EXPLORING COGNITIVE PROCESS OF RESEARCH TOPIC SELECTION IN ACADEMIC WRITING

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Abstract: The purpose of this research is to explore and reconstruct the cognitive processes experienced by Indonesian scientific writers in selecting research topic in academic writing. By using grounded theory approach, this research explored the Indonesian scientific writers' cognitive processes and revealed eleven ways or approaches in finding and selecting research topics, i.e. institutional research road map, literature review, search before research, research trends in the world, national topics of research, interpretation of regulations, court decisions, pros and cons of actual cases or topics, discussion and research sharing method, exposure of controlled data, and looking for possible space for existing papers. Each expertise background dicipline has its own ways and approaches in research topic selection, but there is 'red thread': the selection and determination of research topics rests on literature review. This research endorses practical approaches to find out research topics containing novelties and state of the art of the research in each discipline.

Keywords: cognitive process; academic writing; research topic selection; Indonesian scientific writers; search before research.

INTRODUCTION

Facts show that Indonesia already has several reliable scientific writers, as shown through data from Scimago. Scimago (2018) shows that Indonesia only has 75,220 articles with H-index 196. This acquisition places Indonesia ranked 11th, below Pakistan which has 127,817 articles with H-index 217 ranked 10th. Thailand has 156,829 articles, with H-index 289, making it ranked 9th. Indonesia is even far away from Malaysia which has 24,8457 articles, with the H-index 249, ranked 8th. Hong Kong was ranked 7th with 263,602 articles, H-index 479. 8th position belonged to

Singapore with 265,452 articles, H-index 492. Ranks in the top five in a row were occupied by China (5,133,924 articles, H-index 712) in the first place, Japan (2,539,441 articles, H-index 920) came second, India (1,472,192 articles, H-index 521) in third place, South Korea (1,004,042 articles, H-index 576) fourth, and Taiwan (614,487 articles, H-index 437) in fifth place.

At this level, there is a gap to be able to contribute to language education through a review of proven processes and results of writing. The gap is an opportunity that this research will take advantages of this present

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research. It is a manifestation of efforts to construct the cognitive process of academic writing----selection of research topics in particular. It was also formulated as an effort to contribute to the development of science especially in language education study through the context of proven academic writing. Various studies related to academic writing competence in foreign languages, especially English, generally take context of the formal education environment as the realization of language teaching. These studies generally revolve around the achievement of teaching writing, related evaluations, to the utilization of certain models in teaching writing. At this point, the realm of research actually provides a broad space to be directed at other contexts that can also contribute to language education.

Various studies related to academic writing competence in L2 generally take the context of the formal education environment as the realization of language teaching. This can be seen in several recent studies from Silva & Matsuda, Hinkel, Kahraman (2012), Paris Said, Hamsa & Mahmudah (2015) and Rahimi, Kushki & Nassaji (2015). These studies generally revolve around achievement of teaching writing, related to evaluations and the utilization of certain models in teaching writing. At this point, the realm of research actually provides a broad space to be directed at other contexts that can also contribute to language education.

Previously, several studies had tried to compare the results of academic and nonacademic writing, from several circles as a realization of cognitive processes. For example, White and Cheung (2015) once made comparative studies regarding the results achieved by professional writers and composing amateurs in compositions. Research related to the ability to write scientific papers needs to pay attention on aspects of results and processes in the same proportion. In this case, studies related to the importance of writing skills need to look at aspects related to direct results, as well as the process.

Reviewed from perspective of the creative process, the works of short stories, novels and poetry, there are five creative of processes fiction writing namely: incubation, insight, evaluation, elaboration (Nuraeni & Fadhly 2016). The relevant study also explored the mental processes carried out starting brainstorming, planning, drafting, revision, editing, to proofreading. This study reveals the ways in which authors develop their writing terms of producing long in compositions without losing essence, how writers overcome attachments in their writing process, author-specific writing features and what they expect from readers after reading their writing (Fadhly, Hasanah & Agustiana, 2017). It also reveals that the differences experienced by participants at each writing stage are strongly influenced by their areas of interest, writing behavior and writing style.

Fadhly and Ratnaningsih (2018) also confirmed the cognitive processes involved in popular article writing. Several different ways in which the author gets inspiration to write, what values underlie the author to give their arguments on a particular topic, how the author decides the point of view of their argument, starts writing, develops the argument, and closes the writing.

This present research is expected to bring novelty in identifying the cognitive processes experienced by reputable international journal writers who can take important lessons for other Indonesian scientists. Cognitive models existed are still very limited to explain comprehensively how the true cognitive processes of research topics selection experienced by the author who have been tested. This study is expected to present novelty in the subject area.

