# Tense Analysis in Rhetorical Movement of Results and Discussion Chapters of Master's Theses in Hard Sciences

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## Abstract

In order to gain insights into the tense profile in master theses' Integrated Results and Discussion chapters, the present study investigated the use of tenses in obligatory rhetorical units (moves and steps) in 20 master's theses in the hard sciences written by ESL students within a period of 10 years from 2002 to 2012. To conduct the study, a mixed method of quantitative and qualitative approaches was adopted. The quantitative analysis was conducted to locate the tenses in the identified obligatory rhetorical units of the corpus. Besides, to enhance the robustness of the methodology, the shifts in the use of the tenses and possible reasons for tense preferences in the obligatory rhetorical units were investigated qualitatively in the form of contextual analysis. The contextual analysis revealed that the simple present tense (66.03%) was the most preferred tense, followed by the use of simple past tense (28.14%). Also, the contextual analysis revealed that the contributing factors in the tense choices were temporal aspects, rhetorical unit function, nature of disciplines, the structure of the report, writer's personal tendency, and level of generalizability of issues.
**Keywords:** tense, obligatory rhetorical units (moves and steps), contextual analysis

## INTRODUCTION

Tense and aspects, as essential parts of language grammar, are explicable in terms of verb that show the time, continuance, or completion of an action or a state. In English language grammar, tense refers to the time point when an event occurred (past, present, future). Larsen-Freeman, Kuehn, and Haccius (1999) stated that the choice of English verb tenses is one of the most difficult grammatical areas for ESL. However, very few studies focused on the investigation of tense in the ESL master students' theses. To address this concern, the present study investigated patterns of tenses that were used in the conventional rhetorical units (moves and steps) in Integrated Results and Discussion chapters of

master's theses in the hard sciences. An awareness of appropriate tense choice in rhetorical units of texts may assist ESL (English as a Second Language) students in achieving a better performance in their writing tasks. Consequently, this awareness of tense use may assist ESL master students to efficiently produce their Results and Discussion chapter which is the most difficult chapter of their theses to write (Nguyen & Pramoolsook, 2015; Burrough-Boenisch, 2003). A move can be defined in terms of a rhetorical unit in written or spoken language that helps to coherently improve the communicative function of language (Swales, 2004). In agreement with this view, Holmes (1997, p. 325) defined a move as "a segment of a text that is shaped and constrained by a specific communicative function". According to Dudley-Evans and St Johns (1998, as cited in Nodoushan & Montazeran, 2012, p. 3), step is "a lower level text unit than the move that provides a detailed perspective on the options open to the writer in setting out the moves".

A number of studies have investigated tense usage in academic discourses. For example, Salager-Meyer (1992) investigated how meaning in terms of the tense application was conveyed in Medical journal articles' abstracts. The results of Salager-Meyer's (1992) study demonstrated that the past, present, and present perfect tenses were the most frequently used tenses in different rhetorical units of the study's texts. Salager-Meyer (1992) discussed that in total seven rhetorical moves were used in the examined texts. According to Salager-Meyer (1992), the past tense was the dominant used tense in the rhetorical units (moves) of results, methods, and purpose sections of the investigated texts. However, in data synthesis and conclusion moves, the past tense was used with a lower frequency of usage since according to Salager-Meyer (1992), the data presented in these moves are timeless and generalizations. Besides, in the statement of the problem rhetorical move, the present perfect tense followed by the simple present tense were the most frequently used tenses. On the other hand, the present tense was employed mostly in data synthesis and recommendations moves with a high frequency of occurrences.

In a more recent research, Fallahi and Erzi (2003) studied the tense patterns in the rhetorical units of Discussion sections of language teaching research articles. They found that in information move, 95% of all the used tenses were the present tense. This tense application is explicable in terms of the communicative purpose of the move. Since in the information move the writers attempted to provide facts and accepted norms of the language teaching, it required the authors to communicate meanings using the simple present tense. Consequently, it can be stated that there is a relationship between the nature of any communicative event and the application of verb tenses. On the other hand, in the unexpected outcome move, the proposition was mostly communicated in the past tense which was perhaps a sign of nongeneralisablity of the presented result. In the claim move, and also in the explanation move, the use of the present tense exceeded that of the other verb tenses. This use of the present tense in Fallahi and Erzi's (2003) study was also observed in the other three moves namely limitation, recommendation, and restatement of hypothesis. Finally, the procedure move was predominantly communicated in the past tense.

As a conclusion, in academic writing, the tenses of the simple present and the simple past are generally used more than the other tenses. The literature review also revealed that the simple present tense is an expression of general truths and invariable scientific facts. Besides, the simple present tense is utilized whenever the writers intend to place their findings among the accepted principles of scientific discourse communities. On the other hand, the simple past tense is used whenever the writers intend to refer to the used methodology of a research. Furthermore, there are some cases of the use of the simple past tense in referring to previous research.

