A CROSS-DISCIPLINARY STUDY ON THE FORMS AND FUNCTIONS OF CITATIONS IN THE DISCUSSION SECTIONS OF MASTER'S THESES IN TAIWAN

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ABSTRACT

Effective citation contributes to the success in master's (MA) thesis writing. The current study investigates cross-disciplinary citation practice in EFL Master's theses. First, the corpus was compiled by collecting 20 Applied Linguistics (AL) and 20 Biology (BIO) MA theses Discussion sections. The forms and rhetorical functions of citations were then identified and quantified. The results show that the writers from the two disciplines have different citation practices. In terms of forms, the AL discipline writers utilized both integral and non-integral forms almost equally. The BIO discipline writers, on the other hand, deployed significantly more non-integral citations. In terms of rhetorical functions, citations were used by both groups to achieve a variety of rhetorical functions. The AL discipline writers utilized citations mostly for Comparison and Application to provide explanation and justification. By contrast, the BIO discipline writers took a more descriptive approach by using more Attribution. Overall, the results suggest that while the AL writers seemed to align their citation forms and functions, the BIO writers adopted a more simplified or descriptive approach when citing. The study offers evidence in the need to guide EFL writers of different disciplines to becoming more strategic in their citation practice.

Key Words: forms of citation, rhetorical functions of citations, MA thesis, discussion sections, disciplinary writing

INTRODUCTION

At the highest point of a student's academic achievement, a master's (MA) thesis is regarded as a high-stakes genre (Hyland, 2004). MA thesis writers, regardless of their language background, are expected to have acquired the shared knowledge, culture and practices of their respective disciplines (Samraj, 2008; Thompson & Tribble, 2001). One of the important features of MA thesis writing is the use of citations (Charles, 2007; Harwood, 2010). Citation is a rhetorical feature that involves a reference to "something external to the citing text" (Pecorari, 2006, p. 6) or to any information/finding attributed to a source (Coffin, 2009). According to Hyland (2000), citations are persuasive tools, which allow writers to display their familiarity with the field, position stance to the views held by the members in the field, justify claims and arguments, and establish credibility. Notwithstanding the importance, appropriate citing presents a considerable challenge to MA thesis writers, especially for English as a Foreign Language (EFL) writers (Harwood, 2009; Jalilifar, 2012; Nguyen & Pramoolsook, 2016). And citation is often not explicitly taught in graduate school (Harwood, 2009). For example, EFL writers from Iran and Vietnam were found to use few and ineffective citations in their MA thesis (e.g., Jalilifar, 2012; Nguyen & Pramoolsook, 2016). EFL MA students from Taiwan were found to lack the knowledge related to disciplinary citation conventions (Yeh, 2009, 2010).

The current study investigated a particular chapter, or part-genre, Discussion, written by novice EFL writers from two disciplines. Citations are both required and vital in Discussion sections, which often requires a writer to "draw upon a range of literature to make interpretations and external comparisons of the findings and highlight and explain discrepancies" (Zhang, 2022, p. 12). This is often a daunting task for student writers. The amount of evidence, however, has been derived from investigating L1 writing, and less is known regarding the citing patterns of EFL writing. Past studies also exhibited salient differences in sample size, and virtually none has explored Discussion sections written by EFL student writers to render a more complete picture to citation use. More evidence is needed to understand the citing behavior characterizing EFL students beyond a single discipline, as urged by Zhang (2022).

Forms and functions of citations

Citations can be classified into formal/grammatical and functional characteristics, namely, citation forms and citation functions (Petrić, 2007; Thompson & Tribble, 2001; Swales, 1990). Swales (1990) distinguished citation forms from integral and non-integral citations based on the syntactic position of the name of the cited author. The use of a certain form of citation can indicate which information is emphasized in the citing sentence. Below are examples presenting the two forms of citing.

Citation Form	Citing Sentence
Integral	(1) According to **Pecorari (2006)**, citation is a rhetorical device that involves a reference to "anything external to the citing text" (p.6). [1]
Non-integral	(2) Citation is a rhetorical device that involves a reference to "anything external to the citing text" **(Pecorari, 2006, p. 6)**.

