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WRITING DOCTORAL DISSERTATION LITERATURE REVIEW: IDENTIFYING THE PREREQUISITES, COREQUISITES, AND THE ITERATIVE PROCESS FOR WRITING THE LITERATURE

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ABSTRACT

Aim/Purpose	Identify the prerequisites, the corequisites, and the iteration processes in organizing and writing the literature review chapter of doctoral dissertations
Background	Writing the literature review chapter of doctoral dissertations presents unique challenges. Students waste a lot of time identifying material to write, and the experience is generally that of frustration and time delay.
Methodology	This paper reviews literature to identify levels of information helpful for writing the literature review chapter: prerequisites, corequisites, and iteration process.
Contribution	The contribution of this paper is different than others that have been written about the literature review. The intended audiences for this paper are mentors, advisors, or academies that supervise students in writing their doctoral dissertations. This paper introduces the writing of the literature review by organizing the suggestions into groups of topics more familiar to academies than in other fields. The concepts of prerequisites, corequisites, and iteration are very familiar to educators; they often use them in their courses. The academic curriculums are built on such concepts. Thus, grouping the discussion into these terms familiar to mentors, advisors, or doctoral dissertations supervisors will put the findings into a more helpful focus for educators that supervise students in writing the literature review chapter.

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Findings	Writing a doctoral dissertation literature review is long and complicated because some students delve into the writing without much preparation. Identifying what is helpful before and during the writing and being mindful of the repetitive steps helps guide the students through the writing of the literature review chapter of doctoral dissertations.
Recommendations for Practitioners	Before delving into the writing of the literature review, it will be helpful to identify the prerequisites, the corequisites, and the iteration process that goes into the writing literature review.
Recommendations for Researchers	Writing the literature review chapter in doctoral dissertations remains challenging. More research would be helpful that focuses on the late writing stages. The suggestions we made in this paper could form a solid start for future research in this topic.
Impact on Society	The research findings will help doctoral mentors/advisors guide students in completing the chapter on literature review
Keywords	literature review, dissertation literature review, phases of literature review, snowballing in literature review

INTRODUCTION

> In my view, an incredible amount of scholarly waste exists in the academic industry that results from the inefficient way doctoral students typically conduct doctoral literature reviews. Thousands of doctoral students every year spend hundreds of hours on their dissertation literature review. Most of this time is spent aimlessly floundering since most students don't know what they are doing, and most supervisors don't have a model for guiding them to proceed in a systematic manner. (Okoli, 2015, p. 904)

The points that can be drawn from the quote above are twofold. First, a literature review is essential to completing a doctoral dissertation before working on the other chapters. Second, it can be inferred that conducting a literature review could turn out to be an unnecessarily lengthy and daunting process. The main reason that makes the writing of the literature review chapter long is that students often venture into writing the chapter without much preparation and adequate knowledge of what is involved in writing the chapter (Randolph, 2009).

Writing a literature review (typically the second chapter of a doctoral dissertation), if started without adequate knowledge about what goes into writing the dissertation, will complicate the effort and expand the time required to write it (Ebrahim, 2012). Many issues need to be addressed before and during the literature review, and identifying these issues could lead to a better understanding of writing the literature review chapter. This paper addresses these issues surrounding the writing of chapter two of doctoral dissertations. The purpose of this study is to identify factors that are helpful at the different phases of the writing of a literature review:

- The factors that are helpful to learn before starting the writing of chapter 2. We term this knowledge as the prerequisites to writing chapter 2 and cover it first.
- The specific attributes that are needed to develop during the writing of chapter 2. We term this as the corequisites to writing the chapter on lit review, and we cover it second.
- The repetitive nature of specific steps that students follow when writing the literature review. We name these steps the iterative process for reading and organizing the reviewed literature.
- The daunting task of formalizing the long list of literature reviewed into clear writing consistent with the purpose of research and adhering to formatting and regulation guidelines is addressed next in this paper.

- Last, the paper displays a symbolic summary of what is discussed in the paper and the suggestions it made. It will also include recommendations for future research on topics related to writing doctoral dissertations.

RESEARCH PLAN

The purpose of this research is to clarify the factors of prerequisites, corequisites, and the iterative process that are helpful to the writing of the literature review chapter of doctoral dissertations. The clarification comes in two different forms: First, through the explanation of the various articles to form a view of what is involved in writing each phase of the literature review. Second, through drawing figures that represent what was discussed during the phase of the literature review. Then, the figures are merged into one combined chart representative of all the stages of writing the literature review chapter. So instead of following a straight line of completion in this study, an often-wavy line is followed to clarify the different points that need to be explained here in this paper. Figure 1 depicts the wavy way this research has followed to report their findings.

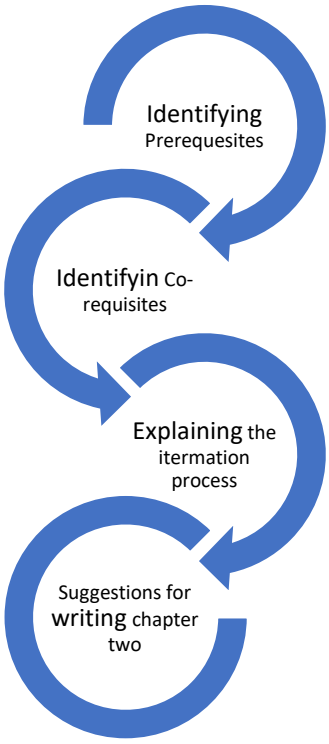

Figure 1: Plan Overview of This Paper

IDENTIFYING PREREQUISITES FOR THE LITERATURE REVIEW

Prerequisite is a word often repeated in academia to refer to one or more courses a student must complete before they are eligible to take a specific course. For example, a course IT8000 Research Method I might be a prerequisite for the course IT8100 Research Method II. This means a student cannot register for IT8100 unless they have taken and passed IT8000 or are otherwise able to demonstrate evidence of knowledge of material covered in IT8000. Thus, knowledge of material imparted in IT8000 is a prerequisite for students enrolling in IT8100. Furthermore, it stands to reason that if a student begins work in IT8100 without the prerequisite knowledge for IT8100, the student will, at best, flounder and struggle in IT8100.

In this paper, we use the word *Prerequisite* to mean knowledge that will be helpful to students as they begin and eventually complete chapter two - the literature review chapter. In other words, it will be more beneficial to the students in their literature review writing if they have this knowledge. We have identified the following points that are helpful to teach the students before starting the work on the literature review:

- Identifying the dissertation research topic
- Review of published dissertations
- Clarify the purpose of the literature review
- Identify typical contents of the literature review
- Establish evaluation metrics and benchmarks

Clear Identification of the Research Topic

Writing a literature review can be helped by adequately identifying the research topic. Clarifying the research topic helps identify what sources to review, keywords to search for, databases to search for, and in many other ways. To put it differently, clear identification of the research topic can give more precise directions in the writing of a literature review (Paul & Criado, 2020; Torraco, 2016; Webster & Watson, 2002).

Identifying the research topic does not come in isolation. Instead, it must be connected to other dissertation sections before being clarified. Lunenburg and Irby (2008) suggested that explaining the research purpose as a pre-condition to starting the literature review is essential. Ali and Pandya (2021) stressed the importance of clarifying the research question section before beginning the literature review.

Along with suggestions for the research problem statement, other concepts in the dissertations need to be clarified. Writing the literature review can be helped by specifying the expected outcome of the research (Terrell, 2015). Understanding the section of research purpose can help determine if the topic is research worthy (Levy & Ellis, 2006) and what kind of literature search needs to be completed. Along the same lines, crucial to clarifying the research topic is knowledge of how to collect data for the research, which brings the issue of the targeted population for the study (Jalali & Wohlin, 2012).