As the review of the above-stated studies revealed, the focus of research has mostly been on the research articles. Furthermore, there are other studies that delved into the patterns of the used linguistic features of different sections of research articles. Additionally, Nguyen and Pramoolsook (2015) stated that most of the studies are on the texts produced by native speakers of English. Besides, in paying attention to post-graduate students' writing, plenty of research has been conducted on PhD theses. However, very few studies focused on the linguistic features (such as tense) of the Integrated Results and Discussion chapter of ESL master students' theses. In order to fill these gaps in the literature, the present study focused on the tense profile in Integrated Results and Discussion chapters of ESL students.

## METHOD

In the present study, the tense patterns in the 11 obligatory rhetorical units (moves and steps) of the Integrated Results and Discussion chapters of 20 master's theses from the hard sciences (Physics and Chemistry) were investigated. The classification of the moves and steps was based on the adapted framework proposed by Kanoksilapatham (2005). Moreover, the taxonomy of obligatory moves and steps was based on Kanoksilapatham's (2005) argument who maintained that if a rhetorical unit (move or step) was found in 60% or in more than 60% of the total number of all the examined text(s) (in case of this study equals to 12 or more than 12 out of 20 theses), it can be an evaluated as an obligatory rhetorical unit. As such, firstly obligatory rhetorical units of the Results and Discussion chapters of the master's theses were investigated. Secondly, the numbers and percentages of the used verb tenses in the obligatory rhetorical units were identified. Thirdly, the textual analysis was conducted in order to find out the possible reasons for tense preferences and shifts in the rhetorical moves and steps.

## DATA OF THE STUDY

The data of the present study comprised 11 obligatory rhetorical units (moves and steps) that were identified in the corpus of the study. The corpus of the study consisted of 20 Integrated Results and Discussion chapters of master's theses written by ESL students in the hard sciences (Chemistry and Physics) in a Malaysian public university. The titles of the theses are presented in Appendix. For ethical issues, the names of the authors are not stated. Additionally, a permission letter was obtained from the university which holds the copyright of the theses. The theses are codified and the codes are used in the excerpts

presented in the results of the study to demonstrate the use of tenses in the rhetorical moves and steps.

## RESULTS AND DISCUSSION

### Overall distribution of tense

Table 1 shows the distribution of different verb tenses embedded in all the obligatory rhetorical units of the corpus.

**Table 1.** Overall distribution of tenses

| Verb Tense | *F ** (%) |
|---|---|
| Simple Present | 1110 (66.03) |
| Present Continuous | 5 (0.30) |
| Present Perfect | 48 (2.86) |
| Simple Past | 473 (28.14) |
| Past Continuous | 13 (0.77) |
| Past Perfect | 5 (0.30) |
| Simple Future | 27 (1.61) |
| Total | 1681 (100) |

*F Indicates frequency of occurrence

**(%) Indelicate percentage of occurrence

As observed in Table 1, the most noteworthy pattern of tense use was the extensive use of the simple present tense. This dominant use of the simple present tense was followed by the use of the simple past as the second frequently identified tense. Another noticeable pattern of the verb tenses was the negligible occurrences of the continuous, perfective, and future tenses.

In agreement with the results of the present study, the scarce use of the simple future tense in the academic writing was echoed by Sime (1990, p. 170). Sime (1990) advised writers to avoid using the future tense in academic writing. According to Sime (1990), the use of the simple future tense is inappropriate in scientific report writing. In line with this view, Taylor (2001) expected the use of the simple future only in the social science disciplines. Taylor (2001) added that the construction of arguments in the hard sciences is different from those of social sciences, and consequently the simple future tense is scarcely used in the hard sciences' arguments. As an example, Taylor (2001) discussed that in Chemistry experimental research, before writing the report, the experiment may have been completed, therefore it is inappropriate to use the simple future tense to refer to the conducted experiment. On the contrary, Taylor (2001) also discussed, in the social science disciplines, an argument is commonly constructed gradually. Hence, this sense of advancement may be conveyed by the use of the future tense.

### Tense in obligatory rhetorical units

The rhetorical units (moves and steps) of structure of the section, describing aims and purposes, listing procedures or methodological techniques, citing established knowledge

of the procedure, pointer, substantiating results, explaining the results, making generalizations or interpretations of the results, evaluating the current findings with those from previous studies or with regard to the hypotheses, describing established knowledge, and referring to previous literature were found in 12 theses (out of total 20 theses). Therefore, these rhetorical units were considered obligatory. Following is a discussion in relation to the identified tenses in the obligatory rhetorical units of the corpus.