This research has the urgency to describe the cognitive processes experienced by Indonesian scientific writers whose writings are published in reputable international journals. By identifying cognitive processes that take place in the writing process, so that it can be a guide for other writers in writing scientific articles in reputable international journals. Another is to boost the quantity and quality of scientific publications of Indonesian researchers/scientists in reputable international journals as part of efforts to increase national competitiveness from the scientific publications sector.

METHOD

In the flowchart, this research shows the specific purpose of this research, which is breaking down cognitive processes in writing articles in reputable international journals since the topic selection, problem expressing tentative formulation, selecting, collecting (thesis). and determining bibliography, making notes and making the outline of the writing, pouring ideas into written language so that it became a coherent, systematic and reasoned initial draft composition, review, to edit academic writing and make it a final draft.

This research was conducted in Bandung based on the place of residence and/or campus teaching resource. Data collection starts from July - December 2017. This research uses grounded theory research design. Referring to the purpose of this study, which is to reconstruct the cognitive process in academic writing experienced by 3 Indonesian scientific writers, the grounded theory research design is deemed appropriate to be applied in this study. As stated by Creswell (2012) that grounded theory research design is used when researchers need a theory or explanation of a process. The activity of writing as a cognitive process is also explained by using a grounded theory approach.

Creswell (2012, p. 440) details eight procedures in grounded theory research, i.e.: "Determine whether grounded theory research design is in accordance with research problems; identify the cognitive processes that want to be studied; obtain permission and access to conduct research; conduct theoretical sampling; data coding; using selective coding and developing validating theory; develop theory; grounded theory research report".

The techniques for collecting cognitive process data in this academic paper are carried out through (1) observation, (2) interviews, (3) documents. Observation is done by directly observing the writing process of the scientific writings of the informants/speakers so that the whole construction of the cognitive process phenomena that occur/is done by them is obtained.

Interviews were conducted in-depth (ininterviews) with depth (3) selected informants from a number of universities in Indonesia from Universitas Indonesian (UPI) Pendidikan Universitas Padjadjaran (Unpad). The three Indonesian scientists included: Didin Saripudin, Atip Latiful Hayat (ALH) and Dr. Fitri Khaerunnisa (FK). The selection of the three Indonesian scientists was taken based on considerations, among others: (1) the performance of research and scientific publications that stood out especially their research works published in reputable international journals; (2) the ease accessing them for the purposes observation and in-depth interviews and obtaining the necessary written documents; and (3) the diversity of informants/resource persons with diverse scientific clusters is intentionally conducted to see whether there are variations in cognitive processes as reflected in the interview process and their academic writings.

Interviews are conducted informally so that the informant feels comfortable and goes on intimately. High technical language will be avoided and researchers should optimally be able to provide a sense of comfort so that informants feel free in responding to each researcher's questions in their own way (Sunstein & Chiseri-Strater, 2012; Marshall & Rossman, 1999, Holstein & Gubrium, 1995).

RESULTS AND DISCUSSION

Of the three informants interviewed, i.e.: DS with a background in Sociology of education, indigenous education & multicultural education, ALH with a

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background in International law and telecommunications law, and FK with a background in nanomaterial carbon, adsorption, nanocomposite polymer. As their different experiences in choosing and determining research topics.

Research topic selection based on research road map

In choosing and determining research topics, DS followed a road map that had been designed with those who have the same expertise. In accordance with his background, DS researches teaching aspects such as approaches and methods, learning resources including textbooks, learning media, learning evaluation, etc. Subsequent research topics follow the path of the research road map designed together with his colleagues in the same Department and with the same research expertise.

DS says that his research had followed the stages of the road map designed. A research topic that is still in a cluster is carried out in a systematic and continuous way. It includes in basic research type. DS elaboratively describes that basic research is usually oriented on producing new scientific findings. That is to produce new concepts, theories, or models. If the basic research topics are running according to the initial planning, then it continues to applied research. Likewise, if the applied research topics have run well, it will continue to development research.

Development research usually produces a product that is known in UPI as a Teaching Industry. So, development research produces products in learning that can be massively produced and sold it to the market. Like me, research on learning resources has been done, an approach is taken to research textbooks and learning media." (Interview with DS, April 5, 2018)

The following is an illustration of the research road map conducted by DS so that the research direction runs systematically and continuously. The research road map designed by DS with his colleagues can be described in the diagram below.

