

Semantic Categories of Reporting Verbs across Four Disciplines in Research Articles

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Abstract

This paper investigates semantic categories of reporting verbs across four disciplines: Accounting, Applied Linguistics, Engineering and Medicine in research article genre. A general corpus of one million words and sub-corpus (for each discipline) were compiled from a total of 120 articles representing 30 articles from each discipline. In this study, two levels of analysis were conducted. Firstly, I randomly selected five articles from each discipline and read and reread each article identifying what reporting verbs are used, in what context are used and why such reporting verbs are used. This process enabled me to identify semantic categories of reporting verbs. Secondly, on the basis of the identified list of semantic categories of reporting verbs, I used the list in generating concordance output for quantitative textual analysis of each sub-corpus of the four disciplines, as well as the general corpus. The results of the study show that writers from both Accounting and Applied Linguistics are having a high frequency of reporting verbs than writers from Engineering and Medicine disciplines. It also shows that there are certain commonalities and differences between the disciplines. For example, all the disciplines are having frequency of the three semantic categories of reporting verbs but with certain degree of variations. The study recommends raising awareness of students on semantic categories of reporting verbs. The results could also help EAP/ESP teachers in designing course materials for discipline specific reporting verbs. It could also be helpful for textbook course designers in developing textbooks for teaching reporting verbs.

Keywords: affirmation, hedging, neutrality, research article, reporting verbs

1. Introduction

This paper examines various theoretical frameworks of reporting verbs and identifies its own analytical framework. I argue that reporting verbs are primarily divided into three main semantic categories. It is one of the key linguistic features academic writers use to evaluate incorporated sources into their texts, making the writers to be critical about the source text (Kwon, Staples & Partridge, 2018; Charles, 2006; & Thompson & Ye, 1991). A number of studies have been conducted on reporting verbs, focussing on different genres and contexts. For example, Thompson & Ye (1991) examine research paper's introduction section across disciplines. Charles (2006) investigates reporting clauses in doctoral theses between two disciplines. Kwon et al. (2018) look at undergraduate L2 writers' use of reporting verbs. However, little attention has been given to research article genre. This study examines the use of reporting verbs across four contrasting disciplines in research article genre.

Thompson & Ye (1991) investigate reporting verbs across disciplines in an introduction section of research article genre. They classify reporting verbs into two distinct categories: *denotation* and *evaluation*. The former is subdivided into three groups of processes: *textual*, *research* and *mental*. The latter is also subdivided into three groups: *writer's stance*, *writer's interpretation*, as well as *author's stance*. One part of their work is author's stance, which they suggest three options are available for a writer to evaluate someone's proposition or informational content: *negative*, *positive* and *neutral*. However, their study analysed only introduction section of the research article. In addition, the framework is quite complex and there is an overlap among the categories. Another study of reporting verbs is a framework of Francis, Hunston & Manning (1996). Their framework is concerned with semantic category of reporting verbs. They developed the categories from the COBUILD project. They categorised the semantic verbs into four distinct categories:

1.1 Show Verbs

This category is emphasising that something is fact, true or you believe with the reported information or proposition, such verbs are: show, mean, and reveal etc.

1.2 Argue Verbs

This classification is concerned with how writers could argue or take up a position on any issues being discussed, such verbs are: *argue*, *note*, *suggest*, and *claim* etc.

1.3 Find Verbs

This group of verbs are concerned with thinking something or to find something, such verbs are: *realise*, *find*, *establish*, and *observe* etc.

1.4 Think Verbs

Charles (2006) states that this group is concerned with how writers or people think, fear, belief, as well as understanding, such verbs are: *feel*, *hope*, *hold*, and *think* etc.