**Table 2.** Distribution of tenses in obligatory rhetorical units

|  | SPF<br>F (%) | PC<br>F (%) | PP<br>F (%) | SPa<br>F (%) | PaC<br>F (%) | PaP<br>F (%) | SF<br>F (%) |
|---|---|---|---|---|---|---|---|
| Structure of Section | 12<br>(60) | 0 | 2<br>(10) | 5<br>(25) | 0 | 0 | 1<br>(5) |
| Describing Aims and Purposes | 3<br>(12) | 0 | 4<br>(16) | 16<br>(64) | 1<br>(4) | 0 | 1<br>(4) |
| Listing Procedures or Methodological Techniques | 28<br>(18.42) | 0 | 10<br>(6.58) | 100<br>(65.79) | 9<br>(5.92) | 0 | 5<br>(3.29) |
| Citing Established Knowledge of Procedure | 65<br>(81.25) | 0 | 1<br>(1.25) | 14<br>(17.50) | 0 | 0 | 0 |
| Pointer | 281<br>(91.23) | 2<br>(0.65) | 3<br>(0.97) | 21<br>(6.82) | 0 | 1<br>(0.32) | 0 |
| Substantiating Results | 281<br>(62.31) | 1<br>(0.22) | 5<br>(1.11) | 159<br>(35.25) | 1<br>(0.22) | 1<br>(0.22) | 3<br>(0.67) |
| Explaining the Results | 120<br>(70.59) | 0 | 3<br>(1.76) | 47<br>(27.65) | 0 | 0 | 0 |
| Making Generalizations or Interpretations of Results | 55<br>(73.33) | 0 | 1<br>(1.33) | 13<br>(17.33) | 0 | 0 | 6<br>(8) |
| Evaluating Current Findings with Those from Previous Studies or Hypotheses | 46<br>(52.87) | 0 | 8<br>(9.20) | 33<br>(37.93) | 0 | 0 | 0 |
| Describing Established Knowledge | 192<br>(82.05) | 2<br>(0.85) | 5<br>(2.14) | 29<br>(12.39) | 2<br>(0.85) | 0 | 4<br>(1.71) |
| Referring to Previous Literature | 27<br>(34.18) | 0 | 6<br>(7.59) | 36<br>(45.57) | 0 | 3<br>(3.80) | 7<br>(8.86) |

SP: Simple Present, PC: Present Continuous, PP: Present Perfect, SPa: Simple Past, PaC: Past Continuous, PaP: Past Perfect, SF: Simple Future

## Structure of section

In 'Structure of Section' move, the authors introduced the order and content of the texts. The percentage of occurrence of the simple present as the dominantly used tense in this rhetorical unit was 60. The simple past as the second most frequently employed tense was used 25% in structure of the section move. Below is an excerpt from the corpus

illustrating the use of the simple present tense as the dominant tense in structure of section:

*The results and discussion of the micostrip ring resonator for moisture measurement using both seeds and fruits of the oil palm fruit as samples **are given** in detail in this chapter.* (PH1)

As such, it can be stated that the location of the appearance of this move in the theses played a role in its tense choice. Furthermore, it was found that in all the 5 cases of occurrences of the past tense in structure of section, it appeared at the end of the Results and Discussion chapters (or the sub-sections) in order to describe the content of the sections or chapters. For example:

*This section **investigated** the performance of the sensor based on these different parameters with the objective to determine m.c. from reflection measurement.* (PH8)

On the other hand, the function of this rhetorical unit to some extents necessitated the use of the simple future tense, because it directs the reader to what is going to be presented in the succeeding part of the text. For example:

*Section 5.3.1 **will compare** the measured and calculated phase using King's model.* (PH8)

In line with this result, Watson (1992, p. 90) in his guide to philosophical writing advocated the use of the simple future tense in this rhetorical unit and further argued that in structure of the section move, the future tense takes the reader on a "voyage of discovery".

## Describing aims and purposes

This step explained the aims and purposes of the study. The simple past as the dominant tense in this these step was used with an occurrence of 64%. The example below shows the use of the simple past in describing aims and purposes step:

*The response behavior of two different crystals to in different aqueous solutions **was compared** to investigate the factor influencing the frequency changes of the crystal. The grafting reactions **were studied** from 50°C to 70°C.* (PH7)

Furthermore, the marginal appearance of the present perfect tense in this step with an occurrence of 16% is explicable in terms of the laboratory-based subject area of the examined texts. For example, in Chemistry as a laboratory-based discipline (Hofstein & Lunetta, 2004; Hofstein, 2004), it was evidenced that the results of the study started in a time in the past and were completed in a time period, and consequently the present perfect tense was used. The following example that is extracted from the present study clarifies how the present perfect was used in describing aims and purposes.

