CHAPTER I

INTRODUCTION

1.1. Background of the Study

Academic writing skill plays an essential role since it becomes one of the graduation requirements in higher education, particularly in Indonesia. The Directorate General of Higher Education issued a Decision Letter number 152/E/T/2012 that is mandatory for all Indonesian postgraduate students to publish their academic articles in International accredited journals before they graduate from higher education (Dikti, 2016). Besides, it stated in the government regulation of the Minister of Research, Technology, and Higher Education that the improvement of publishing the writing in the national accredited journal is required. Nevertheless, they are also supposed to submit it to International or other reputed journals (Permen, 2017).

One of the essential aspects of writing an academic article is the variety of vocabulary. Knowledge of a single word is essential for learners to comprehend academic speech because it provides valuable support for the acquisition of multi-word items in the discourse (Dang, 2018). In other words, a good selection of academic lexis in higher proficiency in academic writing requires several aspects that should be fulfilled. Biber (2006) stated that the difficulties in understanding the register might be particularly acute for non-native speakers. It is convenient with Mozaffari and Raouf (2014), who mentions that ESL learners find the limited knowledge of vocabulary as an obstacle in academic discourse. Therefore

the ESL writers should go extra miles in writing academic articles when they need to publish them in accredited or other reputed International journals.

Vocabulary played an essential role; the basic element of vocabulary knowledge comes from a single word. Words generally considered as the basic elements of language, and they appear in writing, and they are the items defined in dictionaries (Biber, Conrad, and Leech, 2002). Furthermore, the words used in writing the articles represent the particular sequence of the specific disciplines referred to as technical words. The term technical vocabulary correlates to a subject, it happens in a specialist domain, and it reflected in the particular subject area (Nation and Chung, 2003).

The other evidence is conducted by Dang (2018), who attempts to carry out an identical investigation in order to know the similarities and differences between vocabulary in hard and soft science. He also develops the hard science spoken word list (HSWL) and soft science spoken word list (SSWL). A Hard Science Spoken Word List (HSWL) was developed to help second language learners of hard sciences to comprehend academic speech at English-medium universities. Furthermore, the HSWL used by Dang (2018) covers several disciplines such as Math, Engineering, and Medicine, and some of the example word lists are *courts* and *business*. Later on, Dang (2018) continues to create Soft Science Spoken Word List to address the gap with HSWL. SSWL that used by Dang (2018), covers several disciplines, including Business, Law, and History, and the example word lists are *machine, metal, element*. The study of Dang (2018)

represents the incision of the words to determine which word reflects in hard or soft sciences.

Nevertheless, knowledge of single words is essential for learners to comprehend academic speech because it provides valuable support for the acquisition of multi-word items in the discourse (Dang, 2018). Besides, a single word will not stand alone in constructing the sentence; they will combine with other words and creating lexical bundles. Biber, Conrad, and Leech (1999) defined lexical bundles as multi-word expressions that occur frequently and with random sequences of three or more words (e.g., *in the case of the, do you want me to*). In contrast with Biber et al. (1999), Hyland (2008) stated that these words follow each other more frequently, contributing to shaping text meaning and helping our sense of distinctiveness in a register.

In the context of lexical bundles, there were several studies show that the knowledge of lexical bundles implies a higher level of proficiency than the knowledge of individual words (Kwary, Ratri, and Artha, 2017). Also, Chen and Baker (2010) found that the frequency of lexical bundles usage increased as language proficiency grew. Those views reveal that lexical bundles are also one of the aspects that should be used in writing an academic article. The extended collocations i.e., *as a result of,* and *as can be seen*, identified as academic register while *with regard to* and *in accordance with* identified as legal text (Hyland, 2008). It should be noted that the usage of lexical bundles from one science is different from other sciences. Lexical bundles will also be useful for ESL context

since it will build self-confidence by using a variety of lexical bundles (Kashiha and Heng, 2013).

