THINKING ABOUT THINKING
IN WRITING

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Abstract:
Critical thinking is part of problem solving. Researchers often see the writing process as a process of solving problem. Writers are expected to apply information they already know to gather materials suitable for their essays. They have to use declarative knowledge to practice the skills of analyzing information, and synthesizing information. Next the writers need to use procedural knowledge to make decisions to download the content of the essay. However, not all materials gathered are suitable for their essay. They also need to use metacognition to evaluate information to make the materials work best for their writing task. This qualitative study explores the connection between critical thinking skills and the writing process. Open-ended responses from 20 post-graduate students who attended research writing course were analyzed based on categories of critical thinking skills used in their writing process. Findings reveal interesting implications towards learning and teaching academic writing to postgraduate students. The significance of this study is two-fold. Firstly, findings in this study will reveal how writing mirrors the thinking process. Secondly, the results of this study will encourage writing teachers to focus on the learners' thinking process as much as their writing process in the teaching of writing.

Keywords: critical thinking, problem solving, declarative knowledge, procedural knowledge, metacognition

1. Introduction

1.1 Background of Study

We are sometimes confronted with a course-mate, colleague, family member or friend who is known for his/her blunt criticism. Can that person who criticizes frequently be said to have critical thinking skills? Hayes (2014) presented Socrates view of education as "*the awakening of the mind to the need for criticism, and then to the uncertainty of the principles by which it supposed itself to be guided.*" Hayes (2014) said that everyone assumes when they criticize, they are displaying critical thinking skills. Becoming a truly critical thinker is difficult because many begun with

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criticism without going through "*the awakening of the mind*." Socrates puts knowledge above everything else. Only with knowledge can a person begin to criticise. Therefore, critical thinking skills ought to begin with knowledge.

On another note, writing is seen as fun by early writers. Learners learning to write enjoy writing narrative or descriptive essays. They regurgitate what lies in their mind. They tell what they recall. They merely "knowledge-tell" what they want to write. Nevertheless, the ability to "re-tell knowledge" and "transform knowledge" is what differentiates between a novice and an expert writer.
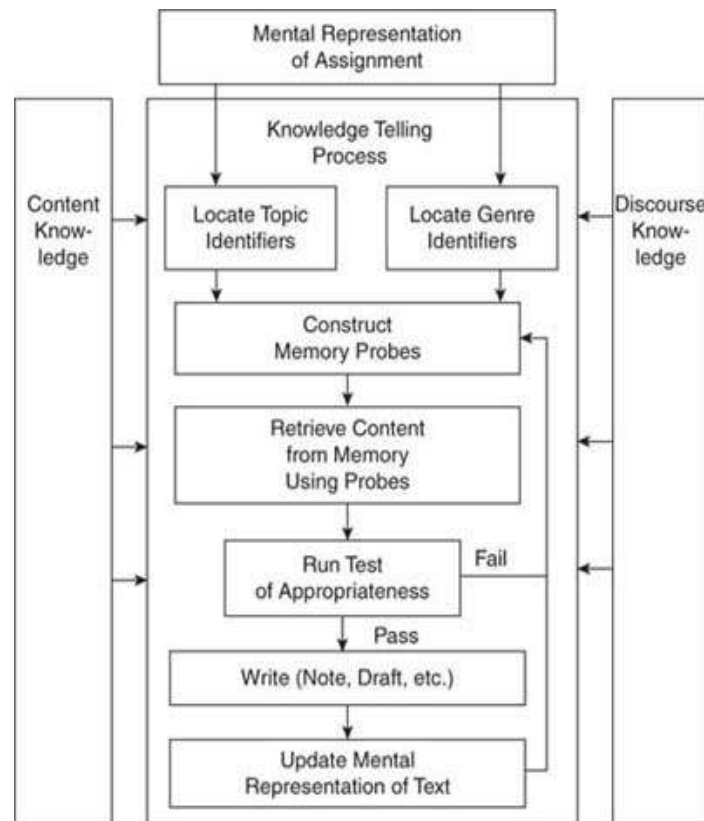

Figure 1: Knowledge Telling Model
(Bereiter and Scardamalia, 1987)