*The conductivity Ppy/MMT nanocomposites **have been studied** by increasing the percentage of MMT from 1% to 7%.* (CH5)

Finally, the simple present had a low percentage of use (12%) in this step. Although other tenses were used in this rhetorical unit as well, the percentages of their occurrences were negligible. This finding was found to be consistent with Weissberg and Buker (1990) who mentioned that the purpose of a study should be expressed in the simple past tense.

However, inconsistent with the findings of the present study, in another study carried out by Fallahi and Erzi (2003), the information rhetorical (which focused on the aims and objectives of the study) unit was discussed mostly in the simple present tense. Additionally, Taylor (2001) stated that the simple present tense can be used to clarify the objectives of a study. Taylor (2001, p. 57) further discussed that the function of this rhetorical unit is to refer to a "work in the process" and because the arguments are constructed "simultaneous with the moment of writing", the use of the simple present tense outnumbers that of the other tenses in this step. The use of the simple present tense in describing aims and purposes move in Fallahi and Erzi's (2003) study was in line with Taylor's (2001, p.57) study who stated that the simple present tense is used whenever "the moment of an event or action coincides with the moment of utterance". However, consistent with the present study's results, Swales and Feak (1994), Salager-Meyer (1992), as well as Swales (1990) mentioned that in this specific rhetorical unit, the simple past tense was not an appropriate tense choice and it could only be used in limited circumstances. As such, the use of the simple past tense may be justified in terms of the completeness and remoteness of the provided information in reporting research.

## Listing procedures or methodological techniques

The procedures or methodological techniques employed in the production of the data were presented in this step. The most dominantly used tense in listing procedures or methodological techniques was the simple past tense with an occurrence of 65.79%. Then, the second most frequently used tense was the simple present tense with 18.42% of occurrences. In line with this result, Taylor (2001) emphasized that referring to what has been stated earlier in a study, which was defined by Taylor (2001, p. 49) as "recapitulation", might be presented either in the simple past or the simple present tenses. However, some other researchers favoured the use of the past tense to represent the methodology of a study. For example, the dominant use of the simple past tense in communicating employed methodological techniques of research studies was attested by Lackstrom, Selinker, and Trimble (1973) who maintained that employed methods may be presented by the use of the simple past tense in order to avoid generalizability. In tandem with this idea and in agreement with the results of the present study, Fallahi and Erzi (2003) opined that conventionally methodological techniques are discussed in the simple past tense. The following examples from the corpus demonstrate the use of the past tense in this step:

*The addition of pyrrole monomer to the MMT **was accompanied** by a gradual colour change of the reaction system from light gray to greenish-blue to black, indication of formation of Ppy in the MMT.* (CH5)

*Lastly, all the regression equations to predict m.c.* **were tested** *and* **analysed** *for accuracy by comparing the predicted m.cwith actual m.cobtained from standard oven drying method.* (PH8)

In addition, the frequency of occurrence of the present perfect tense in this rhetorical unit was 10 (6.58%), which may be attributed to the nature of the disciplines of study. According to Hofstein and Lunetta (2004) and Hofstein (2004), in the laboratory-based disciplines of study such as Chemistry and Physics, the data preparation starts in a time in the past and continues to a certain time as the study develops. As a result, this process requires the use of the present perfect tense. For example:

*Ppy/MMT nanocomposites* **have been prepared** *with the same ratio of concentration pyrrole monomer (0.1 M) and FeCl3 (0.4 M).* (CH5)

### Citing established knowledge of the procedure

This step provides established findings that have impacted the choice of procedures. The simple present tense was overwhelmingly used in presenting this step (81.25%). For example:

*The AFM analysis* **is used** *to determine the physical parameters of microstructural properties or factors such as grain size, grain growth, shape of grain, porosity distribution of each sample.* (PH4)

The reason for the very high frequency of use of the simple present tense in  this step can be explained in terms of the level of generality of this step that discussed what has been established in the employed methodology since the simple present, as Lackstrom, Selinker, and Trimble (1973) mentioned, offers generality of a claim or an issue. This dominant use of the simple present tense in this rhetorical unit may also be interpreted as a sign that the student writers tried to add credibility and validity to the methodology used.

## Pointer

As an obligatory rhetorical unit, 'Pointer' communicated which data were to be discussed. Pointer expressed immediate reference to tables, graphs, diagrams, and so forth. The simple present tense with a percentage of use of 91.23 was dominantly used in this step. The simple past with low frequency of 6.82% was the second most frequently used tense in pointers.

The high frequency of the use of the simple present tense to refer to the visual elements (such as graph or table) in this rhetorical unit was completely expected and is explicable in terms of the function of this step. It directed the readers' attention to what existed in the texts. The high frequency of use of the simple present tense in pointers may also be interpreted as a sign that in this step, the moment of the utterance concurred with the moment of the event. The example below demonstrates the use of simple present tense as the dominant tense in communicating pointer step.