Review of Published Dissertations

Reviewing published dissertations before writing the literature review is of enormous value to the student writing the dissertation. This is more specifically true about writing the literature review. Studying published dissertations provides students with examples and can serve as a guide or navigation tool as they begin their dissertation journey (Wohlin, 2014). Some challenges could be faced in the search for published dissertations. However, electronic library databases can help (Bates et al., 2017).

In our search, we found at least one library database that is specifically geared toward finding published dissertations. Using the *ProQuest Dissertations and Theses* library database, students can search through numerous published dissertations. According to the headlines listed on their page, ProQuest has the most comprehensive collection of dissertations, and their published dissertations can go back to 1861. Unless searching for some specific or seminal dissertation, most students would not need to go back beyond the past five years. But that one can search for dissertations going back 150+ years could be helpful to some students when they review literature.

Students can search for dissertations in ProQuest using a simple search. They can also use the advanced search feature, which allows the search to narrow down. The advanced search has different search options and logical operators that can help narrow down the field and focus more or narrow the focus of the searched dissertations so the search could be more manageable.

Clarifying Purpose of Literature Review

The literature review has different purposes of achieving and different sections to include. Randolph (2009), for example, suggested four purposes for completing the literature review:

- Demonstrating the author's knowledge of the selected field of study
- Clarify the vocabulary, theories, key variables, and phenomena for the selected topic of research
- Presents a history of the topic and methods of searching for information about the topic
- Inform the students of the influential researchers for the chosen topic

Xiao and Watson (2019) noted that the objectives of the literature review could be three: understand the depth of knowledge in a field and find gaps; test hypotheses and develop new theories; and reveal weaknesses, contradictions, and inconsistencies.

Jacobs (2013) stressed the importance of conducting a literature review to narrow down the writing of the research problem statement. Wee and Banister (2016) suggested that a literature review represents an added value for researchers because they (the researchers) get up-to-date information on the issue being discussed in the problem statement. Torraco (2005), on the other hand, considers conducting a literature review very important because it gives the researcher exposure to past writings on the topic and provides a framework on which to explore the future.

We can detect from the statements above that conducting a literature review is sometimes considered an "eye-opener" for the researcher in terms of starting the dissertation by writing the research problem statement (Columbaro, 2009). Literature review, in turn, gives the students ideas on what problems were discussed in the past and compares them with the problem identified in their research (Okoli, 2015). It gives them examples of how research problem statements were written in the past, and they can model what they learned to write their problem statement (Ebrahim, 2012).

Last, we refer to Shaffril et al. (2020), who described the purpose of the literature review in the following statement:

> Previous works are fundamental to the creation of new knowledge. When performing a literature review, researchers analyze, interpret, and critically evaluate the existing body of knowledge. The process allows them to discover the patterns of prior results, comprehend the depth and details of the existing knowledge, and identify gaps for further exploration. (p. 1)

Common Content Typically Included in Literature Review

An appropriate question that could be asked at this point includes what to incorporate in the literature review and which section headings need to be included. Different studies answer this question, but the results do not produce a shortlist of topics to be covered in a literature review chapter. For example, Lunenburg and Irby (2008) list ten common topics to be included in the chapter of literature review: Providing a historical background; Describing its current status; Supporting the purpose of the study; Identifying gaps in the literature; Becoming aware of variables relevant to the problem; Understanding the seminal studies that are cited more often; Identifying the leading scholars relevant to the problem; Proposing useful theoretical constructs for the study; Understanding the methodology used, and Observing comparative studies. Rowe (2014) suggested that the literature review chapter needs to include a summary of prior research, examination, and contribution of the present research, an explanation of results of prior studies, and clarifying alternative views. Kraus et al. (2020), on the other hand, offer that a literature review should contain an explanation of the definition of critical terms and concepts, the theoretical foundation of the study, the historical context of the topic of study, genesis of the topic, and synthesis of literature review.

As seen here, the suggestions are diverse and numerous. Admittedly, the content of the literature review could vary greatly depending on the topic being selected. However, some minimum identifiable sections need to be clarified that could lead the students to start somewhere with the writing of the literature review chapter. Based on our review and what was noted in this section, we determined that the minimum required sections in the chapter of the literature review could include the following.

Introduction: Describe the topic, the purpose of the dissertation, and an overview of the structure of the chapter (Denscombe, 2017).

Search strategy: It is essential to include what the student has done to search the literature and organize them into helpful topics that can be written at later stages. It will be helpful if the student gives details about what databases were searched, what keywords were used, and the results of finding and filtering (Kable et al., 2012).

Historical Context of the Dissertation Topic: Presenting some historical context of a topic could be helpful. Clarifying what took place before the current content sets the reader to appreciate the existing content (Nystrand, 2006). It can also serve as a platform to appreciate new research that doctoral students conduct.

The theoretical foundation used in the study is worthy of research and explanation because the doctoral dissertation is typically based on a theoretical foundation (Osanloo & Grant, 2016). The section on the theoretical foundation is a major focus of doctoral dissertations because many other sections build on it. Thus, providing the detailed context of the theoretical foundation is needed in the literature review chapter.

The variables used in the study: If there is a model that the study will follow or variables that will be studied, the literature review chapter is a good place to introduce this. This discussion may sound specific to quantitative dissertations, but it is not. Typically, quantitative, qualitative, and mixed method studies all have variables in some shape or form, and it is helpful to introduce and explain them within the literature review chapter of a doctoral dissertation (Osanloo & Grant, 2016).

Literature Review and Synthesis: As the name suggests, this section forms the core of the chapter on literature review. The materials covered in this section lay the foundation for building the content of chapter 2 of doctoral dissertations. Therefore, this section is pivotal in how the dissertation would proceed (Kraus et al., 2020). Understandably, the contents of this section are specific to the research problem, and the materials discussed in this section would vary from one study to the next. However, analysis and synthesis of the reviewed material justify the selection of the theoretical framework and the variables used in the study (Paré et al., 2015).

In the literature review section, the researcher is expected to search for answers to the research question(s) they have proposed in chapter 1 of their study. They do this by sourcing, reviewing, analyzing, and synthesizing current relevant published literature. This exercise is important because it serves two purposes.

The first purpose of this exercise is that it establishes that the research problem proposed in chapter one is a known problem among academics. It is important to establish that the proposed research is of interest to researchers and that the student has not proposed using their doctoral journey to solve a local problem or to research a "pet peeve." If academically rigorous research publications discussing their problem cannot be found, the student risks not adding to the "body of knowledge" once their work is complete (Ferrari, 2015).

The second purpose of studying current literature on the research topic is to confirm that, while the topic has been studied in academia, a solution to the student's specific research question(s) is unknown. Obviously, while conducting this exercise, if the student finds a solution to their question(s), their research proposal is moot. But by searching for and not finding a solution, the student can establish that (a) this is a legitimate problem and (b) no known solution can be found (Kraus et al., 2020). Thus, the student makes the case that the only way to answer their research question(s) is for

the student to solve the problem themself. This then sets the tone for chapter three, where the student discusses the research method and specifies, in detail, how they plan to use to solve the problem. Hence, this section lays the foundation that will play a pivotal role in how the dissertation will proceed.

Evaluation Metrics/Benchmarks/Criteria

Setting criteria to evaluate completed work has been part of academia from its inception. The criteria can be set at the assignment level, at a course level, at the program level, or even to obtain a degree. De Villiers et al. (2017) suggested that set conditions for evaluation need to start by identifying the evaluation subject, then the criteria, and then the metrics. This entails clarifying what is to be completed and how it is going to be evaluated. Developing criteria can come in the form of evaluation metrics or establishing benchmarks (Sarialtin, 2015). By establishing metrics or setting benchmarks, criteria can be established in terms of answers to the question of what makes a quality submission (Schoenfeld et al., 2018).