While integral citations foreground the scholars, non-integral citations foreground the proposition (Hyland, 1999, 2004). To better understand citation practice, it is important to relate formal choices to their rhetorical purposes, referred to as citation functions. The functional characteristic of citations refers to the writer's intention of using citation (Thompson, 2001), which can be realized through linguistic cues and the rhetorical roles they perform (Petrić, 2007). Petrić (2007) proposed a framework to analyze the purposes of citation, consisting of nine rhetorical functions, namely, Attribution, Exemplification, Further reference, Statement of use, Application, Evaluation, Establishing links between sources, Comparison of one's own findings or interpretation with other sources and Other. Each is briefly introduced below.

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[1] The source of the two examples is the same (i.e. Pecorari [2006]), included in the reference. The first author manipulated the source in order to exemplify the two citation forms.

1. **Attribution** is used to attribute activity or information to an author: *"A study showed that both GBP-5ta and GBP-5a/b proteins are expressed only in cutaneous T-cell lymphoma (CTCL) tumor cells, melanoma cells and in peripheral blood monocytes (PBMC)"* (Fellenberg et al., 2004).[2]

2. **Exemplification** illustrates a writer's statement by providing further information on the source, and is usually preceded by "for example" or "e.g.": *"For example, Jalilifar (2012) found that EFL AL students used more integral citations in Introductions."*

3. **Further reference** appears usually in parentheses or a footnote and is preceded by "see" to provide further information on an issue. This function is applicable to non-integral citations only: *"Thus, a more integrative approach that considers morphology, genetics, ecological divergence, and geography (**see** Bond and Stockman 2008) may be necessary to more finely parse species boundaries in this group."*

4. **Statement of use** is used to state what works, e.g., theories or frameworks, are used in the thesis and for what purposes: *"Texts of the dialogue are analyzed according to Halliday's (2004) Transitivity System."*

5. **Application** makes connections between the cited and the writer's work in support of the writer. Its main difference compared to the *Comparison* citations below is the absence of linguistic cues: *"In general, the results implied that Reaction process was dominant in English textbooks. Possible reasons might be that the Reaction process in the image depicts the bidirectional interaction between the characters, which may facilitate readers' understanding of written text and development of the plot (Hermawan & Sukyadi, 2017)."*

6. **Evaluation** evaluates using evaluative language that ranges from individual words to clauses which express evaluations: *"Due to its questionable validity and the lack of items concerning English listening in the scale, this study adopted MSTAT-I, instead of Ely's instrument."*

7. **Establishing links between sources** discusses different sources together: *"Few studies have quantified the vegetation structure of the habitat (Castellano et al. 2003, Ziegler et al. 2011) in studying association between call attributes and habitats."*

8. **Comparison of one's own findings and interpretations with other sources** indicates similarities or differences between

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[2] The examples here were retrieved from the corpus data compiled for the present study.

one's own work and the works of other authors: *"As far as the second variable, gender, and the learners' metacognitive awareness were concerned, there was not any significant difference between the boys and the girls in the present study, which was in line with Padeliadu, Botsas, and Sideridis (2000)."*

9. **Other** indicates an obscure relationship between the citing sentence and the citation: *"Otherwise, the observation of Qiu et al. demonstrated that TNF-α was significantly higher in the lungs of C57BL/6 mice soon (4 hr) after infection, and depleted quickly after 24 hours [37]."*

The current study explored citation practices in terms of forms and functions in Discussion chapters of master's theses from two disciplines in Taiwan, Applied Linguistics (AL) and Biology (BIO), to represent soft and hard disciplines. The analyses were grounded on the frameworks of Swale's (1990) two formal criteria and Petrić's (2007) nine rhetorical functions. This study is guided by the following research questions:

1. How do Applied Linguistics discipline and Biology discipline writers use citations in the Discussion sections of their MA theses? In terms of forms, what is the frequency and distribution of the integral and the non-integral forms of citations used?

2. In terms of the rhetorical functions, what are the rhetorical functions of the citations used? What is the frequency and distribution of the different rhetorical functions of citations used?