Figure 1 above shows the writing process of a non-expert writer. Bereiter and Scardamalia (1987) state that this person is using the knowledge-telling model. The non-expert write needs only two main types of knowledge to begin writing; content and discourse knowledge. A non-expert writer begins the writing assignment by recalling ideas from his/her memory (he/she constructs memory probes for topic and genre). The writer then continues to retrieve more content to suit his/her past knowledge on genre. The writer then makes a quick decision (test of appropriateness, Figure 1) to use the recalled content and genre information. The writer then soon begins to write the essay. That is why non-expert writers not only begins writing earlier than the expert writers, he/she (non-expert writers) also often feels that essay writing is easy. The first draft by the non-expert writer is usually the only draft written. Once the writing is done, the writer checks through the writing using his/her memory (update mental representation of text, Figure 1).
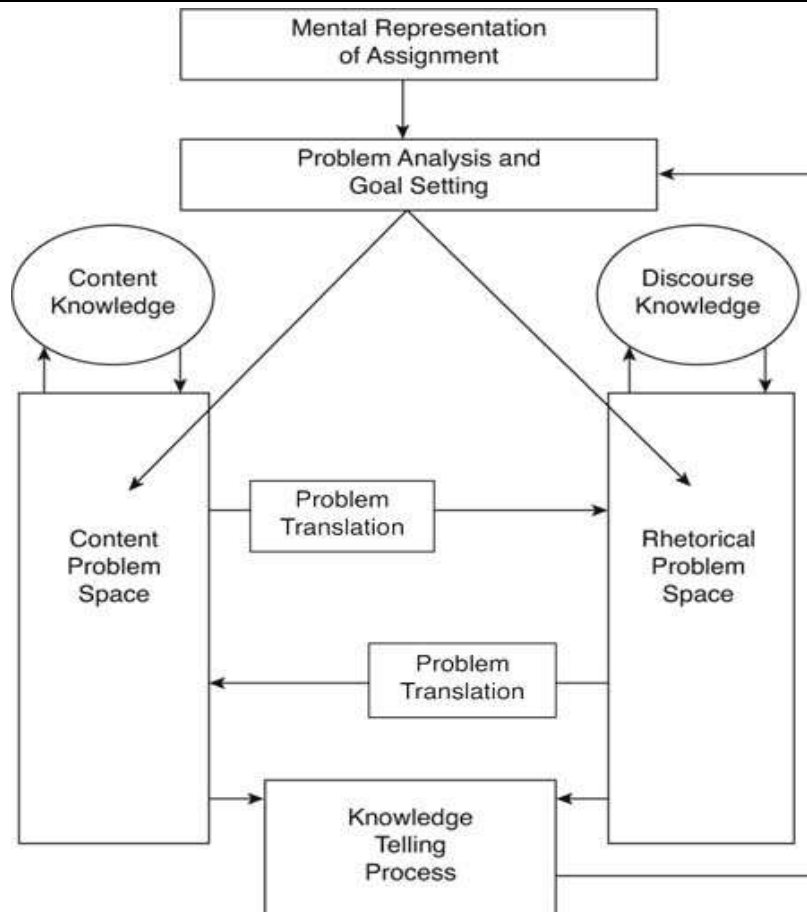
Figure 2: Knowledge Transforming Model
(adapted from Bereiter and Scardamalia, 1987)

Figure 2 presents the thinking process of an expert writer. Bereiter and Scardamalia (1987) reports that the expert writer begins the writing assignment by making plans (problem analysis and goal setting; Figure 2) about the essay writing. This plan is made with the content knowledge and the discourse knowledge that the writer has (or do not have). Solving (after translating what the problem is) content problem space would be making efforts to add suitable content in the essay. Solving rhetorical problem space (after translating /understanding what the problem is) would be making efforts to understand the rhetorical demands of the assignment. After this the writer will then depend on his/her memory on content or discourse knowledge (knowledge-telling process) to complete the writing assignment. According to Bereiter and Scardamalia (1987), solving a problem for an expert writer may lead to the generation (and further solution) of another problem. For example, an expert writer found that he/she needs to add more ideas in a paragraph. Addition of an idea, would mean "where do I get it?", "how can I support the addition of this new idea?", "can this new idea fit into my existing framework" and many more problems. This expert writer has in fact used his/her critical thinking skills to make decisions on problem translation and problem solution while he/she writes. He or she makes decisions to analyse, synthesise, evaluate and even apply information in the whole writing process.

1.2 Problem Statement

Many would agree critical thinking, just like writing, is difficult to acquire and even teach. Whitmore (2017) said that critical thinking skills is used beyond what is taught by the teacher. Learners are taught to understand knowledge. They are given practices and drills to recall content knowledge. However, critical thinking is taught beyond the content. Learners are prompted to use their critical thinking skills when they need to think about what they have learnt/understood. If teaching critical thinking beyond teaching content, then perhaps it can (is) actually taught in non-sciences subjects. So, this study is done to explore the use of article thinking skills in the writing process.

Critical thinking skills can be incorporated into the writing process. Whitmire (2017) reports that critical thinking is difficult to define, hard to transfer from one setting to another, and challenging to measure and assess. He suggests that teachers reinforce critical thinking with other skills. As such, Cavdar & Doe (2012) proposes that good writing assignments can encourage students to practice critical thinking skills. He feels that here is a need to look into what makes up the components of critical thinking in order to know if critical thinking skills is indeed incorporated into the writing process.