Evaluation metrics and criteria are everywhere. And they are practiced repeatedly in different applications. They can be used to evaluate employee performance when applying for promotion, for instance. They can be used in academia to evaluate the work submitted by students for grading or evaluate faculty for tenure or promotion eligibility. Metrics are often attached to the performance evaluation process. These metrics are benchmarks that determine if the examined performance meets the conditions for which the evaluation is being conducted.

Similarly, for the chapter on literature review, different qualitative measurements can be applied. However, along with qualitative measurements, it will be helpful to include some quantitative metrics that students can learn to look for in advance. Two such metrics commonly exist for doctoral dissertations: the number of pages and the number of references that are cited in the chapter. (Kushkowski et al., 2003).

The number of written pages may not always reflect quality. The common notion is that more written pages may indicate proficiency in writing while fewer pages may show the opposite. Longer writing does not necessarily correlate with the quality and depth of writing. On the contrary, fewer pages may be more concise in describing the reviewed literature (Kraus et al.., 2020). Nevertheless, the number of pages in a literature review chapter is commonly used as a benchmark when reflecting on the quality of the chapter.

The number and type of references are other indicators of research depth. If more references are listed in the document, it could imply that more articles are reviewed, and thus more knowledge is presented in the chapter. This may not always be true. Writing with fewer references could be more direct and have better quality than with a reference list that boasts a larger number of references (D. A. Becker & Chiware, 2015).

Another quantitative metric is the originality report, which is a measure of the extent of match between a paper submitted for evaluation and other publications (Baptista et al., 2015). While no specific scoring of matches is available, it is accepted that a high percentage of a match may be indicative of plagiarism. A common issue that results in high matches is direct quotes (Trinchera, 2002). Too many direct quotes in a document will result in high matches. So, it will be best if these direct quotes are kept to a minimum.

Determining qualitative metrics for assessing the chapter on literature review could be more challenging to identify. Brocke et al. (2009) noted that the quality of the literature review is often affected by the literature review process – that is, the portion of the chapter that talks explicitly about the literature review. Since this explicit talk of about a literature review could be unique to each dissertation, it will be challenging to establish metrics that can be applied to all who write chapter two or this section in the chapter.

Based on the discussion in this section, we list in Figure 2 a waterfall graph that shows our suggested prerequisites for writing chapter 2. We selected the waterfall shape to show that each step depends (falls in) on the previous step. That is, one step falls into the next step, and so on. We suggest that these steps are to be explained consecutively to start with clarifying the topic, and as the topic is clarified, then talking about the purpose of the literature review is made easier. The same thing can be said about the other steps.

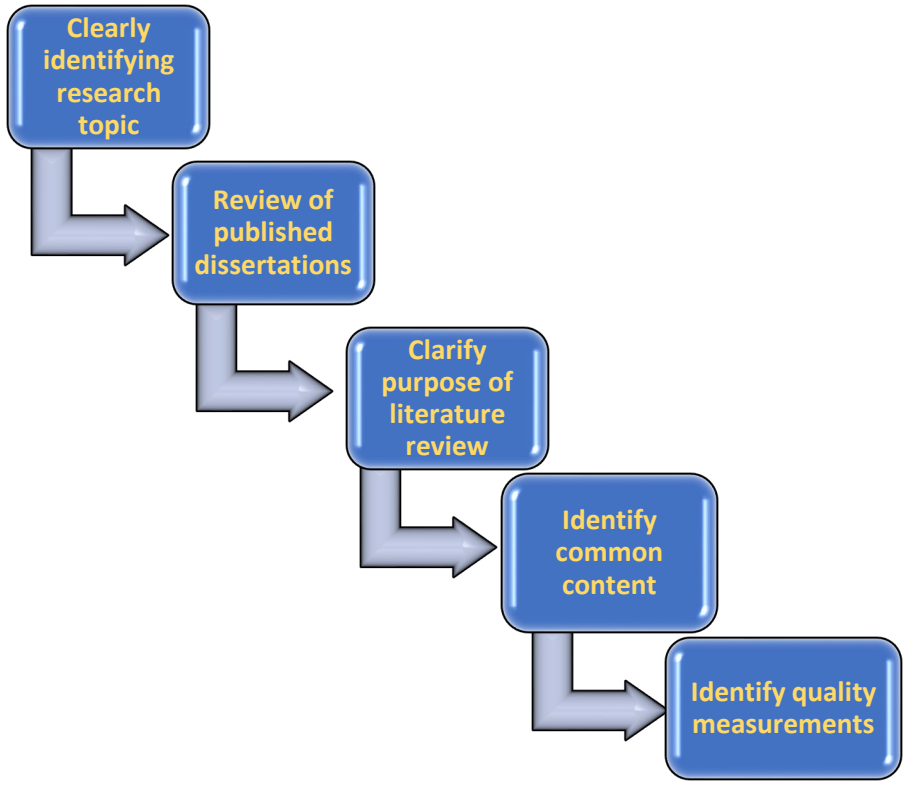

Figure 2 – Depiction of prerequisites to conducting a literature review

IDENTIFYING THE COREQUISITES TO LITERATURE REVIEW

In academia, the term "co-requisites" is often used to identify courses that are needed to be taken together. In other words, a course (call it course A) needs to be taken at the same time as another course (call it course B) because knowledge in both courses complements each other or is required to be taken together. In this study, we refer to the corequisites as characteristics, activities, and steps that are helpful to have while conducting the literature review. In particular, we deem the following factors as helpful to have during the writing of the literature review chapter of the doctoral dissertation:

- Managing the reviewed literature
- Annotations in digital documents
- The progressive quality of the writing of literature review
- Self-efficacy and writing efficacy

MANAGING THE REVIEWED LITERATURE

Over the past two decades, "Googling" has morphed into an acceptable verb in the English language, and it is common knowledge that one can quickly get oodles of information on almost any subject by simply searching for it on internet browsers. However, most of what is found from web searches need not be directly related to the topic being searched (Harzing & Van der Wal, 2008). Instead,

search results yield portions of the phrase searched for, similar words, or other tertiary information related and oftentimes unrelated to the search. So, internet surfers end up having to decipher through the loads of information displayed to them and separate the wheat from the chaff.

A similar thing can be said about students writing doctoral dissertations: when they search for a topic, they can find a lot of information from a simple search they conduct. But they could be overwhelmed by the volume of information that they find from the search (Beliga, 2014). In addition, this information volume must be recalled later when writing the dissertation. To avoid being overwhelmed and to make it easier for retrieval later, the reviewed literature needs to be organized to simplify the recall. For this purpose, two concepts were discussed among researchers on how to manage the reviewed literature: concept map and organizing references and citations.

A concept map is a helpful way to plot ideas. It draws graphics because the text that describes the concept that is cumbersome and difficult to understand (Wilhelm & Kaunelis, 2005). These concepts can better be explained if put in a chart or a diagram that depicts the relationship among these elements. Figure 3 shows the conceptual map for the formal problem determination. Ideally, a researcher may have already considered the concept based on his or her perceptual ability. However, the concept must be translated into one or more constructs so that a determination can be made as to what variables should be investigated. This is where the preliminary review of the literature will indicate the gap in research or the need for replication of such research to substantiate the findings of other researchers. Regardless of the objective of literature review – action research, case study, cohort design, cross-sectional design, descriptive, experimental, exploratory, or field research – the researcher may need to cross-reference the problem domain with the existing literature to establish a strong case for the study of perceived dependent variable(s). Although, at this stage the problem domain cannot be defined formally, nevertheless, and as indicated in the concept map, the validation and verification of the problem requires further refinement by adding three distinct components that include a) preliminary investigation or analysis of the problem, b) internal/external controls that may influence dependent variable, and c) researcher's own skills, efficacy, perceptual ability, and risk-taking propensity.