LITERATURE REVIEW

Studies on citation practice have focused on various genres at different levels of study such as undergraduate students' essays (e.g. Shi, 2004; Lee et al., 2018), RAs (e.g. Harwood, 2009; Hyland, 1999; Kwan & Chan, 2014; Mansourizadeh & Ahmad, 2011; Zhang, 2022), Master's theses (Nguyen & Pramoolsook, 2016; Petrić, 2007), and PhD dissertations (e.g. Thompson, 2001; Thompson & Tribble, 2001). Citation practice is reported to vary between different disciplines, genres, sections/chapters of research arguments, expert and novice, and cultures (e.g., Chen & Kuo, 2012; Harwood, 2009; Hu & Wang, 2014; Hyland, 1999, 2004; Jalilifar, 2012; Samraj, 2008, 2013). For example, on the experience continuum, expert writers employ

citations in a more complex manner and for a variety of purposes (Mansourizadeh & Ahmad, 2011; Samraj, 2013). EFL student writers, on the other hand, not only showed various citation issues (Jalilifar, 2012; Nguyen & Pramoolsook, 2016) but also used fewer citations with limited citation functions in their MA theses (Jalilifar, 2012; Mansourizadeh & Ahmad, 2011; Nguyen & Pramoolsook, 2016).

In terms of citation forms, the ongoing discussion has yielded interesting but inconsistent results, given the range of variables and amount of data examined. For RAs, research has generally established the prevalence of non-integral citations in any section, regardless of disciplines and author's linguistic backgrounds (Hyland, 1999; 2000; Hyland & Jiang, 2019; Kuo et al., 2011; Mansourizadeh & Ahmad, 2011; Samraj, 2013; Yeh, 2010; Zhang, 2022). Zhang (2022) found that professional research writers used more non-integral styles both in the entire paper and part-genres, with Introductions (around 4:1 non-integral vs. integral) showing much greater margin than Discussion (around 3:2 non-integral vs. integral). Still, a few studies reported that soft disciplines were more inclined toward an integral style while their counterparts, hard disciplines, showed a more non-integral style (Hyland, 1999; Thompson, 2001; Thompson & Tribble, 2001). Slightly different from this finding, Jalilifar (2012) found that international RA writers in AL demonstrated an almost equal amount of both integral and non-integral citations in Introductions. The variations in citation use may reflect disciplinary expectations of how knowledge is made and communicated. Hyland (2000) indicated that writers from the hard disciplines used non-integral citations to show objectivity and impersonality of scientific experiments while the writers in soft disciplines preferred integral citations to show their stance and to make evaluations.

Investigations of student writers use of integral and non-integral styles have generally shown that more soft discipline thesis and dissertation writers exhibited an integral citational style and more hard discipline writers resorted to a non-integral style (e.g., Bahadofar & Gholami, 2017; Jalilifar & Dabbi, 2012; Mastura, 2013; Nguyen & Pramoolsook, 2016; Samraj, 2008). These studies, however, exhibited salient differences in sample size, and virtually none of the studies explored Discussions written by EFL student writers to render a more complete picture to citation use. Of the studies analyzing entire theses or dissertations, it was found that both soft and hard discipline student writers, regardless of linguistic background, used a more integral style (Charles, 2007; Mastura, 2013; Nguyen & Pramoolsook, 2016). Inconsistent results, however, were found when investigating

part-genres. For example, Jalilifar (2012) found that EFL AL students used more integral citations in Introductions. Investigating L1 student writers, Samraj (2008), however, reported that L1 soft and hard discipline students wrote more non-integral citations, whereas humanities students used more of the integral style. Specifically analyzing Discussion sections, Bahadofar and Gholami (2017) reported that L1 soft discipline writers tended to write more integral citations while hard discipline writers used more of the non-integral style, aligned with Samraj (2013), which showed that L1 thesis writers from Biology majors used more of the non-integral style.