Writing can be seen as a thinking process. Bereiter and Scardamalia (1987) good writers actually use their critical thinking skills in their writing journey. Bereiter and Scardamalia (1987) also state that what differentiates between novice and expert writers is the use of critical thinking skills while writing. Ideally, using critical thinking skills can make writers become good writers. However, writers are not using critical thinking skills as part of their writing process. So, this study is done to explore the use of "thinking about thinking" as part of their writing process.

1.3 Objective of Study

The main objective of this study is to encourage the use of critical thinking skills in the writing process. Specifically, this study investigates how declarative, procedural and metacognition are expressed in the writing process.

1.4 Research Question

This study hopes to answer the following questions;
1) How are critical thinking skills expressed in learners' declarative knowledge?
2) How are critical thinking skills expressed in learners' procedural knowledge?
3) How are critical thinking skills expressed in learners' metacognition?

1.5 Significance of Study

The significance of this study is two-fold. Firstly, findings in this study will reveal how writing mirrors the thinking process. Secondly, the results of this study will encourage writing teachers to focus on the thinking as much as the process in the teaching of writing.

2. Literature Review

2.1 Introduction
2.1.1 The Writing Process
Writing is a process that involves the combination of three components. Figure 3 shows the theory of the writing process by Flower and Hayes (1981). The theory states that writing involves three components; (a) the task environment, (b) writer's long-term memory and (c) writing process. The first component refers to the task environment. Upon receiving the assignment, the writer needs to consider how he/she can make plans to accomplish the task (writing task).
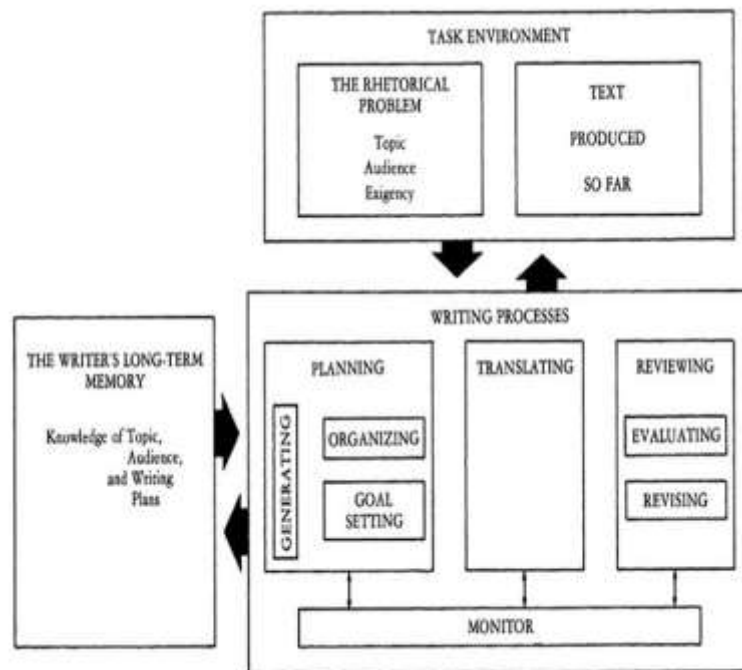
Figure 3: Writing Process
(adapted from Flower and Hayes, 1981)

2.1.2 Problem Solving Skills in Writing
There are two ways of being excited by motives to solve the problem and these ways are meaningful in the educational field. Dostal (2015) states that there are two ways where problem solving is presented to learners in the classroom. The first way is to create a situation that excites the student to want to participate in the problem. However, the interest about the problem solving has to be aroused by the teacher which enables to satisfy the needs resulting from the unfamiliarity. This need is called the cognitive need. The need is satisfied when the problem is solved. The second way involves the application of external stimuli. This external stimulus causes inner motives that are resources of satisfying the learner's individual needs. Learners' desire to solve the problem and satisfaction of the needs regarding its solution the individual him/herself orients to the effective solution of the problem. The purpose stays in this case outside the problem itself because the problem plays only a vicarious role. The pupil solves the problem in order to achieve the aim and the problem solving becomes only a resource. This is in terms of educational results not as beneficial as when the interest in the problem itself appears. This

happens when teachers give students case studies to solve as part of problem-solving skills practice. Either way, critical thinking remains as part of the utilization of problem-solving skills.
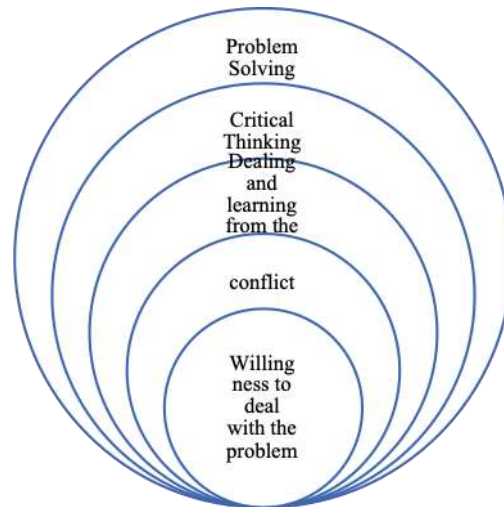
Problem Solving

