

## LEXICAL RICHNESS IN ACADEMIC PAPERS: A COMPARISON BETWEEN STUDENTS' AND LECTURERS' ESSAYS

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### Abstract

In the area of writing, research has yet to explore EFL learners' ability to use varied vocabulary. Although vocabulary teaching has enriched learners' knowledge of lexical items, whether they can use the words they have learned remains to be seen. It is important, therefore, to investigate their lexical richness in their academic writing. Lexical richness, defined as the presence of different words in a text, is commonly measured through type-token ratio (TTR). The present study set out to identify the lexical richness of senior students by comparing them to academic papers written by their lecturers. There are four objectives: (1) to determine the difference between the type-token ratio (TTR) in students' essays and that in their lecturers' essays; (2) to determine the difference between the use of 2000-word level (henceforth K2) in students' essays and that in their lecturers' essays; (3) to determine the difference between the use of academic words in students' essays and that in their lecturers' essays; (4) to determine the difference between the students' essays and their lecturers' in terms of the use of words other than the 2000-word level and the academic words (designated "off-list words"). The essays written by the respondents were submitted to a website for vocabulary profiling (<http://www.lexutor.ca/vp>). This analysis shows that the lecturers fare better in terms of TTR and academic words, but write slightly fewer 2000-word level and off-list words than their students. While the differences in TTR and academic words are significant, the differences in the use of 2000-word level and off-list are not significant. The subsequent discussion addresses possible causes of these differences, and offers some implications for the teaching of vocabulary and writing.

**Keywords:** lexical richness, vocabulary, academic words

A good academic essay is characterized by a number of features. In addition to coherence, meaningful connections between ideas, proper use of punctuation, and grammatical accuracy, a few scholars also suggest lexical richness or vocabulary richness, which is defined as a variety of lexis (Malvern and Richards, 2012). Laufer and Nation (1995, p. 307) maintain that "a well-used rich vocabulary is likely to have a positive effect on the reader". It has also been one of the criteria of good writing in many composition scoring guideline. The one proposed by Jacobs et al (1981) included vocabulary variation as one of the writing sub-skills to be judged. Siskova (2012) proposes different measures of lexical richness, namely lexical diversity (how many different words are used), lexical sophistication (how many advanced words are used), and lexical density (what is the proportion of content words in the text). Read (2000) argues that knowledge of diverse words enable learners to avoid repetition of words by synonyms, superordinates, and other related words. Thus, it makes sense to expect advanced EFL learners to demonstrate high lexical richness in their written works.

A measure that is commonly used to gauge lexical richness is what van Gijssel et al. (2005) refer as type-token ratio (TTR). This measure determines

lexical variation on the basis of the ratio of new words (type) to the total number of all words (token). Thus, it is justifiable to establish the type-token ratio as a measure of lexical richness, and therefore TTR was used as the element that indicates lexical variation in this report.

In the context of English as a Foreign Language (EFL), writing is a skill that is of paramount importance for students who enter the final year of their study. When writing their research reports or internship reports, they need to make great efforts to make the reports not only contributive to the field but also coherent. In addition to that, they are expected to demonstrate the use of varied words so as to create a mature English academic style. At least one research by Lemmouh (2008) highlights the facts that the ability to use advanced words and various lexical items correlate strongly with school achievements. The use of various words indicates that the writers have somehow exposed themselves to diverse English texts and internalized them in a more or less systematic fashion. Diverse words also promote variation in a written work, a quality that avoids monotonous and tedious tone throughout the essay.

To date, investigations into the variety of lexical items in essays written by university students have not been substantial. Exploration into this area

studies can actually serve to map their ability to express their ideas in written discourse and help teachers determine the effectiveness of their vocabulary and writing courses. In response to this, the writer did a research that aimed to delve deeper into EFL students' ability of using various words. Furthermore, the study also compared students' use of varied words to those of their lecturers. The discrepancy that exists may be used as a basis for modifying the course designs of reading comprehension, vocabulary, and writing.