Similar to the analysis of citation forms, research regarding the rhetorical functions of citations also diverges in disciplines (e.g., Charles, 2007; Harwood, 2009; Hyland, 2000; Hyland & Jiang, 2019; Samraj, 2008), groups of writers (e.g., Jalilifar, 2012; Mansourizadeh & Ahmad, 2011; Samraj, 2013), section/chapters (e.g., Bahadofar & Gholami, 2017; Kwan & Chan, 2014; Mansourizadeh & Ahmad, 2011), and range of experience (e.g., Mansourizadeh & Ahmad, 2011; Samraj, 2013; Thompson & Tribble, 2001). It has been generally reported that novice writers or low-rated students tended to use more of the *Attribution* function, which is often associated with knowledge telling through description, as opposed to an argumentative account (Hsiao, 2016). Jalilifar and Dabbi (2012) and Nguyen and Pramoolsook (2016) postulated that EFL graduate students tended to report previous research rather than evaluate it, typical of the writing of less proficient writers. Jalilifar (2012) also found that while EFL students were familiar with the formal features of citations, they were not adept at the functional features. The international RA writers, by contrast, were better able to engage readers by appropriate deployment of the functions. The EFL writers' lack of critical evaluation was attributed to language proficiency, insufficient training, as well as cultural factors. For L1 writers, it was no less challenging. Samraj (2013) discussed that while both student and professional writers displayed a variety of purposes in using citations, student writers had difficulty establishing macro-level or higher order connections with past research. Experts, on the other hand, used more advanced functions to support, compare and justify claims, often accompanied by synthesis of arguments of past research (e.g. Bahadofar & Gholami, 2017; Jalilifar, 2012; Mansourizadeh & Ahmad, 2011; Mastura, 2013; Petrić, 2007; Zhang, 2022). Kuo et al. (2011) found that RA writers used non-integral citations to serve a range of functions to meet the specific communicative purpose of each section. Among these are *Providing views or findings of the cited*

study, *Providing background information*, and *Making comparisons*.

Of the studies exploring EFL students' master thesis in the AL or TESOL/TESL field, a key agenda investigated in the current study, the tendency to resort to integral citation style was found in Mastura (2013), Nguyen and Pramoolsook (2016), Jalilifar and Dabbi (2012), and Jalilifar (2012). Investigating citation relevant skills, Yeh (2009) found that EFL graduate students from the TESL field exhibited a similar tendency as expert writers in summarization and generalization in their term papers; however, when citing, they resorted to long quotes and were at times inaccurate. By contrast, the tendency for expert or more advanced writers to use more of the non-integral style was consistently found in past research. Yeh (2010) found that EFL expert writers in TESL research tended to summarize, paraphrase and generalize from multiple sources, similar to their international counterparts, and also shared the preference for non-integral citations. Hsiao (2016) found that high-rated Taiwanese postgraduates from 30 randomly-selected theses demonstrated a more frequent information-prominent citing style (i.e. non-integral style) than the low-rated students who resorted more to listing and author-prominent citations (i.e. integral style). Investigating the hard science discipline, Mansourizadeh and Ahmad (2011) found that both non-native Engineering RA expert and novice writers utilized a far greater number of non-integral citations. The experts were skilled in synthesizing multiple sources to support and justify claims, whereas their novice writer counterparts used citations individually to lend support.

The evidence related to citation practice, however, has largely been derived from investigating L1 writing, and less is known regarding the citing patterns of EFL writing. Specifically, research related to citation functions among EFL student writers is rare. Mastura (2013), the only study available, found that "attribution" was the most frequent among EFL thesis writers, similar to the majority of studies investigating L1 writers. Additionally, to better understand the phenomenon, it is vital to examine EFL students' citing behavior *beyond a single discipline*, as urged by Zhang (2022). The current work therefore sought to fill in the gaps by investigating a more in-depth study of a single part-genre, Discussion in EFL theses. And to gain a better perspective of citation practice of the targeted scope, cross-disciplinary practice involving both soft and hard disciplines was also investigated.

METHODOLOGY

Corpus

The corpus of the present study was collected from the National Central Library- National Digital Library of Theses and Dissertations (NDLTD) in Taiwan (https://etds.ncl.edu.tw/cgi-in/gs32/gsweb.cgi/ccd=tpcTQH/webmge?switchlang=en). AL was chosen to represent the soft discipline and BIO, the hard discipline. The choice of the two disciplines was due to the fact that both disciplines are considered established and representative (see Becher & Trowler, 2001; Hyland & Jiang, 2019). Several criteria were adopted in selecting the texts. First, theses from each discipline should be written in English. Second, the theses should be more than 40 pages long. Third, the theses should contain an independent Discussion section. Fourth, the theses should be published between the years of 2013 to 2020. The theses chosen from AL included topics such as language assessment, second language acquisition, discourse analysis, and related principles and practices grounded on language teaching and learning. The theses from BIO included molecular cell biology, ecology and evolution topics. Table 1 describes the basic information of the corpus.