The above categories have been adapted by many scholars including Charles (2006) in investigating reporting verbs across different genres. In this study, he finds that both disciplines have a high frequency of reporting clause and verb group ARGUE is the most frequent in both corpora. However, Material Science has many occurrences of both FIND and SHOW groups. Friginal (2013) also adapts Francis' et al. (1996) semantic verb categories in investigating reporting verbs of college-level students in their research-based writing. This study affirms that the corpus-based instruction has positive impact on teaching reporting verbs to students. Similarly, Kwon et al. (2018) adapt both frameworks of reporting verbs from Charles (2006) and Friginal (2013) in investigating use of reporting verbs of undergraduate second language learners in their first year classroom writing. The findings of the study reveal that the first year second language learners use similar patterns with upper-level undergraduate writers in using reporting verbs. In another study, Bloch (2009) looks at how online concordance programme can be used in teaching reporting verbs.

A closely related work of reporting verbs is a work of Satika (2002), although she is not specifically concerned with written academic discourse. Her work also sheds light on how speakers could express their *opinion* or *attitude* in relation to a claim. She states that expression of *attitude* relates to how speakers/writers agree or disagree with the claim. On the other hand, expression of *opinion* is concerned with the degree of agreement or disagreement of the claim by speakers or writers. Hunston & Thompson (2000) also use a concept of evaluation to argue that it has three basic functions. One of the functions is concerned with writers' expressing their opinion. Similarly, Hyland's (2000 & 2005) framework on hedges and boosters does not explicitly use the concept of reporting verbs. Nevertheless, the framework is primarily emphasising the degree of commitment of writers towards authors' proposition or informational content presented in their work. Hyland refers to *booster* as an expression of a total commitment or agreement to what the author has been said. On the other hand, *hedging* means showing a partial commitment or doubt on what the author has been said. However, Hyland's category involves some word classes which cannot be considered as reporting verbs such as *certain*, *doubt*, and *of course* etc. In the same vein, Hyland (2002) provides another framework which is specifically concerned with reporting verbs in academic writing. He classifies reporting verbs into three main categories (on the basis of their functions): *research acts*, *cognition acts* and *discourse acts*. Each category is further subdivided, for example, a *discourse act* has two levels of division and *cognition acts* has one level of division. Although his framework looked at all macro-structures of research article, involved many disciplines and adapted a mixed-methods approach, the framework is quite complex. For example, both cognition and discourse acts at one instance are in one category, and there is an overlap in some instances.

Looking at another set of research studies, Hyland & Tse (2005) focus their study on the rhetorical functions of reporting verbs. They classify 'evaluative that' into four categories: evaluative entity, evaluative stance, source of the evaluations and the evaluative expression. They argue that these categories assist writers to manage their discourse, as well as explicitly state their stance towards proposition or informational content. In the same vein, the work of Pectric (2012) indicates that there are differences in terms of using evaluative terms between high and low MA theses. The former uses a wide range of evaluative functions, while the latter usually employs simple attribution to sources. Parkinson (2013) also examines second language writers' use of that-clause in their academic writing. The study shows that the L2 writers are having a limited number of reporting verbs.

Taking a different approach from the above semantic categories of reporting verbs, I classify the reporting verbs into three main semantic analytical categories: affirmation, hedging and neutrality. I will briefly discuss each category.

1.5 Affirmation

This semantic category relates to how writers typically express their absolute commitment or in total agreement to what they have reported. The writers believe in the proposition or informational content cited in their work. Some of the reporting verbs are: *indicate, show, discover, find* etc. This category corresponds to Hyland's (2000 & 2005) boosting although his framework is not specifically on reporting verbs in that it involves different word classes, such as *obvious* (adjective), *clear* (adjective), and *always* (adverb) etc.

1.6 Hedging

Refers to expressing partial commitment to the cited proposition or informational content (Hyland, 2000 & 2005). Writers are very cautious about the claim of the proposition or informational content. They typically use reporting verbs such as *suggest, recommend, and propose*, etc.

1.7 Neutrality

Refers to taking up an objective stance or using 'unevaluated' reporting verbs towards proposition or informational content cited in your work. Writers typically report what the author says without using evaluative reporting verbs, such neutral or unevaluated reporting verbs are: *compare, reports, state, and see* etc. (see appendix I for details of the three categories).