The research was conducted to achieve these following objectives: (1) to determine the difference between the type-token ratio (TTR) in students' essays and that in their lecturers' essays; (2) to determine the difference between the use of 2000-word level (henceforth K2) in students' essays and that in their lecturers' essays; (3) to determine the difference between the use of academic words in students' essays and that in their lecturers' essays;

- H1 : academic essays by lecturers have higher TTR than those written by students.  
(H<sub>01</sub>: there is no difference between lecturers' essays and students' essays in terms of their TTR).
- H2 : academic essays by lecturers have higher proportion of K2 than those written by students.  
(H<sub>02</sub> : there is no difference between lecturers' essays and students' essays in terms of their K2)
- H3 : academic essays by lecturers have higher proportion of academic words (AW) than those written by students.  
(H<sub>03</sub>: there is no difference between lecturers' essays and students' essays in terms of their AW)
- H4 : academic essays by lecturers have higher proportion of off-list words (words other than K2 and AW) than those written by students.  
(H<sub>04</sub>: there is no difference between lecturers' essays and students' essays in terms of their off-list words)

Before moving on further, it is best to present the definitions of some key concepts. Lexical richness is defined as the ratio of types of words to the total words (token) written in a text (Hoover, 2003), hence the term "type-token ratio". Type refers to the types of words, while token encompasses the total number of words used in a particular text. The higher the ratio, the more the text uses varied words. Another term commonly used is *vocabulary richness*. As stated above, this represents evidence that a learner has been exposing himself or herself to a wide range of reading materials and quite possibly processing them up to the point of mastery.

English vocabulary falls into three major categories: high-frequency words, that is, words that appear very frequently in almost all kinds of discourse, and low-frequency words, that is, words that appear very infrequently across all texts. The former is divided further into 1000-word level, 2000-word level, and 5000-word level. To attain a fluent reading comprehension, one has to master at least 2000 most frequent words plus 570 academic words (Cobb, as cited in Sevier, 2004). The latter is a collection of words that are typically used in academic texts across all major disciplines. The

(4) to determine the difference between the students' essays and their lecturers' in terms of the use of words other than the 2000-word level and the academic words (henceforth "off-list" words).

Since the study is of a confirmatory type, it is deemed necessary to start with several hypotheses. The hypotheses were derived from earlier studies. One by Ghaddesy (1989) shows that students in advanced level demonstrate higher variety in their choice of words than students who are at the lower level of proficiency. Likewise, Breeze (2008) argues that more advanced learners fare better than beginning learners in terms of the use of varied words and the use of academic words. In general, currently existing studies seem to suggest that more advanced students write more varied words than less advanced learners. Thus, based on these current research-based views, four hypotheses were put forward, with the null hypotheses in the brackets:

words cover about 10% of the total words that appear in academic texts.

A study most relevant to the present topic was conducted by Kirkness and Neill (2009). Examining the word profile of textbook chapters and journal articles, they found that a book chapter contains a large number of the first 1000 high-frequency words, fewer AW, and more off-list words than does a journal article. A journal, in contrast, contains twice as many AW as those contained in a book chapter. This is relevant to my present study because of its similar topic. While Kirkness and Neill (2009) focused on book chapters and articles, this present study focuses on written works by university students and their lecturers, thus enriching the research findings in the area of vocabulary profile across different text types.

Siskova (2012) found the strongest correlation between lexical diversity and sophistication, weak correlation between lexical diversity and lexical density, and no correlation between lexical density and sophistication. Her study is important to explain the profile of the respondents in this present study.

Another study by Lemmouh (2008) delves deeper into the vocabulary profile generated by learners of English in their essays. The study aimed to determine how far the diversity of words in a

written work can predict the quality of the learners' essays. It examined the essays of 37 Swedish students, using advanced vocabulary as the standard. The diversity was then linked to 3 dependent variables: scores of essay, grades of the courses being attended in college, and mastery of vocabulary. The results show there is a general pattern of relationship between the use of advanced vocabulary and grades in courses. However, there is no relationship between diversity of words and scores of writing. It was conjectured that the relationship is low because when scoring the written essays, the lecturers assigned higher weights to the content and grammar, not the diversity of words.