*The calculated lattice parameters (a, b and c) and unit cell volume for the samples **are tabulated** in Table 5.1.* (PH5)

In addition, this preference in the use of the simple present tense in pointer is consistent with the study of Brett (1994) who found that pointer is signalled by the use of the simple present tense. The other tenses had negligible occurrences of use of less than 1% in pointer. For example, some occurrences of the simple past tense were observed. The contextual analysis indicated that when the writers pointed to a table, graph, and similar information which were found in a preceding sections or sub-sections, the simple past tense was used. The following excerpt illustrated how the writer chose the simple past tense to refer to a section. For example:

*The SEM photographs of unloaded zeolite and cerium-loaded zeolite **were given** in plates 4.4-4.7.* (CH5)

## Substantiating results

This step presented the results of the study and pointed to the validity of the findings. According to Kanoksilapatham (2005), the communicative purpose of this step is to report to the scientific community that the results of the study may be a part of the consensual knowledge of the field. The simple present was the preferred tense in presenting this step (62.31%). This finding is consistent with the studies conducted by Saboori and Hashemi (2013) as well as Oster (1981) who discussed that the simple present tense is a proper tense to present the results of a study. Below is an excerpt from the corpus which presents the simple present as the dominantly used tense in substantiating results.

*Diffraction peaks corresponding to lower Bragg angles **have** lower FWHM than for those at higher Bragg angles.* (PH5)

The dominant use of the simple present tense in this step may be interpreted as evidence of the student writers' attempts to generalize the results as parts of established knowledge. However, Weissberg and Buker (1990) suggested that findings of a study are better to be presented in the simple past tense and only in some disciplines (for example, Engineering and Economics) can be communicated in the simple present tense. The use of the simple present in this step may be attributed to the nature of the disciplines of study. In Chemistry and Physics, which are considered laboratory-based disciplines of study (Hofstein & Lunetta, 2004; Hofstein, 2004), the results develop gradually. Besides, the time of obtaining the results may coincide with the time of reporting them. Consequently, this rhetorical unit was mostly communicated in the simple present tense.

Besides, the contextual analysis revealed that a tense shift was observed in presenting the results of the study when the function of the rhetorical units changed. For example, whenever the results referred to the information about something before conducting the research, the uncommonly occurred tense of the past perfect was used. In this case and such similar cases, the use of the past perfect may be justifiable based on the fact that this

tense signifies an action that is completed in the past prior to some other past event or time (Celce-Murcia & Larsen-Freeman, 1999).

In addition, in most cases, when substantiating results occurred in a sentence together with pointer, the tense of the step shifted to the simple present tense. In other words, when in a paragraph, the results accompanied with numbers, degrees, or amounts which were already located (by use of pointer) in a table or figure, the preferred tense for presenting the results shifted to the simple present tense. This tense shift was probably used to create a sense of a current relevance of the data to the results of the study. The following excerpt from the corpus showed the above discussed tense selection:

*From Figure 5.4(a), it is observed* [pointer] *that the magnitude (dB) of S11***decreases** *with increasing corresponding moisture content, whereas Figure 5.4(b)* **indicates** [pointer] *that the magnitude (dB) of S21gradually* **increases** *with increasing moisture content.* (PH1)

The contextual analysis also revealed that whenever in a paragraph, the results of the study concurred with listing procedures or methodological techniques step, almost in all such cases the simple present was the preferred tense. Examples:

*Semiquantitative elemental analysis* **was carried out** [listing procedures or methodological techniques] *using SEM-EDX* [listing procedures or methodological techniques]. *The EDX spectrum of Ce4ZP and Ce3ZP (Figure 4.10 (b) and 4.11 (b))* **show** *the existence of Ce compared to original ZP (Figure 4.10 (a) and 4.11 (a). The EDX spectrum of Ce3ZY (Figure 4.12 (b)) also* **shows** *the existence of Ce compared to original ZY (Figure 4.12 (a)).* (CH6)

*The predicted values of magnitude (dB) of S11and S21* **were obtained** [listing procedures or methodological techniques] *from equations (5.5) and (5.6), respectively. The mean relative error percentage between the measured and predicted magnitude (dB) of S11* **is** *1.55% as shown in Table 5.2, whereas the mean relative error percentage between the measured and predicted magnitude (dB) of S21***is** *3.35% as shown in Table 5.3.* (PH1)

A possible explanation for this phenomenon may be that the results were validated and received more generalizability through the use of the simple present tense. Besides, the results coincide with the description of the valid procedure by which the results were obtained. In line with the above discussion, the results showed that when in a paragraph, the results were supported and validated by 'explaining results' step, the results appeared dominantly in the simple present tense. For example, the following excerpt that presented the results of a study was followed by an explanation for the presented results.