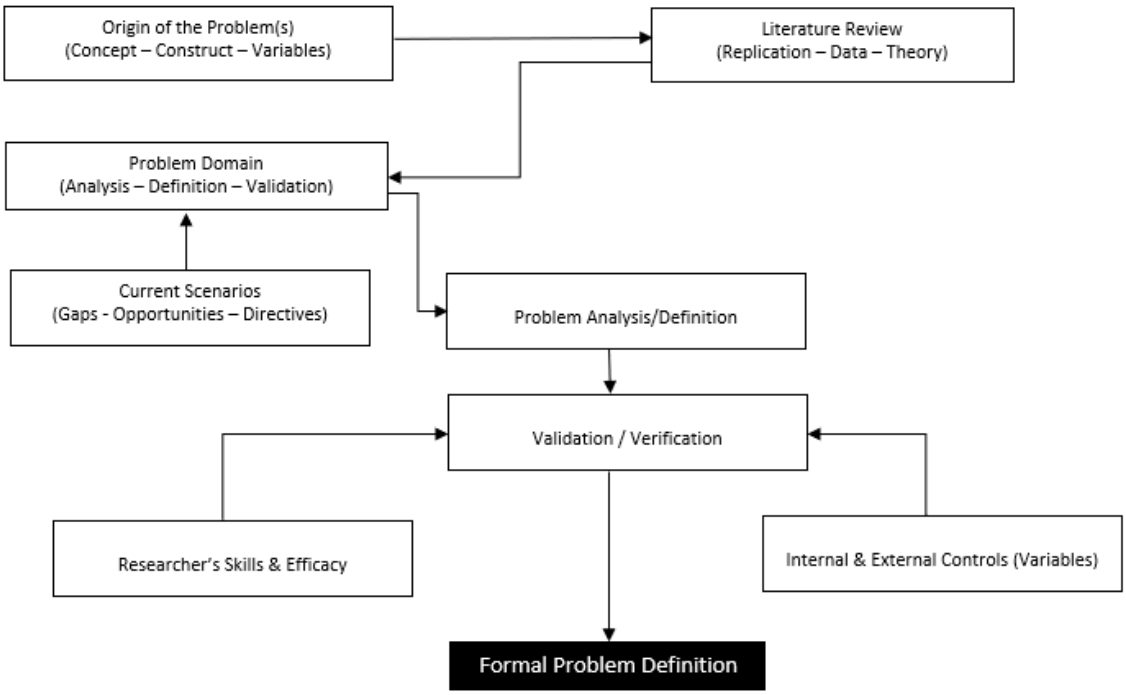

Figure 3 – Concept Map Schema for Problem Determination

Another way to manage all the references that were found in the search is by using the reference management (RM) software tool. Gilmour and Cobus-Kuo (2011) recommended the use of reference management software because it contains the following features:

- **Organization:** Reference managers offer different ways of managing references, including breaking them into categories that can be recalled and tagging the reviewed literature so it can be easily categorized.
- **Searching and sorting:** RM software allows searching and sorting the software. This feature is particularly helpful when attempting to look for specific information later after the student has commenced writing with intensity.
- **Annotation:** RM software allows adding notes to the references. In other words, as the search for literature continues and the student decides to include a reference, they can add notes to remind them of the main points or the reason for adding this literature. Although it may sound trivial, any little step that can organize and simplify the review process is helpful.
- **Citing references and creating bibliographies:** This feature helps immensely reduce errors from misspelling and incorrectly citing references. As the research proposal – and later, the thesis – nears completion, it will be critical that all references are correctly spelled and all references listed in the reference section are cited in the body of the dissertation and vice versa. RM software can help with this time-consuming and tedious task.

While RM software is helpful and perhaps superior in managing the references, most Word Processing software offers many of the above features. MS Word for example offers a feature to tag the references for easy categorization and review. MS Word also offers options for citations but is limited to inserting parenthetical citations (the citation listed at the end of the sentence).

Organizing the reviewed literature is not limited to the use of the software. Other ways can be introduced to organize the reviewed literature. One way is to create a spreadsheet in which the student highlights or lists the main points from the reviewed literature. It can be done by listing the main columns, including author, title, focus, context, and other information. Saving all this information as Excel and PDF files can help review and find information (via search feature) at later stages. Most electronic libraries and search engines allow the download of PDF files. These files can be saved and organized, and they aid in searching for content as the writing of the literature review begins.

Annotation in Digital Documents

Note-taking (or annotation) on printed documents has long been practiced in academia. Annotation can be practiced in many forms: Making notes on the margins of the page, underlying text, scribbling on the selected text, and other means of annotations. Highlighting text with different colors or even adding post-it slips to mark pages where specific information is located serves the same purpose (Pearson et al., 2009). (The annotation techniques allow the researcher to backtrack relevant findings and cross-reference with continued research.) This kind of annotation contributes to close attentive reading where more concentration and memory of materials read is needed.

Above was the norm until technological advances led to a practice evolving significantly. Over the past two decades, primary reading gradually shifted to interactive on-screen and digital media (Pearson et al., 2012). For a while, this reading of digital documents made it difficult to make annotations, as digital media was not conducive to notetaking. This then affected attentive reading (Buchanan et al., 2015).

Today, digital readers have evolved, with embedded annotation tools routinely available within web browsers and portable document format (PDF) such as Adobe Acrobat Reader. The simplest and most common annotation tools include drawing with different colors, highlighting text with different color codes, adding pop-up comments to certain text for clarification, reading aloud, and other annotation tools.

Pearson et al. (2012) research took the annotation issue and further provided significant suggestions for using digital screen annotation to make it easier to annotate. Pearson et al. listed the following techniques that could be used for annotation in digital documents:

- Annotation and bookmarking
- Document mark-up tools are as easy as possible
- Unified post-it tool
- Visual placeholders
- Digital reading desk
- Digital notetaking

With these techniques, readers can annotate in different ways, including writing on the margins, bookmarking where different sections can be linked to others, color coding, and many other techniques that students can use. The point that can be drawn is that annotation came back to the digital screen with more power: readers can highlight, underline, draw, and others as in the past. In addition to annotation in digital documents, digital flashcards and further annotation tools can be used to help pay close attention while reading and so to serve for easier retrieval at a later stage of writing a literature review (Pearson et al., 2009).

Annotation tools can come in handy and be helpful for students writing their literature reviews. When going through the literature volume, it is not a good idea to totally depend on one's memory and to remember all the notes taken during the review. Instead, using annotation tools in various forms provided with technology could help with the retrieval of the information and the writing of the reviews (Agosti & Ferro, 2007).

Writing Efficacy and Self Efficacy

Self-efficacy has been the subject of discussions in many research areas and is considered a key contributor to the success of individuals who persist and complete tasks (Bandura, 1993, Bruning et al., 2013). Bandura (2006) explained that self-efficacy is often associated with the capability of the individual to complete tasks. On the other hand, Bruning et al. (2013) described self-efficacy as the personal confidence that one has that one can complete one's task successfully in the intended domain. In other words, students with higher self-efficacy can tolerate more challenges and persist longer.