Using my own analytical category of reporting verbs mentioned above, I investigate the use of reporting verbs in research article genre across four contrasting disciplines. The study seeks to address the following research questions:

1. What are the frequencies of reporting verbs across the four contrasting disciplines?
2. What are the most frequent reporting verbs typically used across the four contrasting disciplines?

2. Corpus Data and Method

This study is a quantitative corpus-based approach. A general corpus of one-million word was developed from 120 journal articles in four contrasting disciplines: Medicine, Accounting, Engineering, and Applied linguistics. And a sub-corpus from each discipline was also compiled. In selecting the articles, I set up three criteria:

1. The article must have been written between 2010 and 2018.
2. All the articles must be from peer-reviewed journals published by Science Direct or Indexed in Scopus.
3. All articles must be between 6000 and 10 000 words.

Having set up these criteria, I consulted Faculty members from each mentioned discipline, who have been teaching and researching for more than a decade, on whether the chosen journal can be considered as part of the discipline. This process led me to choose 30 research articles from each discipline. I accessed all the journals online via my University's account. I then downloaded the articles and saved them in separate files for each discipline. After downloading the journal articles, I deleted titles, names of journal, abstracts, authors' details, tables, images, figures, footnotes, references and appendices from each article, I then merged all 30 journal articles into one document of each discipline. This gave us a total word count of each discipline and led us to have a sub-corpus of each discipline. I then converted each sub-corpus into text file. Table 1 shows total word count of each sub-corpus across the four disciplines.

Table 1. Total word count from each sub-corpus across four disciplines

	<i>Discipline</i>	<i>Total number of journals</i>	<i>Total word count</i>
1.	Accounting	30	308 200
2.	Applied linguistics	30	281 195
3.	Engineering	30	275 010
4.	Medicine	30	261 651
	Total	120	1 026 056

As mentioned above, I used my own semantic analytical category of reporting verbs (see appendix 1). I developed the analytical category by selecting five journal articles from each discipline making a total of twenty journal articles across the four disciplines. I then read and reread each journal article across its macro-structures, identifying what reporting verbs are used, why such reporting verbs are used and in which context the reporting verbs are used. Each reporting verb identified was recorded and categorised on the basis of its semantic use in

that context. The identified reporting verbs were served as my analytical list for the main concordance analysis (see appendix 1 for complete list of the reporting verbs).

Having identified my complete list of reporting verbs, I set up the concordance software, AntConc (Anthony, 2018), which I used in the concordance analysis. Initially, I uploaded each sub-corpus separately on the concordance software, after uploading it, I made a query of each reporting verb on my analytical category list, the output of each query was saved in a separate file and a copy was also printed for manual analysis. I did follow similar processes for all the sub-corpora.

The concordance output for each sub-corpus was examined by looking at each citation of the reporting verb through cotext and context to determine whether each occurrence can be considered as a reporting verb in that context. Because in some occurrences some words are having different word classes for example, *claim* (noun); *report* (noun) etc. each identified item was marked and recorded. I then counted occurrences of each reporting verb in the whole sub-corpus and calculated its total frequency per 10 000 words. In the next section, I will present findings of the study.

3. Results

I will now present the results of the findings of the study. I will begin by presenting the frequency of three semantic categories of reporting verbs across the four disciplines.