Based on the explanation above, this work tends to investigate the specific part in writing academic articles, i.e., words and lexical bundles. This work focuses on analyzing several aspects of words and lexical bundles by comparing the previous articles from different disciplines. There is not any study that has compared the words as well as lexical bundles in academic articles from different disciplines. Some of the studies focus on investigates the words only or analyze nothing else but lexical bundles. Furthermore, this study will compare the two articles from different subject area as the representation of hard and soft sciences.

For hard sciences, the current study will use the data from Nuclear Physics (NP) discipline. From the website of *www.dictionary.com*, hard science defined as the natural or physical disciplines, like chemistry, biology, physics, or astronomy, in which hypotheses and experiments investigate aspects of the universe. That definition is supported by the website of *www.scimagojr.com*, which clearly shows that if we sort NP discipline as the subject category, the subject area of the science will emerge physics and astronomy. Helmenstine (2019) cited from *www.thoughtco.com* called hard science as natural science because it explores the working of the natural world. She continues that hard sciences require experiments that are not difficult to make objective measurements, set controlled variables, can represent mathematically, and it can be used consistently to calculate identical outcomes.

For the soft sciences, the data will take from Political Science (PS) discipline. From the website of *www.dictionary.com*, the soft science defines as any of specialized disciplines, like psychology, sociology, anthropology, or political disciplines that interpret human behavior, institutions, society, etc., and the basis of scientific investigations for which it may difficult to establish measurable criteria. The website of *www.scimagojr.com* supports that definition. It shows that if we specify the PS discipline as the subject category, the subject area of the science will be classified as a social science. From *www.thoughtco.com*, Helmenstine (2019) states that soft science relates to the study of animal and human behaviors, thoughts, interactions, and emotions. Soft science applies the scientific method to such intangibles, but it is almost impossible to recreate the "soft science" experiment. She adds that it is difficult to isolate all the variables that may influence the outcome.

The characteristic of keywords in NP discipline are likely different from those in PS discipline. It can be proved in the book entitled 'A Guide to the Nuclear Science Wall Chart' created by Matis (1998). NP has specific words and phrases, as the evidence used in the book include *atom, atomic mass, blackbody, blackbody radiation, etc*. In other cases, the author has also found several words or phrases used in the book entitled 'Analyzing Politics 4e' written by Grigsby (2009). The author found the specific words or phrases used in that book, such as *bipolar, bipolar system, confederal system, conflictual party relationship, etc*. Those vocabularies cannot possibly detect in general articles or other writing but only in specific science such as politics or social disciplines. Those vocabularies

also cannot possibly detect in general articles or other writing but only in specific science such as Physics or NP discipline.

The reason for taking the NP and PS disciplines are based on several criteria. First, the number of Scopus indexed journals of both disciplines from 2015-2017 is increasing; it can be proved from *www.scimagojr.com*. Second, the number of Scopus indexed articles of NP and PS are also increasing, and it can also be proved from *www.scimagojr.com*. Third, the balance of articles in the public library of sciences as it published in PlosOne is high, in which the numbers of articles in NP discipline are 1105 while the number of articles in PS discipline is 959 articles.

In order to achieve the comprehension of using words from previous articles, this study would analyze them from every section of academic articles. Conventionally, the structure of research articles, according to Cargill and O'Connor (2009), consisting of Abstract, Introduction, Methods, Results, Discussion, and Conclusion (AIMRaDC). This study would focus on four sections of the structure of academic articles, i.e., abstract, introduction, material and methods, results and discussion. This recent study will skip to investigate the discussion section since several articles of NP and PS do not provide the conclusion section.

This study offers some vital insight into the previous research on the same focus of the study. This study will concern to compare words and lexical bundles between journal articles of NP and PS disciplines as the representation of hard and soft sciences. There are many kinds of the article or academic writing related to

this topic, but they mainly focus on one aspect such as concern to analyze the Academic Words List only. It has not yet been established the research using the broader analysis of words as the main topic in the previous studies. Moreover, this study investigates not only the words but also lexical bundles as the primary focus.