Bandura (2006) identified four skills that contribute to an individual's self-efficacy: cognitive skills, motivational skills, emotional skills, and behavioral skills. In terms of the completion of academic tasks, Bandura (1993) noted that self-efficacy operates at three different levels when it comes to contributing to students' academic success. These include the student's belief, the teacher's belief, and the faculty's belief in the students' self-efficacy. McBrayer et al. (2018) studied the relationship between self-efficacy and time to degree completion of doctoral study. The study concluded that students with higher self-efficacy end up completing the writing of their dissertations in a shorter time.

A subsection of the concepts discussed regarding the writing of a doctoral dissertation is the writing efficacy of the student. Writing efficacy is connected to self-efficacy and is described by Stadtlander et al. (2020) as how well a researcher can accomplish writing tasks based on various skills, such as composition, grammar, and other mechanical skills. Bruning et al. (2013) explained that writing efficacy is a function of three factors: writing ideation, writing convention, and writing self-regulation. In writing ideation, the researcher starts with writing ideas as they emerge in mind, though how well the researcher expresses the ideas is also important. The writing convention is about the different conventions and rules that need to be followed when writing. Writing self-regulation is related to managing the writing of tasks and observing the writing habits that researchers develop.

Self-efficacy and writing-efficacy are necessary components in successfully writing the doctoral dissertations literature review chapter. Self-efficacy is connected to writing efficacy because self-efficacy influences writing efficacy (Stadtlander et al., 2020). In other words, higher self-efficacy students will

make better writing progress. The question that could be asked regarding this study is how advisors/mentors can influence or contribute to enhancing both efficacies and thereby fostering progress.

Stadtlander et al. (2020) noted that a structured experience that the mentor supervises helps improve the students' self-efficacy. Breitenbach (2019) suggested that designing a structured program with sufficient feedback could help more students complete their dissertations. Ewing et al. (2012) echoed similar contentions and noted further that designing a structured dissertation writing process helps acquire research skills.

Structured experience in the dissertation writing (and writing chapter two of the dissertation) can be helped by using a rubric type of feedback. Sparrow (2004) suggested that using rubrics improves teaching by explaining grading criteria. We argue that rubrics also help in writing with efficacy and self-efficacy. Rubrics provide a clearer picture of what is expected. Therefore, students can approach the task with greater clarity.

After going through this discussion, we drew a chart (Figure 4) to depict what is needed for corequisites while writing the literature review. We presented the shape in similar rectangles to show that all factors are handled at the same level and that they do not depend on previous steps to be completed.

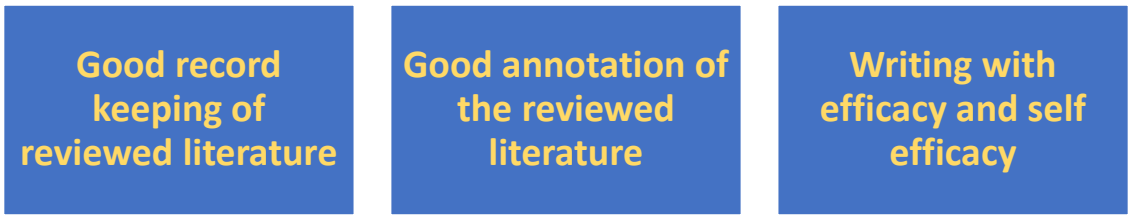

Figure 4 – Factors helpful during (co-requisites) to writing a literature review

THE ITERATIVE STEPS IN LITERATURE REVIEW

Iteration (or loop) is repeated often in computer programming courses. It refers to a step (or a series of steps) that are repeated until a condition is met, and at that time, the iteration is branched out and continues to the next set of instructions. If the condition to halt the iteration cannot be met, the condition is called an "endless loop" or an "infinite iteration". So, to prevent an endless loop, there must be a set of conditions to end an iteration (Felizardo et al., 2016).

In writing a literature review, closely similar concepts are practiced when reviewing the literature. Given the plethora of available literature, students can get caught up in searching for and reading more and more and inadvertently, or even perhaps advertently, keep postponing the writing or adding new material to their reviewed literature. At some point, writing has to start for the student to move forward. Otherwise, the student may enter into the endless loop that is sometimes seen in computer programming.

This section explains the iterative process that characterizes some literature review steps. It includes the following sections: Selecting keyword/key phrase for searching the literature, Identifying the electronic database for the search, Snowballing, and Writing small

KEYWORDS (KEY PHRASES) SELECTION FOR SEARCHING

The literature review typically starts with identifying a topic and learning about a few keywords that best describe the topic. The intent of identifying keywords is to start searching using them to find articles related to the topic of the study in the dissertation (Siddiqi & Sharan, 2015). The question that could be asked at this point is how to identify words or phrases for search.

Lunenburg and Irby (2008) suggested using the funnel approach, where the search begins with general terms and then narrows the keywords to more specific ones. At the wider end of the funnel, students can find more literature through the search, while later, there will be fewer articles found as the student focuses the search more.

The funnel approach can go only so far as the search continues. At this time, more specific keywords need to be used to focus the search, and alternative words may need to be used in the search (Linder et al., 2015). The question that could be asked at that point is what other keywords to use as the search continues to narrow down. The critical point here is finding alternative keywords that could describe the same point originally searched.

Wilhelm and Kaunelis (2005) gave an example to draw an analogy for using different words to focus the research more. Wilhelm and Kaunelis's topic was "cheating on the Internet," and they started the search by using the keyword "cheating." As they searched more and needed to find more articles about the topic, they realized that they needed to change the keyword they used first for searching "cheating" to alternative words that could lead to finding more related articles. Wilheim and Kaunelis assembled a list of keywords they used to find articles about the topic they were researching. Figure 5 summarizes the list of keywords they used for their search. This led to finding relevant articles directly related to their research topic.

Cheating	Academics	Stopping	Technology
Plagiarism	Students	Combating	Higher education
Detecting	Computer software	Dishonesty	Colleges
Preventing	Internet	Ethics	Academic
Deterring	Paper mills	University	Defining

Figure 5 – Key Search Concepts and Terms

Note. Key search terms used to research 'cheating' on the Internet (Wilhelm and Kaunelis, 2005)

Identify Electronic Databases for Search

A literature review could take different turns depending on the remaining writing and literature search. However, it will most likely take successive searches to find sufficient literature to include in the writing finally. Searching the web can be done either through search engines or a library database (Liu et al., 2018). Internet search engines are more known among internet surfers, and people use them for many different searches. However, searching library databases is less known, and questions could arise if there are differences among the databases and which to use at later stages of the search.

Typical library databases related to education can include ERIC, Wilson Education Abstracts, ProQuest Education Journals, and Professional Development Collection (from EBSCOhost). Business-related databases include ABI/INFORM (from ProQuest), Business Source Premier (from EBSCOhost), LexisNexis Academic, and Business and Company Resource Center (from Gale/Thomson) (Wilhelm & Kaunelis, 2005). These library databases can be general or subject-specific (Chen et al., 2020).

Conventional wisdom dictates that searching general databases will be a good place to start the search because it yields a large volume of articles. But the catch here is that searching these databases could result in a lot of unrelated information and less directly relevant information about the topic. The nature of the literature search may necessitate searching for topics specific to the field of study being researched (Bratt, 2018).