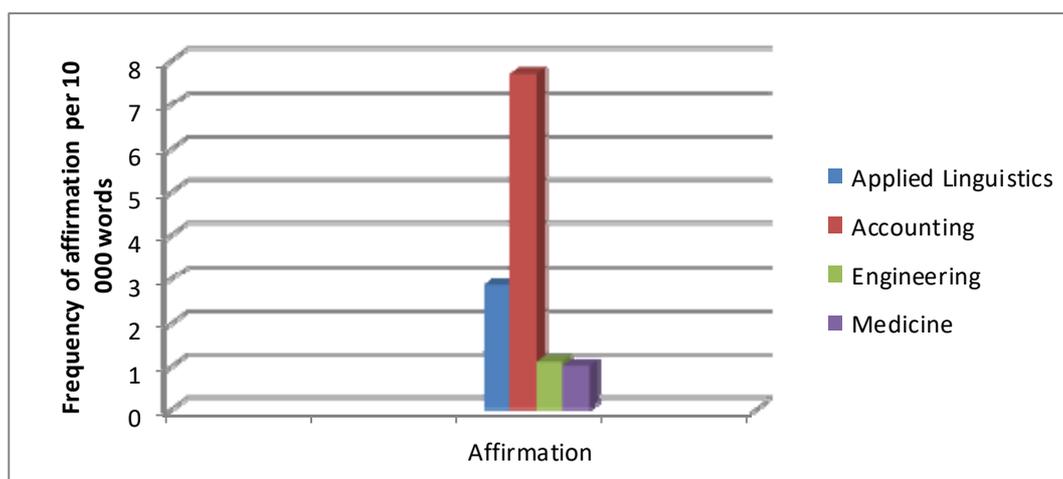


Figure 1. Frequencies of Affirmation across the four disciplines

The results in figure one show that there are quite differences in terms of frequencies of affirmative category of reporting verbs among the four disciplines. As can be seen in figure one Accounting has the highest frequency of 7.69 times per ten thousand words; Applied Linguistics is the second in terms of the highest frequency having occurrences of 2.84 times per ten thousand words. Engineering is the third with frequency of 1.09 time per ten thousand words; and Medicine is having the lowest frequency of less than 1 time per ten thousand words. One example from Accounting sub-corpus states that:

[72] ...Gram (2003) *shows* that foreign tax credits decree... (Accounting sub-corpus)

In the above extract, the writer uses affirmative verb, SHOW to evaluate what he/she has been reporting in his/her research. As such the writer has an absolute commitment or belief in the informational content.

Overall, this result indicates that there are quite considerable differences of frequency of affirmative verbs among the four disciplines. For example, disciplines which belong to Arts or Humanities are having a high frequency of reporting verbs. On the other hand, disciplines from Science and Engineering are having a low frequency.

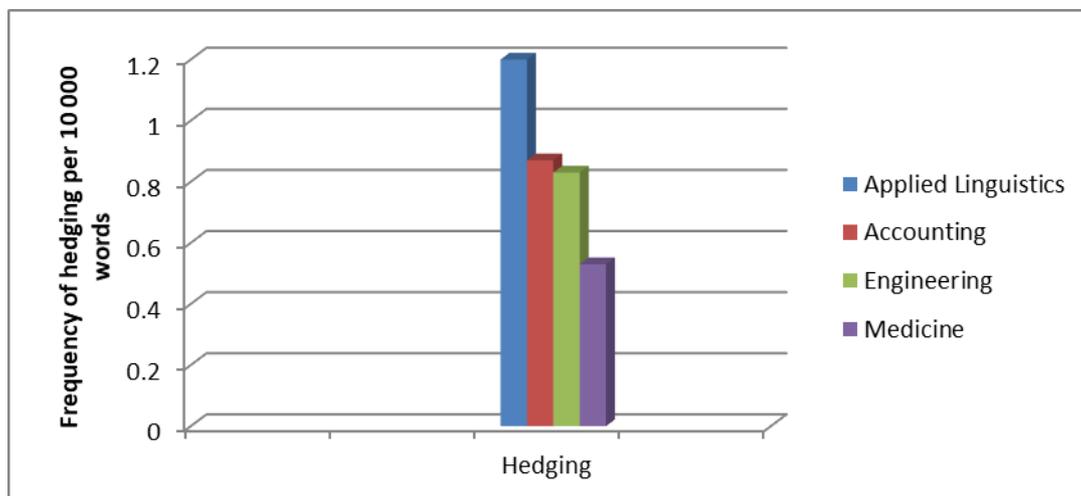


Figure 2. Frequencies of Hedging across the four disciplines

The results in figure two again show similar patterns with the results in figure one, that both disciplines of Applied Linguistics and Accounting are having a high frequency of hedging, whereas the Engineering and Medicine are having a low frequency of hedging. For example, Applied Linguistics has 1.20 occurrences of hedging per ten thousand words; Accounting is the second with a frequency of 0.87 time per ten thousand words; the third in the figure in terms of the frequency is Engineering with a frequency of 0.83 time per ten thousand words; and Medicine is the fourth with occurrence of 0.53 time per ten thousand words. This clearly indicates the variations in using the hedging among the four disciplines. An example from Applied linguistics sub-corpus states that:

[4]...Adel and Garretson (2006) *suggest* that one possible reason... (Applied Linguistics sub-corpus)

The writer in the above extract is cautious in reporting author’s proposition, he/she chooses to use reporting verb SUGGEST, indicating his/her partial commitment to the cited information.