*These values* **are** *higher than the sorption capacity of Ce3ZP. This* **is** [explaining results] *due to the higher exchange capacity of Ce (IV) than Ce (III) in Zeolite P as discussed earlier.* (CH6)

In addition, when the results were presented and supported by numerical values, the tense also shifted from the past to the present tense. Examples:

*Figures 5.2(a) and (b) show the variation in the magnitude (dB) of S11and S21with frequency for the oil palm fruit samples at different moisture content. It **was found** that the magnitudes (dB) of S11and S21approximately and linearly **changed** with frequency for all moisture content. The percentages of the moisture content **are** 33.89%, 55.69%, 61.75%, 78.33%, 94.21%, respectively as shown in Figures 5.2(a) and (b).* (PH1)

*The highest conductivity obtained **is** 1.39 S/cm by using 0.1 M FeCl3 and 0.4 M pyrrole. This conductivity **is** lower compared to the sample with 0.1 M pyrrole and 0.4 M FeCl3.* (CH5)

## Explaining the results

By using this step, the writers suggested reasons for the findings or explained the results of the studies. The prominent used tense in this step was the simple present (70.59%). For example:

*The shoulder in the 1200 cm−1 – 1150 cm−1 region in the pure zeolite spectra **is** the result of asymmetric stretching vibrations of the external linkages of the primary structural units.* (CH6)

The simple past tense was the second most frequently used tense in this step (27.65%). There were also some occurrences of the present and past perfective tense forms. The present perfect tense denotes a situation that has occurred over a period in past time and refers to the results of a study in past. This application of the present perfect is underlined by Taylor (2001) who stated that the present perfect tense relates what has been written earlier and how it is related to the present moment in order to provide a sense of current relevance or perhaps a sense of transition from the past to the present. The high occurrence of the use of the simple present tense in this step is consistent with the findings of Fallahi and Erzi's (2003) study who found the simple present in 73% of the rhetorical units that explained the results of the study. Additionally, in line with the findings of this study, Weissberg and Buker (1990) stated that explaining the results can be either presented in the simple present or past tenses.

## Making generalizations or interpretations of the results

In this step, the writers make generalizations based on the results of the study or interpret the results obtained from the study. The preferred tense to present this step was the simple present. The frequency of the simple present was 55 (73.33%). For example:

*This **implies** that all samples of ternary series **are** amorphous in nature.* (PH6)

The reason for the high occurrence of the use of the simple present tense in this step is explicable in terms of the nature of the step, which refers to the generality of the study. This is consistent with the results of the study by Fallahi and Erzi (2003). They found that 84% of the sentences which presented explanations of the results were in the simple present tense.

The second dominantly used tense in this step was found to be the simple past tense. The frequency of the simple past tense was 13 (17.33%). Moreover, as the third most frequently used tense, the simple future tense occurred with a percentage of occurrence of 8. This co-occurrence of the two tenses (the simple present and the simple future) implied a stronger prediction and generalization arisen from the results of the study.

The thick analysis of the texts indicated that whenever the researcher generalized and made predictions based on the results of his/her study, the simple future tense was the selected tense. For example:

*By using FeCl3 as an oxidant the shifting is higher because FeCl3* **is** *strong and suitable oxidant in polymerization of pyrrole and* **will produce** *more Ppy in the Ppy/MMT nanocomposites.* (CH5)

In the above example, the writer predicted FeCl3 will produce more Ppy in the Ppy/MMT nanocomposite as a result of FeCl3 strength. In agreement with this discussion, Celce-Murcia and Larsen-Freeman (1999) reported that both the simple present and the simple future tenses may be used to imply a generalization and prediction resulted from the finding(s).

## Evaluating the current findings with those from previous studies or with regard to the hypotheses

In this step, the findings of the study were evaluated in comparison to those results of the previously conducted studies, or with regard to the hypotheses proposed by the study. Consistent with the general trend of tense distribution, the dominant tenses in this step were the simple present and the simple past. The simple present tense was used with the percentage of occurrence of 52.87. For example:

*The results* **are** *comparable with As(V) sorption with other adsorbent such as activated alumina-alum (optimum pH range 3.5-8) [Tripathy and Raichur, 2008]…* (CH6)

The simple past with percentage of occurrence of 37.93 was the second dominantly used tense. This finding is in line with the results of Fallahi and Erzi (2003) who found that in research articles, the present tense is used for referring to literature. Moreover, the finding is consistent with the handbook by Weissberg and Buker (1990). As a result, when the results are supported by what has been established by other researchers, the authors consolidated their results and generalized it by using the simple present tense.

Moreover, the contextual analysis of the texts revealed that whenever the results of the study were in line with the hypothesis of the study, or the results were in agreement with the results found in literature, the preferred tense was the simple present tense. This tense choice denoted the students' confidence in adding a sense of generalizability to their results. On the contrary, when the results were not in agreement with the related literature or the hypothesis of the study, the simple past tense was used. As a consequence, the perspective of the writers of the theses may play a role in the tense selection in this step.