Critical Thinking Dealing and learning from the

conflict

Willing ness to deal with the problem

Figure 4: Relationship between Problem Solving and Critical Thinking
(adapted from Dostal, 2015)

2.2 Critical Thinking

Critical thinking can be defined in many ways. Al Sharadgah (2014) defines critical thinking as the search for information and through this search, the learner acquires critical evaluation skills to make choices of articles, and also decisions about those choices. According to Quitadamo and Kurtz (2007), critical thinking includes analysis, inference and evaluation. Analysis involves breaking a concept or idea into component pieces to understand their inherent relationships. Inference is used to reconcile what is known with what is unknown while evaluation considers available evidence with a view to arriving at reasonable conclusions. Edward Glaser (1941) defines critical thinking as "*The ability to think critically*". This ability involves three things (figure 4):

1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences,
2) knowledge of the methods of logical inquiry and reasoning, and
3) some skill in applying those `methods.

Understand the Problem (through experience)

Has knowledge for methods of Logical Inquiry
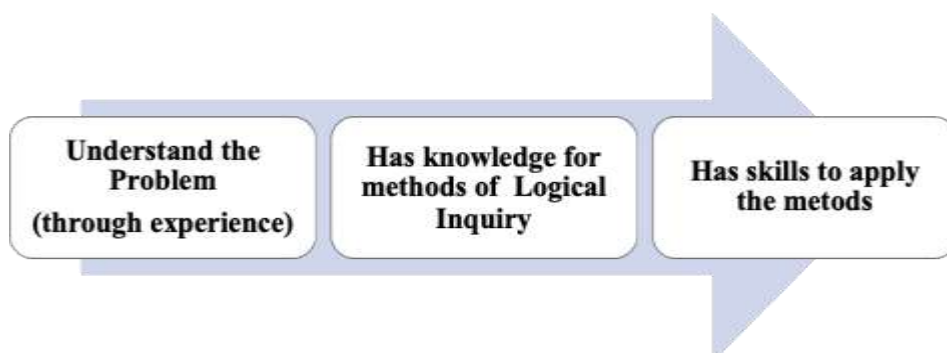
Has skills to apply the metods

Figure 4: The Ability to Think Critically
(adapted from Glaser, 1941)

Critical thinking involves using several related skills. A critical thinker needs first to understand the problem. This person can understand the problem better if he or she has had experience dealing with or solving similar problems. Only through understanding can a person begin logical inquiry. The person's previous knowledge can also help him/her make logical inquiry. Finally, the ability to think critically is also paired with having the right skills to apply appropriate method to make logical relationships, to make judgements or even make decisions about any issue.

However, having the ability to think critically is not enough. A person needs to know that there are three sides of critical thinking. Kurfiss (1988) underlines three sides of critical thinking (Figure 5): declarative knowledge: the facts and concepts of the discipline or field; procedural knowledge: how to reason, inquire, and present knowledge about the discipline; and metacognition: being able to evaluate the outcomes of the thinking process. Metacognition is thinking about one's own thinking (Sendag & Odabas, 2009). This concept of "thinking about thinking" is an important component of critical thinking.
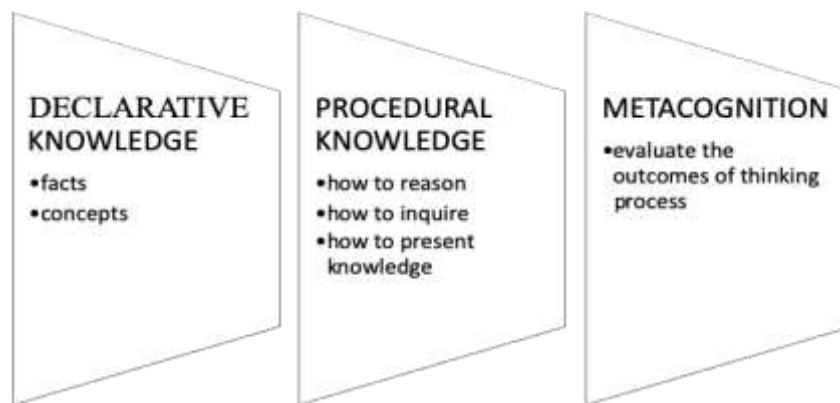

Figure 5: Three Sides of Critical Thinking
(adapted from Kurfiss, 1998)