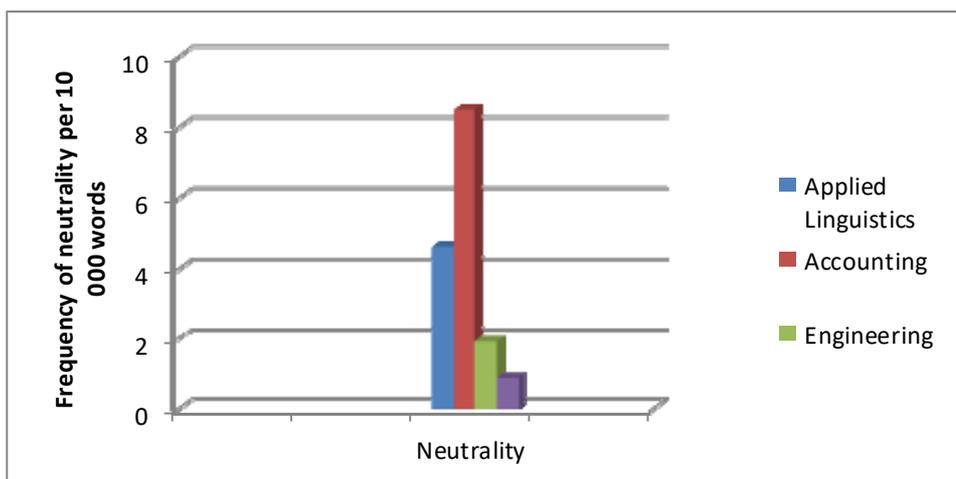


Figure 3. Frequencies of Neutrality across the four disciplines

The figure 3 shows result of neutral reporting verbs among the four disciplines. This again indicates similar patterns with both figures one and two. As can be seen Accounting has the highest frequency of neutral reporting verbs of 8.47 times per ten thousand words; Applied Linguistics again is second with a frequency of 4.66 times per ten thousand words; Engineering still maintains its third position with occurrences of 1.89 times per ten thousand words; and Medicine is having the lowest frequency of 0.88 time per ten thousand words. For example, one author from the Medicine sub-corpus says:

[37]...Tompkins (1995) *notes* that some RBD patients sound... (Medicine sub-corpus)

The writer in the above extract does not take up any evaluative stance towards the cited text but rather he/she reports ‘objectively’ what the author has said through the use of neutral verb NOTE.

Overall, the results in the figure 3 show that all the four disciplines use all the three categories of reporting verbs. However, there are variations in terms of using them across the disciplines. For example, the three disciplines: Applied Linguistics, Accounting and Engineering are having a high frequency of neutral reporting verbs than other two categories; whereas Medicine has a high frequency of affirmative reporting verbs than the other two categories. Surprisingly, those three disciplines that are having a highest frequency of neutral verbs, indicate that affirmative is the second most frequent reporting verbs in their sub-corpora; and hedging is having the lowest frequency among the four disciplines. However, in Medicine the neutral verb category is second in terms of frequency.