## Describing established knowledge

By the use of this step, the authors referred to the general knowledge of the field that was established and accepted by the discourse community. As a result, the step referred to the established knowledge that has been generalized and used by the authors of the theses. Lackstrom, Selinker, and Trimble (1973) mentioned that the simple present tense can be used to discuss general issues. In line with this discussion, the simple present tense with 192 (82.05%) frequency of use was the dominant used tense in this step. For example:

*When ZnO **is introduced** into the glass, the content of P2O5 which **has** lower density **is** relatively reduced.* (PH6)

This finding was also in line with Celce-Murcia and Larsen-Freeman (1998) who maintained that the simple present is used in describing general timeless truths.

The other tenses had negligible frequencies of occurrences in this step. For example, the simple past tense with a low frequency of use of 29 (12.39%) was the second frequently used tense. The cases of the simple past occurrences in presenting this step were explicable in terms of the writers' lack of confidence in the validity and generalizability of the information that they presented as established knowledge in the field.

## Referring to previous literature

In this rhetorical unit, the authors referred to previous research. The simple past and the simple present were the two prevailing tenses in referring to previous literature. The simple past with a frequency of occurrence of 36 (45.57%) was used more than the simple present with a frequency of occurrence of 27 (34.18%). This choice of the past tense in referring to previous literature was found to be consistent with Fallahi and Erzi's (2003) study of language teaching research articles, which the simple past tense was the preferred tense to refer to previous research. Also, Weissberg and Buker (1990) suggested that the past tense can be utilized to refer to the past literature.

Besides, the choice of tense in this step relied on the form of the report. The contextual analysis revealed that the tense choice was different in the signal phrase and propositional content. In the example below extracted from the corpus, the tense of the signal phrase was the present perfect, whereas the tense of the propositional content was the simple present tense.

*Previous researchers **have shown** that multi-step **is** involved in adsorption process of dye ions on zeolite [Wang et al., 2006].* (PH5)

According to Swales (1990), the tense shift from the present perfect to the simple present shows the distance of the reported idea from other researchers to what the writers of the results report. Additionally, Oster (1981, cited in Shaw, 1992, p.303) asserted that the present perfect tense application primarily shows that "there will be continued discussion of some of the information in the sentence and secondarily claims generality

about past literature". As such, the tense usage in the above example indicates the high relevance of the citation to the study.

As another outcome of the contextual analysis, it was also found that the structure of report played a role in the tense selection in this step. In reporting sentences with integrated names, the signal phrase was mostly in the past tense. For example:

*Formiga et al. (2007)* **reported** *that ibuprofen* **acts** *as an additional surfactant as the nonpolar region of the drug…* (CH3)

In non-integral reporting sentences, the present perfect was the favored tense. For example:

*Previous researchers* **have** *shown… [Wang et al., 2006].* (PH5)

As another type of reporting, in non-integral non-reporting sentences, the report was equally presented in the simple present or the simple past tense. For example:

*Ibuprofen* **acted** *as an additional surfactant as the nonpolar region of the drug (Formiga et al., 2007).* (CH3)

In a nutshell, the diversity of the tense usage in this step may be attributed to personal preference. According to literature (for example, Swales, 1990, 1981; Shaw, 1992), all forms of the simple present, simple past, and present perfect are acceptable for this function, which is in line with the above-stated findings.

## SUMMARY AND CONCLUSION

The present study investigated how verb tenses were used in 11 obligatory rhetorical units (moves and steps) in Integrated Results and Discussion chapters in a corpus of 20 master's theses written by ESL students within a period of 10 years from 2002 to 2012. The categorization of the rhetorical units and the taxonomy of the obligatory units were based on Kanoksilapatham's (2005) model. Quantitative analysis revealed that the simple present (66.03%) and the simple past (28.14%) were the two most frequently used tenses in the obligatory units of the corpus respectively.

Besides, the results of this study showed that the choice of tense in Results and Discussion chapter of master's theses does not merely depend on temporal considerations and the tense profile in this chapter varied according to a number of factors. This supports other researchers' findings (Salager-Meyer, 1992; Malcolm, 1987; Hanania & Akhtar, 1985; Heslot, 1985; Selinker & Trimble, 1973; Swales, 1981; Selinker, Trimble, & Vroman, 1972; Lackstrom, Selinker, & Trimble, 1970) that the tense choice does not merely depend on temporal considerations. The following statement from Gunawardena (1989, p. 272) also advocates the above-stated claim:

It is misleading to talk only about time lines with regard to the selection of tenses because there are factors other than time-sense relationships governing tense choice in scientific journal articles. Factors such as the writer's attitude towards the importance of events,

the degree of generality of the research described, or the particular context in which the discourse appears may influence the choice of tense. (Gunawardena, 1989, p. 272)

Thick analysis of the obligatory moves and steps demonstrated that the nature of disciplines that the student writers were engaged in played a role in tense selection. For example, in laboratory-based disciplines like Chemistry and Physics, the present perfect was the favored tense to organize the arguments. Additionally, the temporal meanings of the tenses influenced the choice of tense in the context. For example, when the time of an event coincided with the time of reporting it, the simple present was the preferred tense.

