantive discussion of the student’s idea, supervisors can use the framework to help students develop an early draft. The questions in the framework facilitate this by assisting students in interrogating the literature to identify a research problem and a few research designs. With some supervisor feedback, students can proceed to the second draft. Alternatively, they can reflect on their first drafts and develop a second draft independently with the aid of the framework. I anticipate the framework being used less and less as students near their final draft.

Developing a research proposal is a step in the process of scientific inquiry. Fostering students’ scientific inquiry competence has been recognized as an essential and challenging objective of science education (Hwang et al., 2012). These are crucial skills for graduate research students, irrespective of whether they will proceed to become scholars at higher education institutions or practitioners in the broader economy. Practitioners, too, can benefit from a framework that promises to validate a problem and locate a solution in their various work environments.

To develop skills in scientific inquiry, faculty have relied on problem-based learning. Problem-based learning is a student-centred, inquiry-based approach that begins with an ill-structured problem with multiple possible solutions (Jonassen & Hung, 2008). Supervisors may treat graduate research as an

ill-structured problem. They may use the framework of rhetorical moves to navigate the ill-structured problems characteristic of scientific inquiry.

When developing skills to solve ill-structured problems, specifically knowledge construction problems, the framework helps supervisors initiate a cognitive process among graduate students to build independence and self-regulation. Self-regulated learning is a process in which learners “are metacognitively, motivationally, and behaviorally active participants in their learning process” (Zimmerman, 1989, p. 4). Many scholars suggest that faculty provide scaffolding to help learners self-regulate their processes in solving ill-structured problems (Ge et al., 2016; Loyens et al., 2008).

The framework also helps supervisors to impart metacognitive skills to novices. Reflective practices are metacognitive. Metacognitive skills can compensate for the absence of relevant domain knowledge when recognizing areas of limited understanding, adopting working hypotheses, asking questions, monitoring thinking, and revisiting early interpretations (Wineburg, 1998). Scaffolds with question prompts form essential tools in critical thinking and reflective practice (Bowe et al., 2020). “Like a peer partner or coach, such cognitive-strategy prompts might help refocus student concerns from lower-level processing, such as correcting one’s spelling and grammar, to increase planning and idea generation” (Reynolds & Bonk, 1996, p85). For example, students are often reticent about developing a working thesis. Faculty can do well to provide learning opportunities for students by asking questions rather than providing explanations (Chi et al., 2001; Hmelo-Silver & Barrows, 2008).

Finally, question prompts help supervisors and graduate students with research project management. When applied to the research project, project management principles indicate that well-thought-out upfront planning or front-end loading eases project implementation and limits downstream supervising effort and optimizing faculty time (e.g., Thomke & Fujimoto, 2000).

CONCLUSION

Students struggle to write their research proposals because they cannot quickly identify research problems without a means of self-directed critical and probing questions. This article shows a framework of rhetorical moves and questions that can be used by research advisors to provide scaffolded supervision during their students’ development of their research proposals. Though this framework does not correspond to the structure of a research proposal, the content emerging from answering the question prompts against each rhetorical move can be used to populate the required sections of the proposal. For example, many institutions need the problem and its rationale to be in the Introduction though these aspects emerge from a literature review. “

For graduate students in higher education, we wish to foster independence. The research advisor or supervisor can promote this independence through heuristic scaffolding. Heuristic scaffolding through question prompts can also help the general population of higher education students navigate the problem spaces of their senior theses. Supervisors, mentors, or advisors are advised to attempt heuristic scaffolding. This article’s framework can assist graduate researchers in making reasoning more explicit. This can help counter the tendency toward superficial and non-reflective research work.

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A Framework of Rhetorical Moves

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