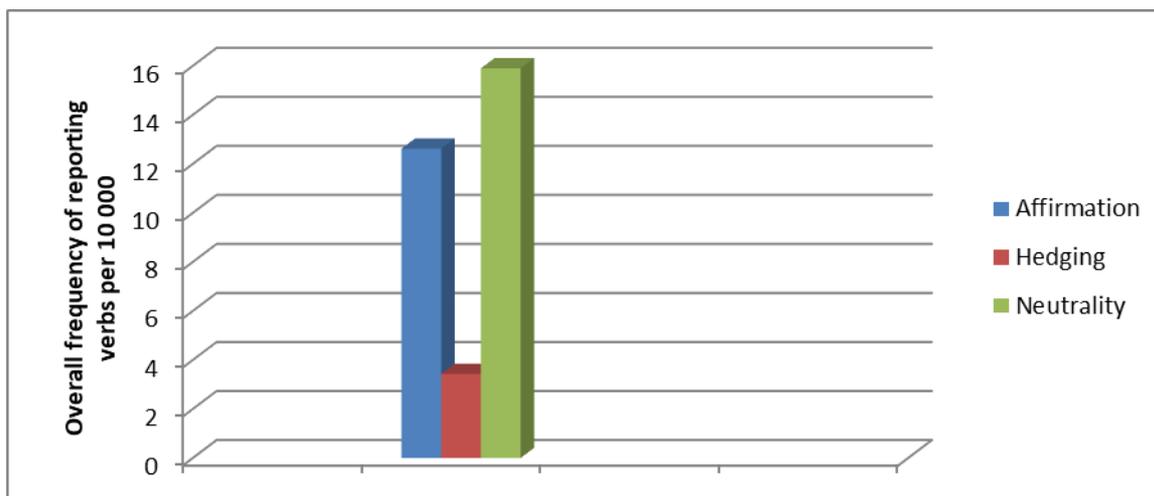


Figure 4. Overall frequencies of semantic categories of reporting verbs across the four disciplines

The figure four is an overall result of frequency of three categories of reporting verbs in the general corpus of the four disciplines. As can be seen among the three categories, neutral reporting verb is having a high frequency of 15.9 times per ten thousand words, followed by affirmative category with a frequency of 12.62 times per ten thousand words, while hedging is the least with the total frequency of 3.43 times per ten thousand words. This clearly indicates that writers across the four disciplines typically use more neutral reporting verbs than other semantic categories of reporting verbs. Having identified the frequencies of reporting verbs across the disciplines, I will now focus my attention to the most frequently used reporting verbs in each category of the verb among the four disciplines.

Table 2. Ten most frequent affirmative reporting verbs across four disciplines

	<i>Applied Linguistics</i>	<i>Accounting</i>	<i>Engineering</i>	<i>Medicine</i>
1.	Find	Find	Develop	Demonstrate
2.	Show	Show	Demonstrate	Find
3.	Indicate	Conclude	Find	Show
4.	Conclude	Develop	Indicate	Indicate
5.	Develop	Point out	Point out	
6.	Maintain	Confirm	Show	
7.	Discover	Demonstrate	Reveal	
8.	Assert	Identify	Prove	
9.	Identify	Assert		
10.	Believe	Indicate		

The results in table 2 indicate that both disciplines of Applied Linguistics and Accounting used a wide range of affirmative reporting verbs. As can be seen in the table that they both have ten most frequent verbs and verbs FIND and SHOW appeared as first and second on the list of the two disciplines. Furthermore, some verbs appear on the list of the two disciplines, such as INDICATE, CONCLUDE, ASSERT, DEVELOP and IDENTIFY. On the other hand, they have three different verbs as one of their most frequent. For example, Applied Linguistics has MAINTAIN, DISCOVER and BELIEVE; whereas Accounting has POINT OUT, CONFIRM and

DEMONSTRATE. In contrast, both Engineering and Medicine disciplines are having fewer reporting verbs compared with the Applied Linguistics and Accounting. This can be seen in table 2, Engineering has eight verbs, and Medicine has only four verbs, they both have DEMONSTRATE, FIND, SHOW and INDICATE. However, Engineering has more verbs of DEVELOP, POINT OUT, REVEAL and PROVE.

Overall, the results show that writers from Applied Linguistics and Accounting have used a wide range of affirmative verbs, while writers from both Engineering and Medicine have used a limited number of affirmative reporting verbs. Moreover, the findings indicate that there are certain commonalities in terms of using some reporting verbs across the disciplines, such as FIND, SHOW, and INDICATE. On the other hand, there are certain differences in relation to using affirmative verbs across the disciplines, such as MAINTAIN appears only in Applied Linguistics; while CONFIRM occurs only in Accounting; and REVEAL and PROVE appear only in Engineering.