Critical thinking skills can sometimes be embedded in writing activities. Scriven & Paul, (2004) listed four critical thinking skills (Figure 6) in writing and they are: (a) Applying Information, (b) Analysing Information, (c) Synthesizing Information, and (d) Evaluating Information. The ability to evaluate information can then facilitate the writer to solve his/her writing problems.
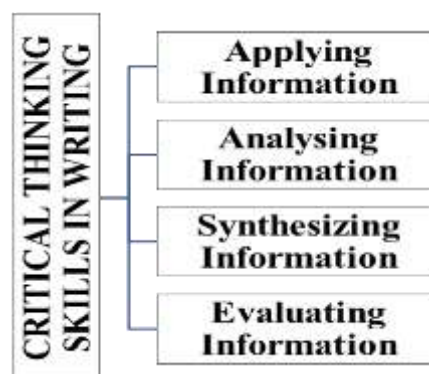

Figure 6: Critical Thinking Skills in Writing
(adapted from Scriven & Paul, 2004)

Firstly, the writer needs to apply his/her information (previous knowledge). The next stage of where critical thinking skills is used is the stage where the writer analyses the information. Analysing information is an important step in writing. Failure to do so would leave the writer only knowledge telling about what he or she has accumulated. Information is reported the way they were presented and may not have any connection to what the writer intends to portray. Finally, good writers need to evaluate the information accumulated. Not all data is reliable, and not all information is useful for the writing. The critical thinker needs to have some elements of reasoning. According to Commanger (1992), the critical thinker has to look for the purpose of the material. He or she needs to question the issues presented before making assumptions and inferences about the materials. The critical thinker needs to look for evidence before accepting any point of views

2.3 Past Studies

Past studies have shown how the process of writing mirrors critical thinking among writers . Different writing activities given by the teacher in the class can foster the use of critical thinking skills in a variety of ways. This section discusses past studies related to writing and critical thinking skills.

Non-traditional writing tasks can lead to a higher level of mastery of content subjects. A study was conducted by Sinagan & Feranie (2017) to identify the impacts of embedding non-traditional writing tasks within the course of modern physics. This quasi-experimental study was conducted on students of Physics Education and Physics Study Programs. The students underwent pre test and post test. The students were given tests on conceptual mastery, tests on critical thinking skills, and a rubric of writing assessment. The data were analyzed by determining the percentages of average normalized gains, Cohen's d, and correlational analysis.

The findings revealed significant difference in the increased conceptual mastery and critical thinking skills. The findings also showed that there was a difference in the writing quality of the students of the Physics Education and Physics Program. There was a correlation between writing quality and conceptual mastery with a high degree relationship and there was a correlation between writing quality and critical thinking skills with a low degree relationship. In addition to that, there was an increased conceptual understanding influenced by the writing domain.

Carefully selected writing tasks can sometimes help to improve critical thinking skills. Alidmat & Ayassrah (2017) examined self-reported perceptions, experiences and opinions by Maritime English students of Aqaba College in Jordan who take an ESP course and who are supposed to develop their critical thinking skills through carefully selected writing tasks in English. This qualitative study used in-depth interview and explored a sample of 10 finalist undergraduate informants on issues related to their writing tasks in English. Findings of the study revealed that there was low correspondence between writing tasks contained in the ESP programme and critical thinking skills. Writing tasks featured in the programme pursued more mechanical writing than thinking.

Sometimes, internet-based writing can help improve learners critical thinking skills. The study by Al Sharadgah (2014)investigated the effectiveness of a writing program on improving Salman bin Abdulaziz University students' critical thinking skills after participating in a seven-

week task-treatment using an Internet-based writing program (IBWP). This programme was developed by the researcher. The subjects were 98 male students who enrolled in a writing course during the first semester of the academic year 2013/2014. The effectiveness of the program was measured by a holistic critical thinking scoring rubric developed by Facione and Facione (1994). The subjects were randomly assigned into two groups. The first group was an experimental group who was taught writing via the Internet-based writing program IBWP. The second group was a control group and the group were taught through the ordinary method. The findings of the study revealed that EFL students in the experimental group who used the IBWP showed greater improvement in their critical thinking skills than did the EFL students in the control group who used the ordinary method.

In addition to that, reading can be a good practice for critical thinking skills. Academic writing process often involve more than just writing skills. The writer needs to read the articles / material to elicit content for the academic essay. This reading process performed by the writer is said to be a critical thinking activity because the writer goes makes several decisions. The study by Hosseini, Khodaei, Sarfallah, and Dolatabadi, (2012) investigated the relationship of critical thinking ability, reading comprehension and reading strategy use among 70 male and female Iranian university students majoring in English Translation and English Literature. The data was collected through the TOEFL (Test of English as a Foreign Language) reading comprehension test, a critical thinking ability test and Reading Strategy Inventory. The findings revealed that there was a significant positive relationship between Iranian English as a Foreign Language (EFL) readers' critical thinking ability and reading strategy use, in general and metacognitive and cognitive reading strategy use, in particular. Moreover, a significant positive relationship was observed between critical thinking and reading compensation.