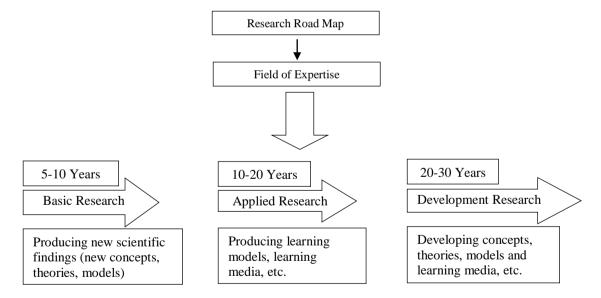


Figure 1. The research road map designed by DS with his colleagues

In the road map, DS with his team designed a research in the field of evaluation. The time range is from 10 to 20 years. Every year, a detailed research topic plan is created. This detailed research topic plan then produces new topics each year so that the research road map designed

encourages members of the research team to be able to produce areas of expertise. From the research road map, a number of scientific publications can also be created and can be divided into scientific publications in reputable international journals. In detail, DS states: For example, in about a few years, 10 or 20 years, what research in the 1st to 20th year. Later, it will become an expert in educational field. It is similar to write in a journal which is the results of those researches. Thus, my writings published in journals are the results of the research that I have done, such as the Wayang Golek as a learning media and I have also written a textbook entitled "History of Indonesia based on multiculturalism". A research can be extracted into several journal articles, not always one research for one article; it can be more than two or three journal articles. Yet, of course, the journal title is not the same as the research title, the journal title must be more attracted, not too long, and not too locality especially if it is an international journal. There is no need to state which iunior high schools or senior high schools." (Interview, 17 August 2018)

Research topic selection based on previous studies by conducting literature review

The role of scientific articles published in reputable international journals/nationally accredited journals is recognized by DS to be very influential in selecting research topic. Based on cognitive experience experienced by DS, it is very important for researchers to read previous studies in order to select research topic. DS sees the importance of reading previous studies by saying:

It has a great effect. Sometimes, I look for ideas after reading previous studies, especially in international journals. For example, I want to see historical learning media, so I read research on historical learning media. There are journals that specifically discuss learning media, such as TUJET (Turkish Online Journal Educational Technology)." (Interview with DS, April 5, 2018)

Research topic selection based on "search before research" activity

Based on cognitive experience of FK as an expert in the field of Chemical Engineering and Nano Technology, the research topic

was obtained from the "search before research" activity which is a process of reading scientific works in reputable international journals. Through this "search before research" activity, FK gets inspiration to choose and determine research topic. Similarly, from "search before research" activity, the research gap will be found so that the research topic will always contain novelty.

FK says that the "search before research" activity is very useful for a scientific writer. FK describes several important reasons why it is necessary to conduct searching activities before conducting research.

First, related to the target of the manuscript publication to a particular journal. The data collected by researchers must be potential to be published in certain journals. FK notes that it is fatal for a researcher to collect data that is not potential to be published. The data collected must be in line with existing research trends. These research trends can be seen from searching activities. In more detail, FK explains the importance of this "search before research" as follows:

Search before research" activity is actually important for me. Why do we have to search before conducting research? First, related to the final target, how our data is still potential to be published and how our data is still in line with the trend that people are working on. The final target can be international or national journals. Second, this is the most feared when we write, there is replication, duplication, and even plagiarism. If I select a research topic, it will be based on my expertise. For example, since I am concerned in the field of environmental chemistry and advanced material, so that the topics I choose are around it. I might not research, for example, about superplasmon because it is out of my expertise. (Interview with FK, May 15, 2018)

The flow of this finding can be described as follows:

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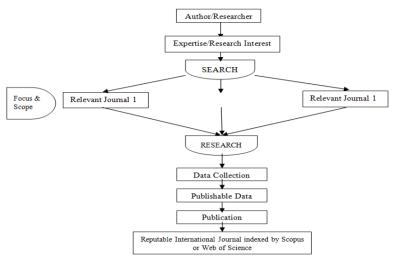


Figure 2. Research topic selection based on "search before research" activity

Research topic selection based on observations of "research trends" in the world

According to FK's cognitive experience, research topics can be explored from research trends that are taking place throughout the world. Global issues that become world's trending topics inspired him to design research with actual global topics or issues. For example, local issues related to warming, food security. Nevertheless, according to FK, from the existing global issues, we must look for more specific issues that people have not researched yet, because even though the research topic has been raised as a world trend, we must still take into account the more specific issues.