Table 3. Most frequent hedging across the four disciplines

	<i>Applied Linguistics</i>	<i>Accounting</i>	<i>Engineering</i>	<i>Medicine</i>
1.	Suggest	Claim	Propose	Suggest
2	Propose	Assume	Suggest	Claim
3	Recommend	Question	Assume	Assume
4	Claim	Attribute	Question	Propose
5	Assume	Recommend		
6	Encourage	Propose		
7	Attribute			

The results in table 3 still reflect similar patterns with the results in table 2. Although both Applied Linguistics and Accounting do not have ten most frequent reporting verbs, but still shows that they have more types of reporting verbs than both Engineering and Medicine. For example, both Applied Linguistics and Accounting have some commonalities of some verbs: PROPOSE, CLAIM, ASSUME, RECOMMEND, and ATTRIBUTE as most frequent use. On the other hand, they have some kind of differences that Applied Linguistics has SUGGEST and ENCOURAGE; whereas Accounting has QUESTION. In contrast, both Engineering and Medicine have a few most frequent hedging. They both have four most frequent verbs with similarity in PROPOSE, SUGGEST, and ASSUME. On the other hand, Engineering has QUESTION, and Medicine has CLAIM as their major difference.

Looking at the four disciplines, we can say that there are certain similarities and differences in terms of most frequent hedging. With regard to similarities, all the four disciplines have ASSUME and PROPOSE. On the other hand, there are quite differences among the disciplines, for example, ATTRIBUTE and ENCOURAGE appear only in Applied Linguistics, QUESTION occurs only in Accounting and Engineering, and SUGGEST appears in all with exception in Accounting, etc.

Table 4. Ten most frequent neutral reporting verbs across the four disciplines

	<i>Applied Linguistics</i>	<i>Accounting</i>	<i>Engineering</i>	<i>Medicine</i>
1.	Examine	Argue	Describe	Report
2	Describe	Examine	Discuss	Note
3	Report	Report	Investigate	Argue
4	Argue	Document	Note	Describe
5	Compare	Investigate	Explore	Compare
6	Explain	Discuss	Compare	Address
7	Discuss	Note	Classify	
8	State	Address	Report	
9	Explore	State	Analyse	
10	Mention	Explore	Mention	

In contrast to the results in tables 2 and 3, the results in table 4 show that three disciplines have ten most frequent neutral verbs, while Medicine has only six neutral verbs. One striking finding is that none of the disciplines share a significant number of neutral verbs, that they share only REPORT which appears in all the disciplines. However, in some instances there are some reporting verbs which appear in two disciplines, such as STATE occurs in both Applied Linguistics and Accounting. Similarly, there are some neutral verbs which appear in three out of the four disciplines. For example, DISCUSS and EXPLORE appear in Applied Linguistics, Accounting and Engineering, while COMPARE occurs in Applied Linguistic, Engineering, and Medicine. On the other hand, NOTE appears in Accounting, Engineering and Medicine. Overall, this result shows that all the four disciplines are typically having wide range of neutral reporting verbs. This suggests that writers are more frequently reporting authors' proposition or informational content without evaluating it.

4. Discussion

One of the findings of this study corroborates findings of Charles (2006) and Hyland and Tse (2005) that there are variations of frequency in using reporting verbs across disciplines. As stated above, both Applied Linguistics and Accounting are having higher frequencies of reporting verbs compared with Engineering and Medicine, where they are having lower frequencies of reporting verbs. Furthermore, as can be seen above, the patterns of most frequent reporting verbs reflect similar patterns that writers from both Applied Linguistics and Accounting have used a wide range of reporting verbs, whereas writers from Engineering and Medicine have used a few reporting verbs. This suggests that writers from disciplines which can be categorised as Arts or Humanities are typically using a lot of reporting verbs. This might be as a result of disciplinary nature of the discourse, where the issue of subjectivity is prevalent. Thus, they tend to use lots of reporting verbs. On the other hand, disciplinary discourse of both Engineering and Medicine do not solely depend on subjectivity but rather they tend to use more objective stance as well. They usually use a lot of symbols, formula and images, unlike in Humanities. This could be one of the possible reasons that they have used a limited range of reporting verbs.