Another research conducted by Chen and Baker (2010) looked into the proportion of lexical bundles found in scientific articles and compared them to scientific papers written by EFL learners. They found that lexical bundles are more abundant and are present in a higher variety in scientific articles than those in students' works. The lexical bundles generated by the students are also more uncommon than those found in scientific articles. Common lexical bundles in scientific articles rarely appear in the students' works. This present research shares the same area of investigation, and as such it serves to confirm or disconfirm the notion that EFL learners use less varied lexical items in their essays.

In his study, Breeze (2008) compared written papers by EFL college students who had TWE scores of 6. Using WordSmith and VocabProfile, he found that the essays written by students of low-proficiency are generally lower in the variation of words, lower in the use of AW, but higher in the use of high frequency words.

Another study pertinent to the issue was done by Coxhead (2000). It aimed to identify the proportion of AW. After a thorough analysis of around 3.5 million words in a corpus, she maintains that AW accounts for 10% of the total words used in academic discourse, but only 1.4% of all words in fictions. This has an important bearing on a study that investigates the same area.

A somewhat dated study by Ghaddesy (1989) compared the word diversity in two different classes. He found that sixth graders demonstrated a higher TTR than students in the third grade. More specifically, the sixth graders also demonstrated higher number of post modification, collocations, and function words. The result is important because it provides a foundation on which the hypotheses stated above was proposed. Whether the finding in Ghaddesy' study will also hold true in a comparison between university students and their lecturers is a question to be pursued by this present research.

A more recent study in the same area was conducted by Morris and Cobb (2004). They tried to determine if TTR could be used to predict academic success. By correlating the TTR of several hundreds of students with their grammar scores, they found

that TTR is highly correlated with courses that are more procedural in nature. TTR is also found to be helpful in selecting students based on language proficiency. It was claimed that it even works better than interviews.

The study by Morris and Cobb leads to the idea that students with higher TTR have quite possibly exposed themselves to the target language in a wide range of scientific discourse, be it in oral or written form. By reading and attending to scientific texts and speeches outside class they quite probably have internalized a variety of words. In turn, this ability opens up their perspectives so that they can make better achievements in school. If this notion could be made more tenable by empirical evidence from more studies, it would seem right to push students from all educational levels to increase their habits of reading different academic sources which not only widen their perspectives but also enhance their lexical richness.

A more recent study by Douglas (2012) examined the papers written by a group of students who were non-native speakers of English. He came to the conclusion that lexical richness correlates highly with writing ability. In turn, the writing ability predicts academic success. Thus by the same token, lexical richness could be used to predict their chance of being lecturers or used as a criterion for their admission to post graduate studies. If a causal relationship can be established, a deliberate act can be systematically introduced to enrich students' vocabulary through extensive reading and academic writing.

Finally, the most recent study was conducted Olinghouse and Wilson (2013). They wanted to see if students use different variety of words when writing three different genres: stories, persuasion, and informative. The results indicate that students vary their words depending on the genre they wrote. They use most diverse words when writing stories, and use more varied words when writing persuasive genre than when writing informative texts. This is relevant to the present study because both focus on the vocabulary profile of students' academic works and intend to see if different types of writing generate specific vocabulary profile.

Some limitations of my research need to be addressed. First of all, the population from which the sample was taken fell into two major types: most of them were about applied linguistics, and the rest were about literature. However, the researcher did not do a stratified random sampling to ensure that the sample contained the same proportion of each type as in the population. Instead, a simple random sampling was done to select written works from the population. As a consequence, a strong generalization to the actual population could not be strongly guaranteed because the proportion in the sample may not be exactly similar to that in the actual population.

Secondly, the total number of data is lower than 30. A test of homogeneity of variance was not conducted. This condition permitted only the use of non-parametric analysis.

Despite the limitation above, the study is still deemed important because it adds to the body of research in the same area that so far has been explored by a few researchers in Indonesia. Mahardika (2015) and Saputro (2005) are two of the scholars who have studied lexical richness among Indonesian students. This accumulation of empirical evidence will provide a solid ground for making a connection between the teaching of English reading comprehension, the teaching of vocabulary, and the teaching of English writing. Without a pioneering effort to initiate the foundation, the three will go to separate directions, unaware of the potential they might harness if there is some kind of relationship that combines the three. Thus, this study, albeit limited in a number of aspects, still offers a useful set of findings that will pave the way toward a more solid basis for establishing such relationship.