To convince us how important it is to pay attention to these research trends, FK explains that by reading the developing trends in the world, a writer/researcher is able to select a research topic. Reputable international journal publishers will consider 'business aspect', namely looking at research trends that are happening. If author does not pay attention to the aspect of research trends, it will be difficult for a manuscript to be published. Regarding this research trend, FK describes as follows:

Because business aspect is considered in the world, the publisher company will also consider it. If they want to sell, the topics loaded must be in the trend. For example, people are concerned about energy, so we have to find out the topics about energy. Or about the global warming issue, then anything related to the solution of how to

prevent global warming will be more attracted. This aspect then becomes the reason why an article can be quickly published, why it is this long, why it is being rejected, and why it is accepted. (Interview with FK, May 15, 2018)

Then, how do we find the research gap so that it has an element of novelty? FK explains that a researcher needs to have sensitivity and foresight on any topics that might be raised. The important thing is not to duplicate or replicate the previous works. In the context of searching this gap, the key word is "looking for the possibilities that exist in that trend." Following is FK's explanation related to the gap of a trend:

First, looking for possibilities that exist in that trend; which part that has not been researched by others. For example, a person in America has been doing it and another person is working on it. If we just follow what they are doing, it is duplication so that it will be difficult to publish. It can be done if we just to get the knowledge of how a research works, but if we want to run into publications, it cannot be done. Thus, novelty is actually easy, just by searching. (Interview with FK, May 15, 2018)

Research topic selection based on national research topics of Indonesian ministry of research, technology and higher education As an authoritative institution as well as sponsors of various types of research, the Indonesian **Ministry** of Research, Technology, and Higher Education (Kemenristekdikti) carries out certain themes every year. Every year, there are no less than 10 (ten) research topics offered by Kemenristekdikti. Researchers utilize

research topics offered by *Kemenristekdikti*. Following is FK's explanation regarding the importance of designing a research topic by referring to the research topics offered by the Indonesian Ministry of Research, Technology and Higher Education.

In national scale, Kemenristekdikti always issues ten national themes. As long as our proposal concerns among the ten themes, our proposal will be accepted. There are possibilities to be accepted, depending on how we propose our ideas in the proposal. So, the publication is the same, every journal has its scope, this journal coverage is about this, another journal about this, so when I want to publish an article, I always see the target journal and consider its scope. If the scope is suitable, then the data I have can be submitted to the journal." (Interview with FK, May 15, 2018)

Research topic selection based on interpretation of regulations

As a researcher in the field of law, ALH explained his cognitive experiences that research topic were obtained through interpretation of a regulation. The novelty of a research topic was derived from the process of understanding and interpreting the existing regulations. In detail, ALH explains the importance of interpretation as the main source of research topic that has a high novelty element as follows:

For the legal articles writing, it can be from an interpretation of one provision, for example in law, international conversions or international agreements. How we understand and interpret it can become a research question. Since every provision or rule whether domestic or international is made for the future, there will be situations and practices that are different from when the rules were made. That is where the problem can be revealed. (Interview with ALH, June 7, 2018)

Research topic selection inspired by court decisions

Based on ALH's experience, a research topic also usually comes from an analysis of court decisions that are often referred to as case studies. It is especially related to the research question of how a court applies the law in a case. He also analyzes to criticize whether a court decision is true or not. The research question often arises from the court decisions. "We criticize whether the

judgment is true or not" (Interview with ALH, 7 June 2018).

Research topic selection inspired by the presence of actual cases or topics that are becoming public discourse

Research topic selection is inspired by the emergence of pros and cons of a case or a regulation. ALH explains his cognitive experience as follows:

If outside the field of law, they refer to it as an article review. We analyze the experts' writings, then we have different opinions and understandings. It can also be a debate between pros and cons, for example writing one stance and then it is debated. That is normal in legal articles. Sometimes, it is not enough to just reply, sometimes reply again and again. That is like such polemics. It is one of the sources of ideas to write. (Interview with ALH, June 7, 2018).

Research topic selection through research discussion and sharing

Intensive discussions with experts, lecturers and teachers inspired writers to select a research topic. DS acknowledges that through discussions with teachers as education practitioners inspired him to find research topics that have a high element of novelty. DS said:

The inspiration can also come from discussions. Like my experience that after having discussions with teachers in MGMP, it turns out that the history teachers need historical learning media while the available ones were science learning media. Then, we talk with the company that produces the media. Incidentally, they said that the historical learning media do not yet exist, so we make proposals on how to make historical learning media in the form of replicas of historical objects and electronic maps. It was responded well by the company because it might be profitable in terms of economy. There is a good market nation. (Interview with DS, April 5, 2018)

In addition to colleagues, Indonesian scientific writers are also inspired to get new topics through discussion with teachers. From DS's experience, when discussing directly with history teachers, they need learning media specifically for historical subjects that are not yet available. From this need, then there is an opportunity to become an industry. DS says that the need for historical learning media inspired him to

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design a research project by collaborating with industry. Regarding this cognitive experience, DS explains that:

The inspiration can also come from the journey. Like my experience that after having discussions with teachers in MGMP, it turns out that the history teachers need historical learning media while the available ones were science learning media. Then, we talk with the company that produces the media. Incidentally, they said that the historical learning media do not yet exist, so we make proposals on how to make historical learning media in the form of replicas of historical objects and electronic maps. It was responded well by the company because it might be profitable in terms of economy. There is a good market nation (Interview with DS, April 5, 2018).