Unlike the findings of the previous studies, this study shows that neutral reporting verbs are having a high frequency in three out of the four disciplines. In fact, the overall results show that neutral reporting verb is having a high frequency than other semantic categories of reporting verbs. In spite of variations of most frequent neutral reporting verbs among the disciplines, the results show that all the disciplines have used a wide range of neutral verbs compared with other two categories of the reporting verbs. This suggests that writers from all the disciplines are more frequently using neutral reporting verbs in their texts. In other words, they are objectively reporting authors' proposition or informational content without evaluating it.

In terms of semantic categories of reporting verbs, Thompson & Ye (1991) provide only eight verbs. However, this study identifies more neutral verbs as can be seen in table 4, as well as a complete list of the items in appendix 1. Furthermore, the various studies mentioned above have provided different kind of semantic categories. For example, Francis et al. (1996) classify reporting verbs into four main categories. However, in this study I argue that we have only three main categories of reporting verbs: *affirmative*, *hedging* and *neutrality*. Whatever we are going to report we typically use one of the three categories. In other words, all reporting verbs are performing three basic functions as argued in this paper.

5. Conclusion

This study investigated the use of reporting verbs across four disciplines. It also introduced more neutral reporting verbs. As can be seen from the results there are certain commonalities and differences among the four disciplines in terms of using the three semantic categories of reporting verbs. One of the commonalities is a high frequency of neutral reporting verbs, suggesting that writers are typically reporting the authors' proposition without evaluating it. On the other hand, writers from disciplines of Accounting and Applied Linguistics are having a high frequency of all reporting verbs compared with the writers from Engineering and Medicine. The paper also showed that the previous studies classified verbs into many categories, arguing that we have only three main categories of reporting verbs as shown above.

Although this study involved a wide range of research articles across four disciplines and conducted the study across the whole macrostructure of the articles; there is a need to expand the study to include more genres, such as PhD thesis and student's undergraduate projects etc. This could probably provide a more generic result. Further, the size of the corpus could be extended to be more than one million words.

6. Teaching Implication

The findings of this study could be used for EAP/ESP teachers, as well as textbook writers. This could probably assist EAP/ESP students across the four disciplines in using reporting verbs in their academic disciplines. For example, teachers could develop course materials focusing on the three semantic categories of reporting verbs. They could also raise the awareness of students regarding the main functions of each category. Furthermore, teachers could also use a concordance out from an authentic text. The output could be given to the students to work out by themselves what reporting verbs are used in the context. They could also be asked what types of semantic reporting verbs are used in the context. In addition, teachers could also present some relevant research articles to the students and ask them to identify various types of reporting verbs used in a particular rhetorical section of the article. This could probably assist the students to learn how to use different kind of reporting verbs in academic writing.

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Appendix 1

SEMANTIC CATEGORIES OF REPORTING VERBS

SN.	AFFIRMATION	HEDGING	NEUTRALITY
1	Demonstrate	Assume	Report
2	Show	Postulate	contend
3	Identify	Propose	focus
4	Conclude	Claim	Analyse
5	Develop	Recommend	Note
6	Maintain	Suggest	Argue
7	Reveal	Encourage	Mention
8	Find	Question	Explain
9	Point out	Hypothesise	Examine
10	Discover	Imply	Say
11	Confirm	Attribute	Describe
12	Assert		See
13	Indicate		Document
14	Believe		Address
15	Prove		Investigate
16			Compare
17			Explore
18			Contribute
19			address
20			Classify
21			Observe
22			Comment
23			Discuss
24			Stress
25			Define
26			Elaborate
26			State
27			Expand
28			Interpret
29			Illustrate
30			Distinguish
31			Highlight

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