Writing courses at postgraduate level may help students practice their critical thinking skills. The study by Vyncke (2012) used in-depth interviews with three postgraduate students to investigate the students' interpretations of critical thinking, the factors which they perceive to affect the implementation of critical thinking, and the perceptions of their development as critical thinkers. The findings revealed that the students, despite coming from different traditions of discourse, have a fairly comprehensive understanding of critical thinking and willingly engage with it. The findings also revealed that although cultural background plays a role in influencing their writing styles, the students have the capacity to learn and master a new discourse. The problems they encountered were due to uncertainty in demonstrating an argument, insufficient subject knowledge, and problematic issues surrounding the essay genre, such as authorial voice and assessment demands. Implications for university departments and tutors are that they should review their writing instruction and guidelines so as to make the requirements of argument more explicit and easily understandable, and in the long term, to re- evaluate the norms of the traditional essay form to accommodate a wider spectrum of expression.

2.4 Theoretical Framework

Not all types of writing demand the use of critical thinking skills. Compositions that only involve mechanics like narrative, and descriptive writing can be written without the use of critical thinking skills. However, academic writing involves thinking about the writing, making plans,

etc. This "thinking about thinking" in the writing process involves many levels of critical thinking skills.

Figure 7: Theoretical Framework of the Study: Thinking about Thinking in Writing
(adapted from Commanger,1992; Scriven & Paul, 2004)

The theoretical framework of the study (Figure 7) is rooted from a compilation of past studies. The characteristics of critical thinking skills in writing (Scriven & Paul, 2004) is mapped onto the three sides of critical thinking (Commanger, 1992) to form a new relationship of strategies of "Thinking about thinking" in Writing.

Critical thinking skills among writers can be utilized in three different levels; using (a) declarative knowledge, (b) procedural knowledge and (c) metacognition-although in actual fact, skills of metacognition are seen at every level. During the writing process, declarative knowledge is used when the writer applies information to begin the search for materials to support the content of the writing. Next, the writer undergoes procedural knowledge when he/she analyses the information. This is when the writer decides to either use the materials or to discard it altogether. This is also the stage where the writer examines the suitability of the content of the material chosen. The writer then uses another level of critical thinking ability to synthesize materials chosen to fit into his/her framework of writing.

The use of metacognitive skills is actually apparent at every level, although the product of this metacognition is seen at the end. This is the stage where the writer analyses the take-aways he/she has developed from the reading/analysis activities. This is the also the stage where the writer evaluates and re-evaluates the information take-aways from the whole reading/thinking processes.

3. Methodology

3.1 Research Design, Population and Sample
This is qualitative research is done to explore the extent of the use of critical thinking skills in the writing process. The population is taken from a group of post-graduate students who had undergone a semester of research writing. 20 samples were purposively chosen to participate in this pilot study.

3.2 Instrument
The instruments used was a set of open-ended questions of the writers' perception on their experience during the write-up of research writing assigned to them throughout the semester.

The questions were divided into 4 main categories based on Scriven & Paul (1992); applying information, analyzing information, synthesizing information and evaluating information. The answers that writers responded to is then sub-categorised into "challenges faced", "how did you solve?" and also "what did you learn?" These three categories were adapted from Dostal (2015) in Figure 4 and they are (a) conflict, (b) willingness to deal with the problem and (c) learning from the solution.

3.3 Method of Data Collection and Data Analysis

Data was collected through students' responses in the open-ended questions. The data was analysed based on the responses and the responses were coded based on the categories by Commanger (1992); as well as Scriven & Paul (2004).

4. Findings

4.1 Introduction

This section reports the qualitative findings for the data collected. The data is analysed based on the categories by Commanger (1992) and Scriven & Paul (2004). The writing process involves the writer solving problems throughout the writing process. According to Dostal (2015), critical thinking is part of problem-solving skills. Writers use critical thinking and problem-solving skills in the writing process throughout the process of using knowledge and facts from materials obtained. Technically, the writing process demands that the writer analyzes and solves problems as they write. This section presents the answers the three research questions and they are;

1) How are critical thinking skills expressed in learners' declarative knowledge?
2) How are critical thinking skills expressed in learners' procedural knowledge?
3) How are critical thinking skills expressed in learners' metacognition?