Another factor in tense selection was attributed to the writers' stance and their tendencies toward the claim they made. For example, writers' satisfaction about the outcome of a piece of research was conveyed mostly in the simple present tense. Furthermore, the function of the rhetorical unit was found to be another influential factor in tense selection by the ESL student writers. For instance, whenever student writers referred to the established knowledge which was already accepted as a fact, the simple present was an appropriate choice. Finally, the type and structure of reports influenced the choice of tense by the ESL writers. For example, when the reports consisted of a signal phrase and a propositional content, the present perfect was selected as the tense of signal phrase. But the tense of propositional content was selected as the simple past tense.

A study can be conducted to compare the tense use in theses written by EFL, ESL, or ENL students to find the effects of the target language on the students' writings. Moreover, a tense use analysis can be conducted in order to investigate all the chapters of theses to establish a workable pattern in thesis writing. In addition, other features (like hedges, boosters, the length of the chapter and so forth) of sentences or chapters can be taken into account in investigating theses from different disciplines to find the patterns and disciplinary variations.

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## APPENDIX

### List of Theses

| Sample Code | Title | Discipline |
| --- | --- | --- |
| CH1 | A Molecular Modelling Approach for Designing a Novel Semisynthetic Metalloenzyme based on Thermolysin | Chemistry |
| CH2 | Preparation and Characterization of Biodegradable Poly (Lactic Acid)/Tapioca Starch Composites | Chemistry |
| CH3 | Nanoemulsion Formulation of Palm oil Esters for Topical Delivery of Ibuprofen | Chemistry |
| CH4 | Preparation of Poly(Styrene) Grafted Oil Palm Empty Fruit Bunch Fiber and Its Application as a Filler for High Impact Poly(Styrene) Composites | Chemistry |
| CH5 | Preparation and Characterization of Polypyrrole/Montmorillonite Clay Conducting Polymer | Chemistry |
| CH6 | Synthesis and Characterisation of Cerium-Exchanged Zeolite and Its Application in the Removal of Arsenic from Wastewater Samples | Chemistry |
| CH7 | Removal of Hazardous Oxyanion Pollutants by Lanthanum (III) Hydroxide and Lanthanum (III) - Loaded Ion Exchangers | Chemistry |
| CH8 | Isochronal Recovery Of Electro-Magnetic Energy Loss And Electrical Resistivity In Yttrium-Iron Garnet (Y3fe5o12) | Chemistry |
| HS9 | Effect of (3-Aminopropyl) Trimethoxysilane and (3-Aminopropyl) Triethoxysilane on Mechanical, Thermal and Morphological Properties of Kenaf Fiber Reinforced Poly (Lactic Acid)/ Poly (Butylene Adipate-Co-Trerephthalate) Blends | Chemistry |
| CH10 | Phase Behaviour And Physical Properties Of Sulphonated Methyl Ester And Fatty Alcohol Ether Sulphate Mixtures | Chemistry |

| PH1 | Development of a Microstrip Ring Resonator for Measurement of Moisture in Oil Palm Fruits and Seeds | Physics |
|---|---|---|
| PH2 | Structural, Magnetic and Electrical Properties and Colossal Magneto Resistive Effect of La 0.67 Sr0.33 Perovskites with Dy Substitution at La Site | Physics |
| PH3 | Microwave Extraction of Essential Oils from 'Penaga Lilin' (Mesua Ferrea L.) Leaves | Physics |
| PH4 | Development of a New Converging Thermal Wave Technique for Diffusivity Measurement of High Conductivity thin Foils | Physics |
| PH5 | Synthesis and Characterization of $CDS/SIO_2$ | Physics |
| PH6 | Physical and Electrical Properties of Zinc-Magnesium-Phosphate Glasses | Physics |
| PH7 | Frequency Behavoiur of Quartz Crystal Microbalance in Contact with Selected Solutions | Physics |
| PH8 | Insulated Monopole Sensor for Determination of Moisture Content in Hevea Rubber Latex | Physics |
| PH9 | Thermal Diffusivity Measurement of Copper Selenide Using Photoflash Technique | Physics |
| PH10 | Physical and Thermal Characterization of Glass Ceramics Prepared from Cullet and Coal Bottom Ash | Physics |