Another factor to consider when selecting a library database for search is the availability of key features that are provided. Besides the specificity of the subject, library databases can be preferred based on the features they provide for searching and recording the results. Some of the preferable features available in library databases include (Wilhelm & Kaunelis. 2005):

- Availability of PDF files to download
- The number of logical operators that are used to limit the search in the database
- Ability to use the cite feature where the database list the citation as selected based on the writing style (APA, MLA, Chicago, and others)
- Ability to link to articles listed in their bibliography and also to similar articles about similar topics,

Last, we recommend conducting time-bound studies when searching for references from databases. Unless seminal in nature, we recommend articles be ignored if they were published more than the past half-a-dozen or so years. Given the fact that new material is constantly published and made available for review and that databases can have source articles published globally, it is reasonable to expect that material published a decade or so ago is now old and has been refreshed. So, we submit that a researcher should not spend time sourcing and reviewing older material when there is a plethora of new material available. This approach will help limit the number of articles that one would review and is, therefore, a small step in curtailing the endless loop in which some researchers find themselves. The only exception is seminal work. As and when seminal work needs to be adequately referenced, it logically makes sense to research and read it, irrespective of when that work was published.

SNOWBALLING

Snowballing is a term often used in different conversations with different contexts. However, the word means one general thing that people in different fields of study can use for their own purpose. So, it is prudent first to define what it means and how it is applied here in the literature review. Webster's dictionary defined snowballing as "to increase, accumulate, expand, or multiply at a rapidly accelerating rate" (Merriam-Webster, n.d. b).

Snowballing in literature review refers to searching more literature to find additional relevant information to the research topic so as to include and cite more information in the chapter or sections of the literature review (Wohlin, 2016). The goal is to find relevant information on the research topic and include it in the literature review. Snowballing can be accomplished either by searching forward (forward snowballing), searching backward (backward snowballing), or searching relevant articles. All three ways of snowballing can be helped using electronic databases and search engines.

Forward snowballing aims at finding articles that reference or cite the article being reviewed (Badampudi et al., 2015). In other words, while the researcher reviews one article (We can call it Article A), the researcher can find articles B, C, and D that cite article A. Citing or referencing article A may indicate that more relevant information can be found by reviewing the other articles. Since the article was cited by other articles (B, C, and D in this case), the researcher can find more relevant information by reading the other articles (in this case, articles B, C, and D). Library databases make this snowballing easier – they often provide a list of articles that reference the article being reviewed, and the researcher can click on them and review them. An advantage of forward snowballing that can be noted here is that forward snowballing provides a list of articles published more recently or at least after the first article was published (Felizardo et al., 2016).

Backward snowballing can be done by searching the references section of the articles being reviewed to find articles relevant to the research (Felizardo et al., 2016). Some library databases and search engines offer a clickable reference section (which means when clicked, it displays the referenced article). In this case, it makes it easier for the researcher to review the cited articles – they can click on the article, view the content, and decide whether to add it as a reference. The backward snowballing

searches resources in the reference section; thus, it is published before the date of writing the literature review and before the date of the article being examined by the researcher.

Figure 6 shows a view of forward and backward snowballing to illustrate the difference between the two snowballing methods.

Figure 6 – Backward and forward snowballing

Searching for relevant articles is another feature that is offered in electronic databases. When searching for a particular topic or keyword, the library databases display a list of hits for the keyword. They list a link labeled "relative articles" or something similar that can be clicked and further searched. When clicked, the search can continue, and the researcher can find more relevant articles, and the search can continue. Figure 7 depicts the three methods of snowballing used in finding literature while searching library databases: forward snowballing, backward snowballing, and finding relevant articles.

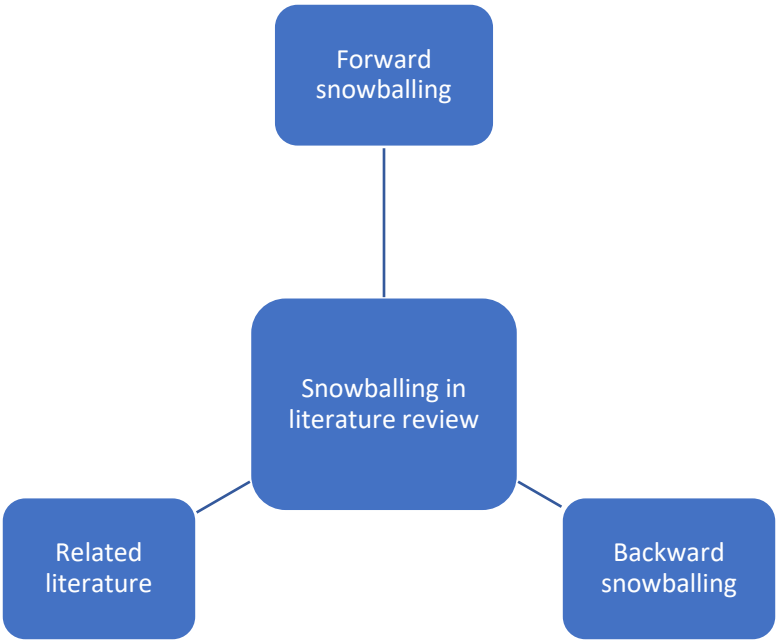

Figure 7 – Snowballing Methods in Library Database Searches

All three methods are helpful and easy to use, but the ease of use of it may make it addictive – that is, researchers will get bogged down by looking at an article, looking at relevant articles, then finding more relevant articles, and continuing the clicking and the finding of more information. Thus, it becomes critical to start writing even on a smaller scale.

WRITING SMALL

The point that can be said about writing a literature review is that students will read a lot of material, indeed read a lot more than what they will write (Okoli, 2015). As articles are found, the temptation could be to continue reading. It is a good idea to write some as the search continues. Writing complete sections is not likely at this point because the search and iteration continue. Thus, we recommend writing some, preferably based on what was found in the article currently being studied, and then adding to it as the next article(s) are sourced and read. In this exercise, the writing can also become iterative if, each time the student adds to the document, s/he first reviews what was written thus far before continuing. However, this form of iteration is a good exercise as it helps reinforce prior material and prevents the student from advertently writing something covered in an earlier reference.

Writing some text at this point is not to be confused with the focused writing of the dissertation chapter. At this stage, the writing can be compared to doodling, which some may do manually. Doodling, although it is mainly characterized as being bored and is a way to get out of boredom, doodling can be used constructively as well. It can help us remember information. Writing some as the literature review continues will help jot down some information that can work as reminders for later big-time writing.

Figure 8 illustrates the steps that are typically practiced during the repetition and iteration of the literature review. It shows the repetition (iteration) while writing the literature review. It reveals that it starts by selecting keywords to search library databases and continues by writing some of what was found. That cycle could continue for some time, but it has to end at some point, and the focus has to shift to writing.

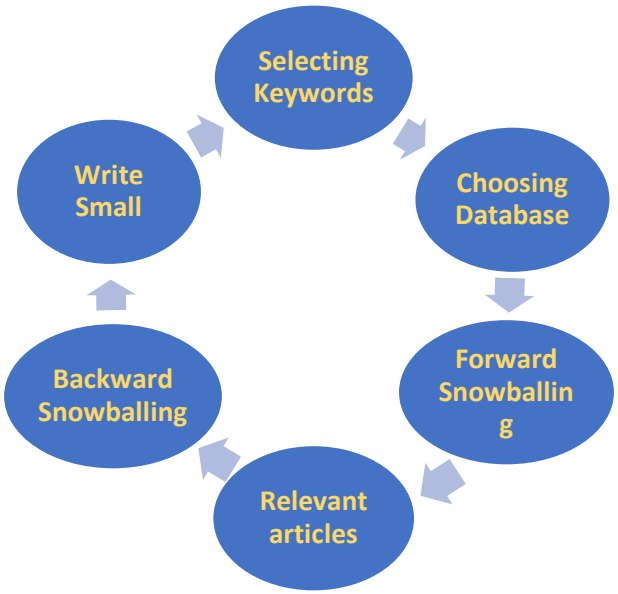

Figure 8 – A show of the iteration process in the literature review

BRANCHING OUT OF THE ITERATION – FOCUS ON WRITING

Once the decision is made to start the writing, the heavy lifting begins to translate the piles of reviewed documents into meaningful, understandable writing for chapter two. Writing the literature review is an arduous, grueling, and difficult, and nothing we say in this paper is meant to indicate otherwise. To add more complexity to the issue, we also note another difficulty that faces the writers once they start writing –writer's block. Figure 9 depicts cynically the stages and frustration that accompany going through the phases of writer's block.