## METHOD

### Population and sample

The accessible population in this study comprised 25 academic papers written by lecturers of Universitas Ma Chung and 12 theses written by the students of English Letters Department from class of 2007, 2008, and 2009. From that population, 9 lecturers' papers and 9 students' theses were taken as the sample.

While the entire papers by the lecturers were taken for analysis, only chapter 1, chapter 4 and chapter 5 of the student theses were taken as data. The three chapters were selected on the grounds that they contained most of the students' original

thoughts, while the other chapters were usually full of citations from other sources and thus lacked originality.

Data were obtained by feeding the essays described above into <http://www.lex Tutor/ca/vp>. This website, designed by Tom Cobb, provides a host of tools for vocabulary profiling. The output of the processing by the site were three word categories: the most frequent 2000 words (henceforth named "K2"), academic words (henceforth AW), and words that did not belong to those two categories (henceforth named "off-list"). In addition to those, there was also information about the type-token ratio (TTR).

### Data analysis

To compare the two groups in their uses of the four lexical types (TTR, K2, AW, and off-list), Mann-Whitney U test was used. This non-parametric test was used instead of a more rigorous t-test because the data were fewer than 30 and the homogeneity of variance test was not performed.

## FINDINGS AND DISCUSSION

The section below presents the answers to the four research objectives stated as follows: (1) to determine the difference between the type-token ratio (TTR) of students' essays and that of their lecturers' essays; (2) to determine the difference between the use of 2000-word level in students' essays and that of their lecturers' essays; (3) to determine the difference between the use of academic words in students' essays and that of their lecturers' essays; (4) to determine the difference between the students' essays and their lecturers' in terms of the use of words other than the 2000-word level and the academic words. The table below presents the descriptive statistics of the TR data:

Table 1. Descriptive Statistics for the Type-Token Ratio (TTR)

Variable	Observations	Obs.		Minimum	Maximum	Mean	Std. deviation
		Obs. with missing data	without missing data				
TTRLec	9	0	9	0.210	0.340	0.277	0.036
TTRStu	9	0	9	0.140	0.220	0.170	0.029

Note:

TTRLec = the TTR of the lecturers

TTRStu = the TTR of the students

Table 2. Mann-Whitney U Test for the Type-Token Ratio (TTR)

U	80.000
Expected value	40.500
Variance (U)	127.721
p-value (Two-tailed)	0.0001
Alpha	0.05

Table 1 shows that the mean of the lecturers'

TTR is slightly higher (0.227) than that of the students (0.170). Table 2 shows that this difference is significant ( $p = 0.00001$ ). Thus, the null hypothesis stating that there is no difference between the two should be rejected. The lecturers are indeed different from the students in their TTR, with the lecturers' TTR being higher than the students'. The following answers the second research objective:

Table 3. Descriptive Statistics for the K2

Variable	Obs	Obs. with missing data	Obs. without missing data	Min	Max	Mean	Std. deviation
K2Lec	9	0	9	78.230	85.000	81.376	2.138
K2Stu	9	0	9	78.420	89.620	83.008	3.994

Note:

K2Lec = The 2000-word level by lecturers

K2Stu = The 2000-word level by students

Table 4. Mann-Whitney U Test for K2

U	32.000
Expected value	40.500
Variance (U)	128.250
p-value (Two-tailed)	0.489
Alpha	0.05

K2 is slightly higher (83.008) than that of the lecturers (81.376). Table 4, however, shows that this difference is not significant ( $p = 0.489$ ). Thus, the null hypothesis stating that there is no difference between the two can be accepted. The lecturers are not different from the students in their use of K2.