Table 1

Corpus description

Discipline	No. of data sets	Length (words)	Average words per section
AL	20	63,289	3,264
BIO	20	25,395	1,270
Total	40	88,684	2,217

In total, the corpus comprises 88,684 words, with the AL discipline containing 37,894 more words and on average 1,994 more words than the BIO discipline. To address this concern, the numbers of citations were normalized by the number of citations per 1,000 words.

Identifying Citations and Coding by Forms and Functions

To start, citations were identified following Hyland and Jiang's (2019) criteria, which selected only canonical citation forms, referred to as (A) a name or a date in parentheses or a name whether followed by publication date or not, for example, *Lin's study (2011)*, (B) a number in squared brackets, for example, *In addition to MAPK/Nrf2-mediated mechanism of antioxidant defense…[84]*, (C) bibliographical footnote or superscript references, for example, *since the K-12 curriculum pays attention to the training of the student's higher cognitive thinking levels*, and (D) abbreviation and Latin references to other citations, for example, *e.g. Deci, 1971*. The identified citations were subsequently analyzed based on their forms and rhetorical functions, following Swales (1990) and Petrić (2007), respectively. The citations were identified as being integral or non-integral, using Swales' (1990) classification. After this, each of the identified citations was further coded based on Petrić's (2007) framework for the rhetorical functions, including *attribution*, *exemplification*, *further reference*, *statement of use*, *application*, *evaluation*, *establishing links between sources*, *comparison of one's work with that of other sources*, and the last, *other*. The coding process involved iterative reading of all the Discussion sections, which was a recursive process where the researcher read, coded, updated coding and re-read. Two coding examples taken from the corpus compiled for the current investigation are presented below.

Table 2

Sample coding of the form and rhetorical function of citation

Data	Form	Rhetorical function
Thus, a more integrative approach that considers morphology, genetics, ecological divergence, and geography *(see Bond and Stockman 2008)* may be necessary to more finely parse species boundaries in this group.	Non-integral	Further reference *(see…)*

As shown in Table 2, the citation is enclosed in parentheses and does not have any grammatical role in the citing sentence. In this case, the citation was first coded as a *non-integral* form. In addition, the linguistic cue *see* directs readers to further information related to *"a more integrative approach that considers morphology, genetics, ecological divergence, and geography"* in the cited source (i.e., *Bond and Stockman 2008*). Thus, the citation is coded as "Further reference". Another way to determine the rhetorical function of a citation is by considering the textual clues within the citing sentence as illustrated in Table 3 below.

Table 3

Sample coding of the form and rhetorical function of a citation

Data	Form	Rhetorical function
This first research question compared the effect of three learning tasks, RC Task, GF Task, and PW Task, on incidental vocabulary acquisition based on an immediate posttest. The participants in each learning task scored a mean from 57.11 to 66.17 out of 90, the full score, which indicates…*This finding conforms to the statement from Huckin and Coady (1999) that* "text-based tasks can enhance incidental vocabulary acquisition."	Integral	Comparison of one's own findings or interpretations with other sources *(This finding conforms to…)*

In the example provided above, first, the citation was coded as an *integral* form given the presence of the names of the authors (i.e., Huckin & Coady). Following this, this citation was coded with the rhetorical function, *Comparison of one's own findings or interpretations with other sources*, given the expression *"The finding conforms to the statement from Huckin and Coady (1999) that. . . ."* After coding the forms and rhetorical functions of citations, raw

frequencies were calculated, after which comparison of use was done by chi-square tests.

Interrater Reliability

Two additional coders from each discipline, including a current PhD student and an AL Master's degree holder, and two Biology teachers with Master's degrees in Biology and with teaching experience from one to four years, were invited to code citational functions in a randomly-selected set of Discussion sections. The analysis of the citation forms, by contrast, is based on linguistic forms, which are straightforward and do not require expertise in coding (Swales, 1990, Thompson, 2001, 2005). The four coders were trained in the application of the coding scheme over several sessions.

Four Discussion sections or 20% of the Discussion sections from each discipline (four from Biology and four from Applied Linguistics) were randomly selected for the coders to code independently. The agreement among the three coders for the AL discipline was about 93%, while the agreement among the three coders for the BIO discipline was around 87%. Differences among the coders were discussed until a consensus was reached.

RESULTS

The goal of the present study was to analyze and describe the citations in EFL writers' Discussion sections of MA theses from the disciplines of Applied Linguistics (AL) and Biology (BIO). The AL and BIO writers showed variations on how they discussed their own results in relation to existing studies.