4.1.1 Expression of Critical Thinking Skills in Learners' Declarative Knowledge

Applying Information

Challenges/Conflict	Dealing with The Problem	Learning from the Solution
• Finding articles to related topics • Findings recent articles • Could not find research-based articles	• Use keywords • Extend keywords, make keywords more specific • Use multiple keywords to search for articles • Some even paid for the journal articles	• Keywords are very helpful • Learnt about how people write research and use as models/examples

Table 1: Findings for "Applying Information"

An analysis of the responses for "applying information" revealed how writers searched for articles to support their research writing. Table 1 shows the accumulated data from the writers' open-ended responses. The responses were analysed and the common comments were found. Writers faced conflicts, they dealt with the problem and they then learnt from the solution. Among some of the common challenges faced are "finding articles related to topics", "finding recent articles", "inability to find research-based articles". Next, writers responded to the

challenges by dealing with the problems. Some writers use keywords, some extended the keywords to make the keywords more specific, while some even paid for the articles. What did the writers learn? They found that having specific keywords were helpful. They also felt that they learnt about how people write their research and decided to use some research as models. The process of critical thinking involves problem solving in the process of writing. So, this process involves facing challenges, learning to solve the challenges and the getting the "take-away" from the process application of information. Some responses for Applying Information is seen below. (Table 1).

4.1.2 Expression of Critical Thinking Skills in Learners' Procedural Knowledge

Analyzing Information

Challenges / Conflict	Dealing with the Problem	Learning from the Solution
• Some articles had good content, some did not fit the criteria • The keywords led to too many articles, sometimes unnecessary ones • Some information contradicts with topic • Hard to pinpoint the exact information that was needed • Led to overgeneralization of scope • One keyword leads to an endless search • Found too many articles and wasting time reading too much, lost focus • Style of writing difficult to understand	• Take down notes, read to understand better • Only chose articles I can understand • Prepare a table so I can list information into categories • Focus on the topic of assignment • Summarize each article used • Collect and compare the information before building the foundation of the theories • Focus on "what I need" only	• Critical reading • Improve reading skills • Divergent articles enrich my knowledge to decide key points or main ideas • Learn to establish scope

Table 2: Findings for "Analyzing Information"

Another thinking strategy in writing in by analyzing information. Table 2 shows the responses by writers on analyzing information. Problem solving begins with facing challenges, then dealing with the problem and finally, learning from the solution. In the process of analyzing information, writers may face some challenges. For one, writers may find out that their initial keyword has led to more confusion – "*the keyword led to more articles, sometimes unnecessary","led to over-generalzsation of the scope*" (Table 2). How did the writers deal with the conflict? One writer chose to "summarize each article" first, another writer learnt to "focus only" on what she needed. What is the take-away from the conflict resolution? Some said the learn to improve their "reading skills", and another said she used her "critical thinking" skills.

Synthesizing Information

Challenges/Conflict	Dealing with The Problem	Learning from The Solution
• Summarizing details takes great focus • Time consuming • Summarizing is difficult • Difficult to narrow down	• Read more • Be selective and critical • Focus on understanding • Make comparison with other articles • Come up with a table and fill in the information	• New knowledge • Proper organization of ideas • Get specific ideas • Model good writing from articles

Table 3: Findings for "Synthesizing Information"

The process of synthesis is one of the most difficult skill to master by writers. Some writers attempted to synthesize but ended up summarizing related writings by other writers. Table 3 presents the findings for synthesizing information by writers. Some conflicts writers faced are "summarizing needs focus", "synthesizing is time-consuming", and many found it "difficult to narrow down". "Narrowing down " refers to the attempt of the writer to synthesize what he/she has read form past writers. The postgraduate writers in this study felt that they can better synthesize if they "read more, "be selective and critical", and a few also mentioned they "come up with a table to fill in information" read. Interestingly writers felt they gained "new knowledge", and some also "modelled good writing from the articles".

4.1.3 Expression of Critical Thinking Skills in Learners' Metacognition

Evaluating Information

Challenges/Conflict	Dealing with The Problem	Learning from The Solution
• Cannot see relationship of ideas • Cannot make relationship with past studies • Not enough information • Feeling of redundancy	• Find more articles • Read to link • Find the association	• Don't be quick to conclude • Be better organized checking • Fresh insight • Adapt • Summarize

Table 4: Findings for "Evaluating Information"

In the writing process, evaluation information is equally important as the other stages in writing. Table 4 shows the findings for evaluating information in writing. Writers report that they when "cannot see the relationship of ideas", or they "cannot make relationship with past studies", they therefore, find it difficult to evaluate the information. How did they deal with this conflict? Some looked further for "more articles", and also focus their reading to "find the association" in what they are reading. Some writers felt this activity helped them to be "better organized", while others found they gained "fresh insight" of the issue.