The section below answers the third research objective:

Table 3 shows that the mean of the students'

Table 5. The Descriptive Statistics for Academic Words

Var	Obs	Obs. with missing data	Obs. without missing data	Min	Max	Mean	Std. deviation
AWLec	9	0	9	5.930	12.130	9.481	2.333
AWStu	9	0	9	4.390	9.340	6.830	1.753

Note:

AWLec = The lecturers' use of academic words

AWStu = The students' use of academic words

Table 6. Mann-Whitney U Test for Academic Words

U	64.000
Expected value	40.500
Variance (U)	128.250
p-value (Two-tailed)	0.040
Alpha	0.05

AW is slightly higher (9.481) than that of the students (6.830). Table 6 shows that this difference is significant ( $p = 0.040$ ). Thus, the null hypothesis stating that there is no difference between the two should be rejected. The lecturers are indeed different from the students in their use of academic words, with the lecturers' AW being higher than the students'. The section below answers the last research objective:

Table 5 shows that the mean of the lecturers'

Table 7. Descriptive Statistics for the Off-List Words

Variable	Observations	Obs. with missing data	Obs. without missing data	Min	Max	Mean	Std. deviation
OffLec	9	0	9	6.360	14.940	9.143	2.476
OffStu	9	0	9	2.760	17.060	10.162	4.209

Note:

OffLec = the use of off-list words by lecturers

OffStu = the use of off-list words by students

Table 8. Mann-Whitney U Test for Off-List Words

Mann-Whitney test / Two-tailed test:	
U	29.000
Expected value	40.500
Variance (U)	128.250
p-value (Two-tailed)	0.340
Alpha	0.05

Table 7 shows that the students' use of off-list words is slightly higher (10.162) than the lecturers' (9.143). Yet, Table 8 shows that the difference is not significant ( $p = 0.340$ ). Thus, the null hypothesis stating that there is no difference between the two should be accepted. The students are similar indeed to the lecturers' in their use of off-list words, with the students' off-list being slightly higher than the lecturers'.

The findings presented in the earlier section lead to two main points as a conclusion, that is, the lecturers use more variety of words, and use academic words more frequently than their students.

The results can be discussed in the light of the other studies discussed in the previous section. For one thing, the findings complement what has been found by Kirkness and Neill (2009) in their investigation into the vocabulary profile of textbook chapters and journal articles. While they found that journals contain a high proportion of academic words, this study not only finds a similar proportion of use of academic words in lecturers' essays but also points out the rarity of such words in students' essays.

The findings are also in line with Ghaddesy's (1989) and Breeze's study (2008), which concludes that the lexical variation of learners in the beginning level is lower than that of learners in a more advanced level. The present study finds a similar phenomenon among university students and lecturers. After years of studying English, the students are still lower in English proficiency than their lecturers, which explain why their lexical richness is still not on a par with that of their lecturers.

The finding that students rarely use academic words is apparently in line with the finding by Chen and Baker (2010), who found that EFL learners do not frequently produce what is called lexical bundles in their scientific articles.

Breeze (2008) also captured the tendency of learners to use more high-frequency words. This is something obvious in the present report. Lecturers and students alike are fluent in using those frequent words up to the point where their rates of use are similar to each other.

The research by Douglas (2012) also bears relevance to my findings. He proves that lexical richness is strongly associated with writing ability. The findings of this present study can be followed up by a program that enables the students to broaden their vocabulary knowledge. Following the implication of Douglas' study, one can predict students' ability in writing academic papers simply by looking at their degree of lexical richness.

Mastery of vocabulary is also related to the research by Morris and Cobb (2004). Their study concludes that TTR can be used to predict academic success. Students with high TTR may have maintained the habit of reading extensively up to the point where they not only know more words but also internalize the cognitive functioning necessary for learning and understanding academic materials. If this holds true, deliberate attempts can be made among high school students that will make them read more. Higher amount of reading will in turn prime them for a higher level of education.

The finding showing that lecturers wrote more academic words than students did seems a fairly

predictable result. Lecturers, being older than their students and having been engaged in the field much longer than their students, must have read and written a substantial number of essays in the course of their career. Their longer exposure to English and use of English has apparently enabled them to write essays with more academic words than their students did.