Frequency and distribution of the integral and the non-integral forms of citations

Table 4 reports the total number, the mean, the range, standard deviation, and the density (citations per 1000 words) of citations found. Although a greater raw number of citations, 524, were

identified in the AL corpus, there is a lower density or number of citations per 1000 words (*M*=8.38, *SD*=3.68). By contrast, the BIO Discussion sections contained more citations (*M*=14.50, *SD*=4.87) per 1000 words, despite showing fewer raw numbers.

Table 4

Number and density of citations in the corpus

Discipline	No. of Data sets	No. of citations	No. of integrals	Range	No. of non-integrals	Range	Density[a]	
							M	*SD*
AL	20	524	267 (50.95%)	6-24	257 (49.05%)	0-48	8.38	3.68
BIO	20	359	46 (12.81%)	0-9	313 (87.195)	5-37	14.50	4.87
Total	40	883	313	0-24	570	0-48	11.44	5.27

Note: M= Mean. SD= Standard Deviation.

[a] Density is the number of citations per 1000 words or the normalized frequency of citations.

Investigating the forms of citations (integral and non-integral) revealed that the total numbers of integral and non-integral citations in AL are almost equally divided (267 and 257), which may imply writer awareness of the functional features of the two citation forms (Jalilifar, 2012), as the pattern was similar to that of the practice found in expert writers in published articles (Jalilifar, 2012; Mansourizadeh & Ahmad, 2011). On the other hand, writers in BIO used non-integral citations almost seven times more than the integral ones. Out of the 20 Discussion sections, thirteen had a larger number of non-integral forms of citations and six did not contain any integral form of citations. The use of prominently more non-integral in the BIO corpus may be attributed to disciplinary practices. As Hyland (2000) and Hyland and Jiang (2019) explained, non-integral citations are common for those in the hard disciplines to foreground their research, which allows the writers to show impartiality and objectivity in their writing.

Chi-square test results revealed a significant relationship between disciplines and the use of citation forms, $\chi2$ (1, *N*=833) = 135.440, *p* = < .001. Table 5 presents the chi-square test results, and the main contributors to the statistical difference are the use of the integral citations.

Table 5

Discipline and use of citation forms

Discipline	No. of Integral citations	No. of Non-integral citations	Total	Pearson Chi-Square		
				$\chi2$	*df*	*Sig.*
AL	267	257	524	135.440	1	<.000
BIO	46	313	359			
Total	313	570	883			

Table 6 below illustrates how an AL writer brought readers' attention to the researchers (using integral forms) and reported information (using non-integral forms) of the cited sources in the same paragraph.

Table 6

An example of AL's use of citation forms

Text	Citation Form
The relatively high occurrence of a Reaction process is compatible with the findings of previous studies (Attar, 2014; Guijarro & Sanz, 2008; Hermawan & Sukyadi, 2017; Pertama, Rukmini & Bharati, 2018).	Non-integral
Analogous to the results of Guijarro and Sanz's (2008) research on children' narrative story, there is a predominant use of a Reaction process... In	Integral
Pertama, Rukmini, and Bharati (2016) . . . a Reaction process was extensively used to create the interaction between the characters. In general, the results implied that the Reaction process in the image depicts the bidirectional interaction between the characters, which may facilitate readers' understanding of written text and development of	Integral
the plot (Hermawan & Sukyadi, 2017).	Non-integral

First the author used non-integral citations to show general support from the literature for the results obtained. Further discussion was included by adopting two integral citations to give reasons why similar results, the predominant use of a Reaction process, were reported in the specific genres each studied. The author then made a generalization which entertained the potential of a Reaction process in facilitating comprehension using a non-integral type.

By contrast, Table 7, written by a BIO student, presents only non-integral citations, used in the absence of explanation. The lack of linguistic cues in some sentences makes it difficult to tease out the writer's intention from the cited sources, particularly for those that encode present tense assuming fact (e.g., sentence 1 and 3). By comparison, metadiscursive devices such as hedges (i.e., *In certain circumstances* and *can*) in sentence 2, passives (i.e., *was reported*) in sentence 4, and emphatic expressions (i.e., *And also*) in sentence 5 more explicitly encode the writer's intention to use the cited sources *in support of* the statements made. While non-integral citations may focus reader attention on the propositions, the lack of appropriate linguistic cues in teasing out their own and cited ideas may be confusing, especially to those who lack prior knowledge in the area of study.