Determination of research topics resulting from exposure to controlled data so that novelty is found

Based on FK's cognitive experience, the determination of research topics can also be raised from the exposure of new data found. However, exposed data is verified (crosscheck) with scientific articles that have published bv leading journals throughout the world. The novelty element can also be identified from the activity of exposing the data. When exposing data generated from certain methods equipment is found element of novelty, the research topic can be identified. Regarding data exposures, the novelty and topic of this research, in more detail the FK describes it as follows:

When they expose the data to show that the research activities carried out are in mind so with planning. If we are tested once a week, for example, "You are testing this again, how can you get the data?" It is proven that this crystallization of the structure is not like this, if it does not mean changing the method. For example "You don't research here anymore, because people have already researched", so we lose opportunity, we have changed here. So the process is also escorted in such a way as to ensure the data is published or not. The Japanese

are not very good at English, but why they can penetrate into nature, can penetrate into science not because of their English skills. But why can it be? Because they have the ability in the data, in the data they are advanced who are better at revealing something new (Interview with FK, May 15, 2018).

Determination of research topics as results from the search for the possibility of the existing papers

Finding possibilities from published articles in line becomes an important way of determining research topics that have novelty elements. The intelligence of a researcher with long hours of flying reading will easily identify the possibility space so that the data to be explored also has a high element of novelty. Such is the FK experience as a scientist who has been involved in a number of prestigious studies scientists. Japanese according to the FK, the possibility of in line space must be tested first to ascertain whether there is an opportunity to get new data that can be published. The following are FK's explanations regarding determination of research topics resulting from the possibility of the possibility of existing papers:

If we do searching, we will meet you, so my habit outside of that time (Japan) is when we want to work on the article, not "let's give a presentation!" But I'm doing a journal. If in the searching context, the professor gave 50 journals. And he's already directing it to the journal we're going to work on. Then he told me to read, and told me to write down what you got what you got. Then what are the possibilities that can still be done, sometimes the ones who can make it acceptable are novelty of ideas, or for example like the others who researched it, they just got A (Interview with FK, May 15 2018).

Broadly speaking, the determination of research topics that are cognitively experienced by three Indonesian scientific writers with different scientific backgrounds can be classified as follows:

Table 1. Research topics selection their variety and characteristics based on the background of the field of expertise

	Expert	Expertise background of the author			
	DS	FK	ALH		
No	Sociology of	Nanomaterial	International law		
	education,	carbon,	and		

	Determination of research topics	indigenous education & multicultural education	adsorption, nanocomposit e polymer	telecommunicatio ns law
1	Institutional Research Road Map	$\sqrt{}$	$\sqrt{}$	- ,
2	Literature review	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$
3	Search before Research	$\sqrt{}$	$\sqrt{}$	=
4	Research Trends in the World	$\sqrt{}$	$\sqrt{}$	-
5	National Research topics (Ministry	$\sqrt{}$	$\sqrt{}$	-
	of Research, Technology and			
	Higher Education)			
6	Interpretation of legislation	-	-	$\sqrt{}$
7	Court Decision	-	-	$\sqrt{}$
8	Pros and Cons of Actual Cases or	-	-	$\sqrt{}$
	Topics			
9	Discussion and Research Sharing	$\sqrt{}$	-	-
	Method			
10	Exposure of controlled data so that	-	$\sqrt{}$	-
	it is found novelty			
11	Looking for possible space for	-	$\sqrt{}$	-
	existing papers			

CONCLUSION

From the research conducted it was reconstruction concluded that the cognitive processes writing reputable international journal articles experienced by a number of Indonesian scientific writers had very important benefits for development of cognitive models in writing especially academic writing. Reconstructing the cognitive processes experienced by Indonesian scientific writers is a fairly long cognitive journey and their cognitive experience will inspire other scientific and Indonesian researchers writers increase the productivity of publications. This research has been able to explore how Indonesian scientific writers in various disciplines express their cognitive experience so that their scientific works can be published in reputable international journals indexed in Web of Science (WoS) and Scopus.

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