5. Conclusion

5.1 Summary and Discussion

The qualitative findings of this study revealed how critical thinking skills in embedded throughout the writing process. Firstly, writers use their previous declarative knowledge to apply the information that they found in their search. The writers were given an equally

thorough task of information search at the beginning of the writing process. This is a rather non-traditional writing activity and writers were able to see the link between using good material in their writing. This is also agreed by Sinagan & Feranie (2017) who reported that sometimes non-traditional writing activity can help boost writers' confidence in future writing. Next, the writers in this study agreed that good writing is coupled with critical reading skills. Writers need to read articles and make decisions about the articles. The study by Hosseini, Khodaei, Sarfallah, and Dolatabadi, (2012) also found that critical thinking ability, reading comprehension and reading strategy are all important components of writing. The postgraduate writers in this study reported that among some of their take-aways form the writing process was the opportunity to improve their ability to evaluate information. This is also agreed by Vyncke (2012) who found that writing-related activities among post-graduate students helped improve writers critical thinking skills.

5.2 Pedagogical Implications

Writing is thinking; the whole process of academic writing requires the writer to make a variety of decisions at different levels in writing. A writer begins the writing process by reading, the reading process requires critical thinking skills. Then the writer attempts the first draft. Evaluating the draft requires the writer to sue critical thinking skills again. If there are changes to be made, the writer writers again. This whole writing, reading and critical thinking process forms a cycle (Figure 8) of thinking and writing.
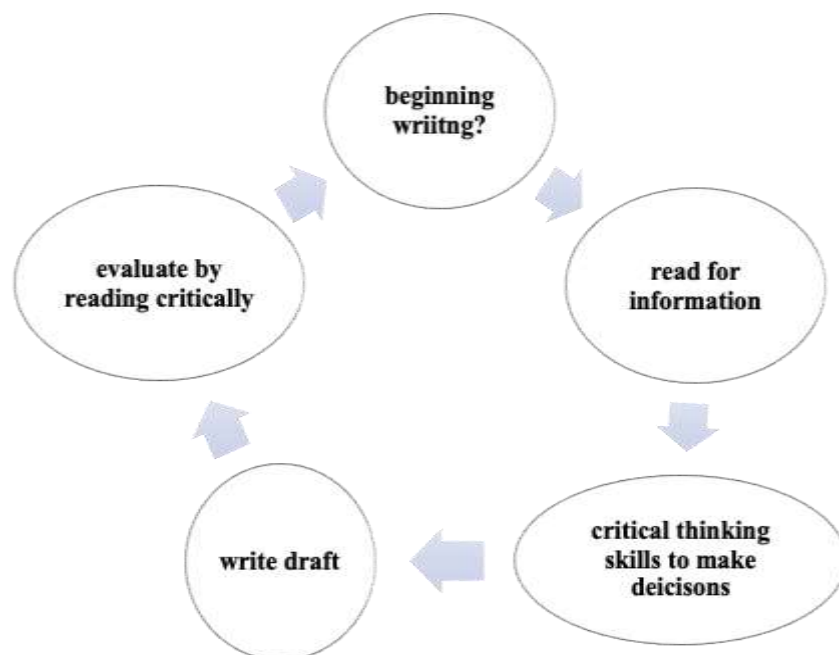

Figure 8: The Cycle of Thinking and Writing

Good writing involves good planning. According to Bereiter and Scardamalia (1987), skilled writers use their critical thinking skills when they transform information from sources to be used in their write-up. In addition to that, Willingham (2007) also reports that with deep knowledge, thinking can penetrate beyond surface structure. This means the writer need to "think about his/her writing" throughout the writing process-a lot of thinking goes into the

writing process. However, Hayes (2014) says hat critical thinking is not a mechanical task, to have critical thinking skills is not merely being able to criticise. Criticising is a responsibility that the critical thinking has to take on. Criticising involves making decisions and the decisions has to be made from informed choices.

The product of writing process is more than just the completed composition written by the writer. The writer gains more than just declarative and procedural knowledge. Bereiter and Scardamalia (2014) mentions "*psychological constructivism*" to indicate that learners build their own knowledge, and this can be done through writing. How did the writer gain psychological constructivism? When a writer writes, he or she is faced with problems-rhetorical situation. According to Rahmat (2019), this rhetorical situation deals with two aspects. The first aspect deals with how the writer views the issue and the second aspect of rhetorical situation is how the audience views the issue. So, just as writing, critical thinking is a skill that can be taught. Busch (2017) suggests that writing teachers encourage students to build awareness, understanding and control of their thought processes This is also known as metacognition. So, the choice of writing assignments can further encourage writers to practice their critical thinking skills.

5.2 Suggestions for Future Research

It would be interesting if future research explored the thinking process that goes in the writers' mind when they write. This can be done through think aloud protocol. Thinking can improve writing. Can writing improve thinking? What aspects of thinking lead to good writing? Further research can explore in-depth the relationship between reading, writing and thinking.

Acknowledgement

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