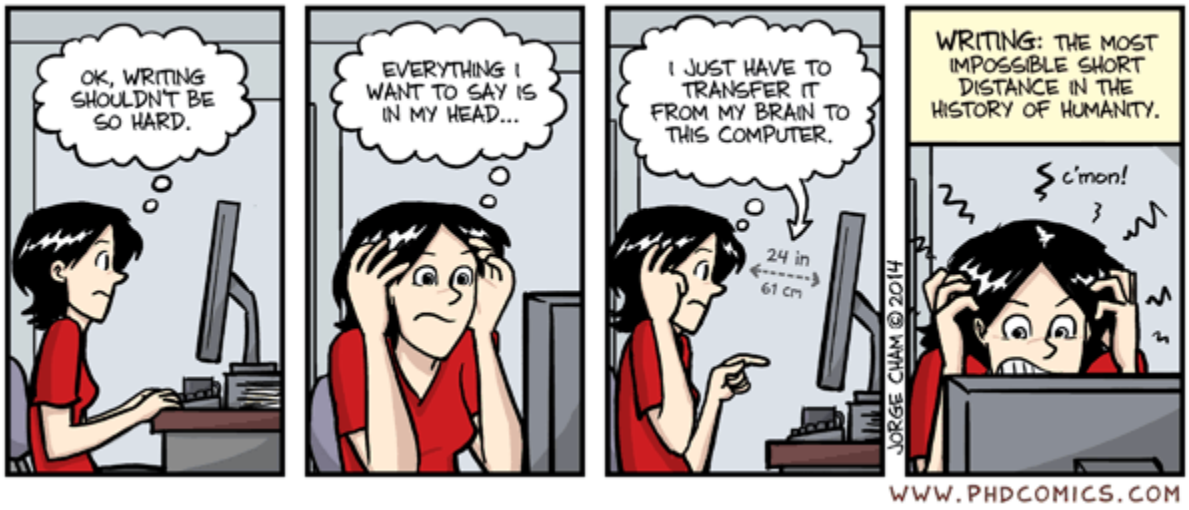

Figure 9 – Cynical way of representing the writer's block (Cham, 2014)

Huston (1998, p. 93) called it the "white page terror" and described it as "a stress reaction that paralyzes the ability to put thoughts into words." Castillo (2014) suggested that most writers (even long-practiced writers) experience this in one way or another. Bastug et al. (2017) noted that writer's block is related to certain cognitive and affective issues in the writing process. These issues intensify when writing doctoral dissertations, particularly in the literature review (Rose & Rose, 2009). For doctoral dissertations, the difficulties are more complicated due to the rigid rules and the shifting focus associated with writing doctoral dissertations (Rose, 1980).

There are many causes of writer's block. It could be related to unrealistic expectations (Huston, 1998) where writers expect to write a large amount of the literature in one session or to finish an error-free review in the same session. Lowering these expectations and putting them in a realistic image of the long and arduous writing of the chapter literature review could be helpful (Tubbs, 2017).

Despite the difficulties associated with writer's block, students need to progress and build upon what was reviewed. Taking the whole writing of the chapter on literature review as a one-step would not be possible for most researchers (Castillo, 2014). It could be counterproductive if attempted to do so (Huston, 1998). Instead, breaking down the writing process into smaller, more manageable steps will be more attainable.

Ali and Pandya (2021) tackled the issue of writing a research problem statement (a crucial step in starting to write doctoral dissertations) by breaking down the process into four stages. The suggested stages by Ali and Pandya start with writing simple statements to continue providing more support and then to the finalization stage. Regarding writing the literature review, a similar approach could be followed from the general standpoint but a different four stages that are more fit for writing the chapter on literature review. We suggest the following four steps to be followed in the writing of the literature review:

- Develop a rough outline
- Start the crude writing process
- Connect ideas
- Finalize the writing

Develop a Rough Outline

Starting by developing a rough, sketchy outline will be a good first step in the venture to writing the literature review chapter. Although a good number of sections in the literature review dissertation

chapter are specified, developing an outline that would include more than just a listing of the sections in the chapter can be helpful. A thorough outline goes beyond what was described before as doodling ideas should be developed. Instead, some complete sentences may need to be phrased in each section, although we do not suggest that the sentences and phrases be complete or connected here. The idea is to get moving with a rough outline and start the writing.

Lovering (2017) stressed the importance of developing a rough outline in writing research and explained these benefits that could be gained from developing a rough outline that could include the following.

- A rough outline assists in giving ideas about the structure of the paper and seeing if the information flows smoothly.
- The rough outline helps in selecting a better way to organize the information needed to be presented and the analysis and conclusion from the information that was gathered.
- A clearer picture of the direction of the writing could be drawn after drawing the draft, thus, clearing the way for a smoother writing
- A rough outline could change over time as the writing continues, new ideas emerge, and different old ideas may need to be taken out and so to continue the cycle of writing

The Crude Writing Process

What is meant by crude writing is simply to write and write more. Webster's dictionary defined crude as: "marked by the primitive, gross, or elemental or by uncultivated simplicity or vulgarity" (Merriam-Webster, n.d. a). Our interpretation of this definition emphasizes the primitive and the elemental parts as applied to writing a literature review to build out the chapter. The interesting thing about writing is that it connects the mind with the arms and hands (A. Becker, 2006). So, continuing the writing may be a good idea even if what was written does not make clear sense. The important point is to write the ideas reviewed and translate what was reviewed into *simple* writing. The emphasis here is on simple writing to keep the writing flow going. As more ideas are written, more connections to other ideas emerge, and the writing will be a step close to completion. Other tasks like following the correct formatting and checking references and citations could be postponed to a later stage for the sake of the continuation of writing. The point to be emphasized here is that writing continues, and as more writing is done, new ideas emerge, and these ideas need to be connected to give room for more writing.

Connecting Ideas

Next, we suggest connecting ideas that were written in the previous step. Connecting the basic sentences written in the crude-writing step to make full paragraphs helps in proceeding with the writing. It is also helpful to check the flow of writing and how the work is progressing. Ideas can emerge from the beginning and through the different sections as the writing continues.

Connecting ideas can be addressed at the writing and subject levels of the topic being discussed. The University of Melbourne (n.d.) published an article that suggested connecting ideas at the sentence and paragraph levels. Most notable from these suggestions are ideas about the connectedness used at the sentence and paragraph levels. According to Melbourne University, these connectedness words or phrases present the ideas clearly and cohesively. Some software tools (like Grammarly) may help with this, but it is no substitute for a thorough review by the writer.

Connecting ideas need to be taken care of at the topic level as well to ensure that the information presentation flows clearly and consistently. Wiesner-Groff (2021) suggested dividing the writing into main topics and sub-topics. Wiesner-Groff also suggested dividing the writing according to a structure that links the different topics (main topic and subtopic). Hence, the reader clearly understands the main topic and how the sub-topics support them.