Concern has arisen in comparing the same topic using the data of hard and soft sciences, but the disciplines are different from this study, which are NP and PS. This study will use the NP and PS disciplines of journal articles as the primary data sources in conducting the research. Furthermore, this study will carry out the words by comparing the NP and PS articles from every section of journal articles, i.e., abstract, introduction, material and methods, finding and discussion. This present study will broaden our knowledge of comprehending the central aspect of writing an academic journal article that should be acquired by the author.

1.2. Problems of the Study

Based on the background of the study regarding analyzing the comparison of NP and PS articles, the research problems are formulated as follows

1. How the words of NP and PS articles are distributed based on word classifications as they are classified into GSL (General Service List), AWL (Academic Word List) and TW (Technical Word)? How the words of both articles also distributed based on semantic category in different sections, i.e., abstract, introduction, material and methods, and also results and discussion?

2. How the lexical bundles of NP and PS articles are distributed based on the frequency of use? How the lexical bundles are distributed based on functional categories as they are classified as Epistemic Stance, Discourse Organizers, and Referential Expressions in different sections, i.e., abstract, introduction, material and methods, and also results and discussion?

1.3. Objectives of the Study

Based on the research problems above, this study aims to figure out the distribution of the words between NP and PS articles based on word classifications. Based on the comparison, the investigation is then elaborated through the distribution of the word into its semantic category. Subsequently, the words used in both articles are going to be compared as they are operated in different sections based on the structure of academic article i.e., abstract, introduction, material and methods, and also results and discussion.

This study also tends to carry out the distribution of lexical bundles based on the frequency of usage in the article. The investigation is then continued to find out the lexical bundles based on functional categories. The distribution of lexical bundles in NP and PS articles are investigated in different sections based on the structure of academic articles i.e., abstract, introduction, material and methods, and also results and discussion

1.4. Significances of the Study

This study presents the comparative analysis of words between NP and PS articles as the representation of hard and soft sciences. The study is expected to give benefit to the readers both in theoretical and practical aspects. From the theoretical aspect, it will invite researchers to extend research in corpus linguistics, particularly in words. This study aims to eliminate the similarities and differences between hard and soft sciences, too, is it very different or quite similar.

On the other hand, from a practical aspect, this study will contribute to authors who intend to publish their writing in accredited journals. This study will become one of the references to writing using academic style. Besides, it will help the teacher or lecturer to understand the main point in teaching academic writing. It will help the students who have not understood the steps to write the academic article. Moreover, it will be useful to the graduate students who have the requirement to publish the article in accredited journals. It will become the references that support them in writing an academic article.

1.5. Definition of Key Terms

It is essential to explain the definition of key words used in this study and avoid misunderstanding. The explanation is presented in the following passage:

1. **Nuclear Physic (NP):** one of the branches of physics and astronomy (*www.scimagojr.com*)

2. **Political Science (PS):** one of the branches of social science (*www.scimagojr.com*)
3. **General Service List (GSL):** contains the most widely useful 2,000-word families in English (West, 1953; Coxhead, 2000); include many content words, like *government, forests, production* (Nation, 2001)
4. **Academic Word List (AWL):** Coxhead found 570 headwords taken from academic language corpora of four disciplines cover Law, Art, Commerce, and Science (Coxhead, 2000)
5. **Technical Word (TW):** technical words typically cover for about 5% of the running word in the text (Nation, 2001); terms are closely reflected in a particular subject area (Nation and Chung, 2003)
6. **Semantic Category:** semantic tags show semantic fields that collect word senses that are related by virtue at some level of generality with the identical mental concept (Archer, Wilson, and Rayson, 2002)
7. **Lexical Bundles:** lexical bundles as multi-word expressions that frequently occur and with accidental sequences of three or more words e.g., *in the case of the* (Biber, Johansson, Leech, Conrad, & Finegan, 1999)