Table 7

An example of BIO's use of citation forms

Text	Citation Form
In the basal state, Nrf2 associates to Kelch-like ECH-associated protein 1 (Keap1), which serves as a substrate adaptor for Cullin 3 (Cul3)-based E3 ubiquitin ligases complex and lead to ubiquitination and following degradation of Nrf2 by UPS [75]. [3] *In certain circumstances* such as chemical or oxidative stress, Nrf2 *can* dissociate from Keap1 and translocate into the nucleus [75]. In the nucleus, Nrf2 associates with small Maf and promotes expression of cytoprotective genes by binding to ARE [74]. Phosphorylation of Nrf2 at serine 40 *was reported* to be involved in the dissociation of Nrf2 from Keap1 [76]. *And also*, phosphorylation of Nrf2 contributes to its stabilization [77]. *In our experimental OLT model*, the expression levels. . .	Non-integral Non-integral Non-integral Non-integral Non-integral

Frequency and Distribution of Rhetorical Functions of Citations

The frequency of citation functions is presented in Table 8. As can be seen, the most common rhetorical function used by the AL discipline is *Comparison of one's own findings or interpretation with other sources*, 208 instances (39.69%) and *Application*, 205 instances (39.12%). The least frequently used rhetorical functions are *Evaluation* (0.95%) and *Further reference* (0.19%). The rhetorical function *Other* was not found in the AL corpus selections. In the BIO discipline, *Attribution* was most frequently used, 124 occurrences (35.54%), followed by *Comparison of one's own findings or interpretation with other sources,* 74 instances (20.61%). Similar to the AL discipline, the two least frequently used functions are

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[3] Numerical citation convention (e.g. [75]) is often found in some hard disciplines such as Biology, where research writers use numerical endnote systems to cite other people's work, as required by journals (Hyland, 1999).

Evaluation (1.11%) and *Further reference* (0.28%). Combined, *Comparison of one's own findings or interpretation with other sources* has the highest frequency with a total of 282 citations (31.94%). *Application* followed with a frequency of 270 citations (30.58%). *Attribution* came next with 163 (18.46%). Chi-square results reveal statistically significant differences in the number of rhetorical functions of citations employed by the two groups of writers, $\chi2$ (8, $N = 883$) = 205.96, $p = <.001$.

Table 8

Distribution and Chi-square test of rhetorical functions between groups

Rhetorical Functions[a]	Numbers of citations						Pearson Chi-Square		
	AL	(%)	BIO	(%)	Total	(%)	$\chi2$	Df	Sig.
Comparison	208	(39.69)	74	(20.61)	282	(31.94)	205.96	8	<.000
Application	205	(39.12)	65	(18.11)	270	(30.58)			
Attribution	39	(7.44)	124	(34.54)	163	(18.46)			
Establishing links	15	(2.86)	64	(17.83)	79	(8.95)			
Exemplification	31	(5.92)	13	(3.62)	44	(4.92)			
Statement of use	20	(3.82)	8	(2.23)	28	(3.17)			
Evaluation	5	(0.95)	4	(1.11)	9	(1.02)			
Other	0	(0)	6	(1.67)	6	(0.68)			
Further references	1	(0.19)	1	(0.28)	2	(0.23)			
Total	524	(100)	359	(100)	883	(100)			

Note. [a] The rhetorical functions column is arranged from the highest to the lowest frequency.

Further, separate non-parametric chi-square tests were performed. Table 9 shows that the use of citations for different rhetorical purposes is mostly significant, except for *Further reference* and *Evaluation*.

Table 9

Chi-square test of the rhetorical functions of citations in AL and BIO

Rhetorical Functions	AL		BIO		Pearson Chi-Square		
	No. of cit.	%	No. of cit.	%	$\chi2$	df	Sig.
Comparison	208	39.69	74	20.61	63.674	1	<.001
Application	205	39.12	65	18.11	72.593	1	<.001
Attribution	39	7.44	124	34.54	44.345	1	<.001
Establishing links	15	2.86	64	17.83	30.392	1	<.001
Exemplification	31	5.92	13	3.62	7.364	1	.007
Statement of use	20	3.82	8	2.23	5.143	1	0.023
Evaluation	5	0.95	4	1.11	0.111	1	.793
Other	0	0	6	1.67	6.0	1	0.014
Further reference	1	0.19	1	0.28	.000	1	1.00
Total	524	100	359	100			

Note. [a] The rhetorical functions column is arranged from the highest to the lowest frequency.