Finalization Stage

This is the last sage that we suggest to be followed. At this stage, we suggest going through all that has been written and ensuring it is all correctly stated and all points are correctly aligned and connected. The main points to check at this stage include:

- Checking proper formatting (APA or others)
- Checking that the references are properly cited
- Check the clarity of the flow of information
- Checking for punctuation
- Checking for completeness, all ideas that need to be included are properly included and cited
- Cross-check the citations and the references ensuring all references are cited and all citations have a corresponding reference.

A good idea here is to check with assessment rubrics if they are available in academic programs for which the dissertation is being prepared. Assessment rubrics may serve different purposes. Cabigao (2021) identified three questions that rubrics could answer:

1- What do educators want students to know and be able to do?
2- How well do we want students to know and be able to apply or use a skill in a concept?
3- How well teachers and other scorers determine when a learner knows a concept and does an activity well

De Silva (2014) echoed the same ideas about rubrics and noted further that rubrics affect performance in writing. Despite these notes, a point is that not all academic programs have rubrics (Agu et al., 2015). It could be worthwhile to consult checklists and rubrics published for this purpose. For example, Leite et al., 2019) prepared an elaborate literature review checklist that included many items. These can be consulted to ensure that the literature review chapter is complete. At the same time, rubrics could be subject to wide disagreement on what is being covered and how the items are judged. In a case like this, the research could be helped more by double-checking the rubrics if available. At the same time, it would be more robust if a manual check of all the sections of the literature reviews chapter is completed both ways, along with checking the rubrics.

Figure 10 shows a view of the steps suggested in these sections about starting the writing and then completing the finalization stage.

Figure 10: Suggested four steps for writing the literature review

Putting It Together

After going through the steps to explain and elaborate on the different points that need to be addressed in organizing and writing the literature that was collected, it is time to show all these steps together in one figure. Showing the figures together gives a clearer glimpse of the four phases that were discussed in this paper. It also works as an effective summary of what was covered earlier in the paper.

The result of what was intended in this study is presented in the form of a figure (Figure 11) that shows the four phases we covered. The first figure is about identifying the prerequisites for writing the literature review. The figure has a waterfall format to show the preference for coverage. The

second shows the corequisites, suggesting skills that would help with organizing the literature. The third figure is presented circularly to show the repetitive nature of these steps. The fourth is the writing process which we divided into four sections for simpler management of the reviewed literature and the review's writing. All four figures are combined into one figure below to present one glimpse of what was covered in this paper.

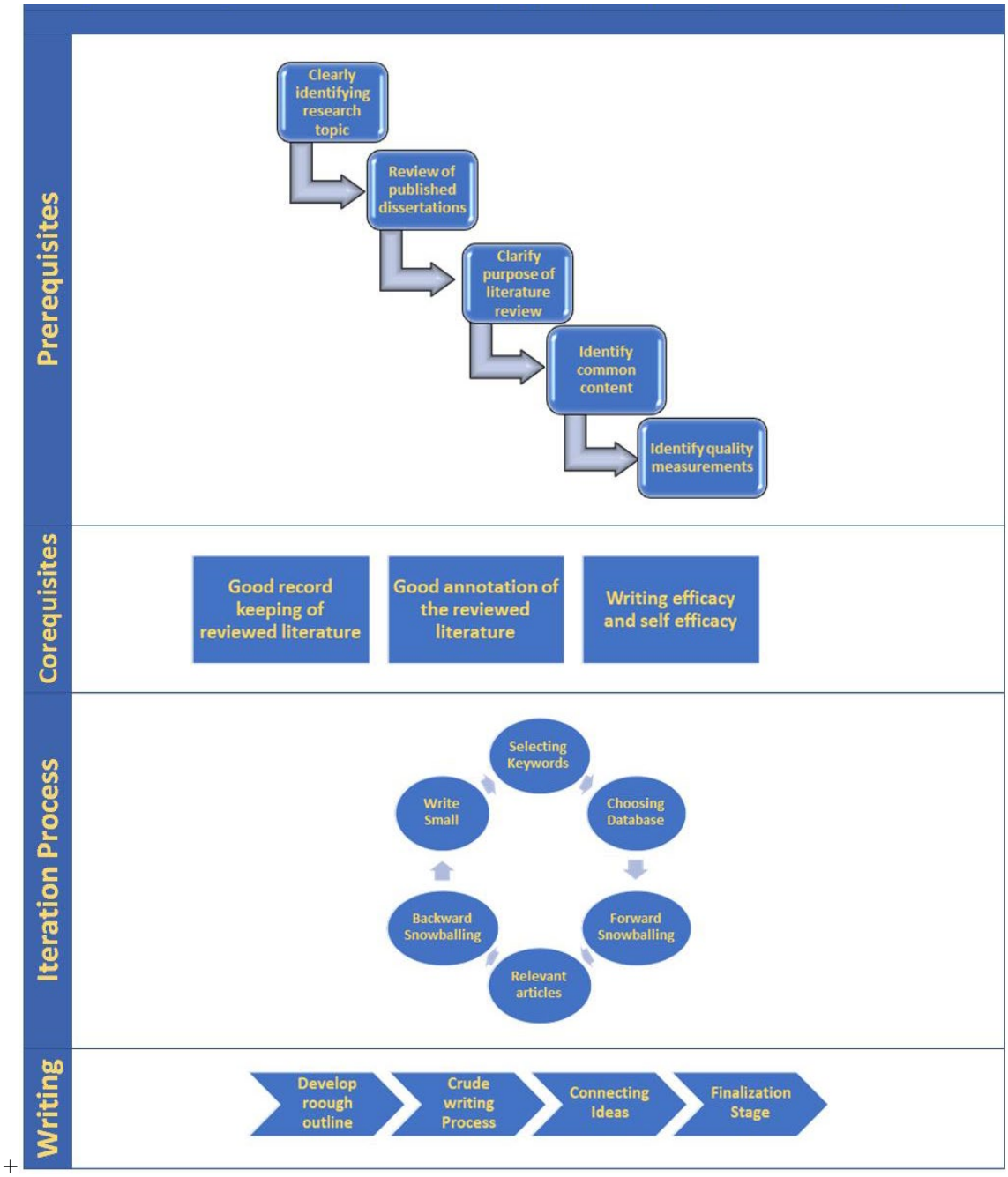

Figure 11 – Putting it Together, Phases of Writing Chapter 2 of Doctoral Dissertation

SUMMARY AND SUGGESTIONS FOR FUTURE RESEARCH

Writing the literature review chapter of doctoral dissertations is an arduous process that could last a long time and has the potential to make or break a dissertation. The main contributing factor to the

failure to complete the literature review chapter is a lack of knowledge about what goes on in a literature review from two viewpoints: writing and preparation. This paper attempted to fill this gap and explained the factors that go into the writing of a literature review from the following perspectives:

- To clarify what is needed to learn about literature review before starting it
- What is helpful to have during the review of the literature
- The repetitive nature of reading literature and recording reviews
- Overcoming the writer's block and focusing on the writing process

In our view, our coverage of the literature review in this paper helps organize the literature review and makes known all factors related to the writing of the literature review, which students have major difficulties in completing. However, there are other sections that students have challenges with, and we feel we can help. A major challenge that students have difficulty with is aligning the major sections of chapter one in the doctoral dissertations. Aligning these sections of chapter one proved to be a major challenge for many students. Such correct alignment could prove to be a major turnaround if completed properly during the writing of the doctoral dissertation. We feel that we have the expertise that we can provide suggestions and give ideas on how to align the main sections of chapter one and then continue a smoother ride toward the completion of writing the dissertation. So, we plan to shift the focus of writing to chapter one, and we plan on writing on how to align the main sections of chapter one of doctoral dissertations.

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