Non-significant differences aside, it is interesting to note that students tend to write more K2 words than their lecturers did. This seems to be the corollary of the now widely accepted view that EFL learners commonly use words they have been very familiar with. The use of these familiar words may have been so pervasive that the students also used them for meanings which could actually have been expressed in academic words or other low-frequency words.

Another non-significant difference that nevertheless is worth discussing is the fact that students' off-list words outnumber those written by their lecturers. This may have been caused by the topics of the theses the students wrote. Some of them wrote about literature, and because literature usually uses many words and expressions of literary style, their writing may have contained more words of those types than their lecturers' papers. The study by Olinghouse and Wilson (2013) discussed in the previous section is relevant here because it turns out a similar result. The conclusion that can be drawn is that when students write papers that are closely related to literature, they produce more words that do not belong to high-frequency or academic words.

Still, with regard to the fact that lecturers use fewer off-list words, Siskova's study (2012) can be referred to again to offer an explanation. She found no correlation between lexical density and sophistication. Thus, persons who write fewer sophisticated words do not necessarily lack lexical density. This seems to hold true with the lecturers in my study. They apparently wrote fewer off-list words than the students but in terms of lexical density may have been higher or at least on a par with the students.

From the findings, several suggestions concerning the practical applications can be put forward. First of all, reading courses need to instruct students to comprehend a large amount of materials of various genres and be more aware of the presence of academic and sophisticated words. In addition, a vocabulary course should push the learners to learn and use less frequent lexical items and more academic words. The course should then be linked to a writing course in which they deliberately apply the new lexical items to their essays. This is in line with Papadopoulou (2007) who conducted a study on the effect of vocabulary instruction on the vocabulary knowledge and writing performance of third grade students. She came to the conclusion that

vocabulary instruction improved the students' writing quality and their use of larger number of words taught. By instructing students to use words they have learned in a meaningful context, they will be accustomed to using more varied words in their writing.

Secondly, the learners should be taught how to perform a profiling of their own vocabulary use. Since instruments for this purpose abound in the Internet, they should be able to perform this easily. Once they know the degree of diversity in their own writing, they can take an appropriate action. Thirdly, since vocabulary is obtained mostly from reading, the learners should also be exposed to a variety of texts which boast a wide range of lexical items. They should be made aware of the presence of these words. Along with this, they should be taught synonyms so they can learn how to convey the same messages using different words with similar meanings.

## CONCLUSION

One of the foremost criteria of a good academic writing is the lexical richness. To date, not many studies have been conducted to present a profile of lexical richness among Indonesian scholars. A study with the focus on that area can measure lexical richness through the type-token ratio (TTR), and the frequency of academic words. The paper reports a study aimed at profiling the vocabulary in academic papers written by senior students and their lecturers. Four questions were set to be answered in the analysis: (1) whether the TTR in the students' essays are different from that in their lecturers' essays; (2) whether the use of 2000-word level (henceforth K2) in students' essays differ from that in their lecturers' essays; (3) whether the use of academic words in students' essays differ from that in their lecturers' essays; (4) whether there is a difference between the students' essays and their lecturers' in terms of the use of words other than the 2000-word level and the academic words ("off-list" words).

A sample of 9 lecturers' papers and 9 students' theses were submitted to a vocabulary profiler to see the TTR, and proportions of the K2, academic words, and off-list words. The analysis shows that lecturers write with higher TTR and higher proportion of academic words than the students. Students write slightly more K2 and more off-list words than their lecturers, though the differences are not significant.

The results are consistent with what other previous studies have found. In general, learners at the less advanced level use more K2 words and less academic words than those in a more advanced level. The high TTR is also indicative of good reading habits, which the lecturers have obviously maintained better than the students.

In the light of results, teachers are advised to encourage their students to read widely and to raise their awareness of the presence of academic words and more low-frequency but sophisticated words. Their vocabulary class should make the students learn not only the meanings of some new words but also learn how to produce good discourse with those words. In this fashion, vocabulary course should be linked to writing course. Finally, it is recommended that teachers show the useful role of vocabulary profiler in informing the students how rich their vocabulary has been.

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