According to Table 9 above, salient differences in the rhetorical function of citations were found. Almost all of the functions exhibited significant differences between the disciplines. For example, BIO writers used far fewer *Comparison of one's own findings or interpretation with other sources* citations. If used appropriately, *Comparison* citations allow writers to draw readers' attention to the similarities and differences between one's own study and previous works. The use of such a function is considered effective by emphasizing one's strengths while also strategically justifying differences (Basturkmen, 2009). Similarly, *Application* was also used significantly more often by the AL writers to connect the authors' findings, limitations, arguments or interpretations to other sources in

order to establish substantial evidence to support one's own work. Its main difference compared to the *Comparison* citations is the absence of linguistic cues. Instead, the BIO students used significantly more *Attribution*. *Attribution* is considered to be the simplest rhetorical citation function, which does not require advanced rhetorical skills compared to other functions (Petrić, 2007).

To summarize, the MA thesis Discussion sections from AL and BIO disciplines showed variation in both the forms and rhetorical functions of citations. In citation forms, the AL discipline used almost equal amounts of both integral and non-integral citations. The BIO discipline, on the other hand, used significantly more non-integral citations, which puts more emphasis on the reported information. In terms of rhetorical functions, combined, *Comparison of one's own findings or interpretation with other sources*, *Application*, and *Attribution* were the three used most frequently. In contrast, the AL writers used more *Comparison* and *Application* to compare the similarities and differences, and to explain and justify their results in relation to other sources. On the other hand, the writers from the BIO discipline used citations more for *Attribution* purposes, followed by *Comparison*.

DISCUSSION AND CONCLUSION

Citation Form in the Soft and Hard Disciplines

The current study found that the AL corpus contained the two forms of citations investigated almost equally, with a slightly higher number of integral than non-integral citations. This suggests that the AL discipline placed almost equal emphasis on the author and information of the cited sources. The finding in the present study is different from previous studies also investigating soft disciplines (Bahadofar & Gholami, 2017 on Discussions; Charles, 2007 on MA theses; Mastura, 2013 on entire MA theses; Nguyen & Pramoolsook, 2016 on entire MA theses). Bahadofar and Gholami's (2017) found that the writers of TEFL MA thesis Discussion sections from Iran made greater use of integral citations, which covered almost 74% of the total number of citations. Nguyen and Pramoolsook (2016) also reported that the integral citations (79%) were more notably used than

the non-integral citations (21%) by the TESOL Vietnamese writers in their thesis Discussion sections. However, published RAs from the soft disciplines, on the other hand, were found to exhibit more non-integral citations (Hyland, 2000; Hyland & Jiang, 2019; Yeh, 2010; Zhang, 2022). Zhang (2022) reported that regardless of discipline, a strong preference for non-integral citations were present in all the part-genres investigated. Non-integral citations serve these writers well in "comprehensive discussion of results" (p. 12) while the insertion of integral citations allows them to explicitly identify support or distance from the source, a move to encode the author's attitude. The more frequent use of non-integral citations was also reported to be a current trend in research writing. In Hyland's (2000) research, the Applied Linguistics (AL) journal articles exhibited at least twice as many non-integral as integral citations (66% vs. 34%). Hyland and Jiang (2019) reported that the writers from AL articles showed a significant increase in the use of non-integral citations over time (from 29% in 1965 to 73% in 2015).

Factors such as language background, genre, and experience may have caused such discrepancies in the findings. Some researchers stressed that linguistic background affects the choice of citation forms (Harwood, 2010). In terms of genre, citations are used differently by RA writers and MA thesis or student writers. While authors of published articles utilize citations to strategically position themselves in connection with their disciplinary community (Jalilifar, 2012; Samraj, 2013), MA thesis writers use citations to display knowledge and demonstrate their ability to apply theories (Jalilifar, 2012; Petrić, 2007). In other words, the goals of citation use may vary between student and expert writers. Experience in research is another factor which may account for differences in citation use. While expert writers can more maturely deploy their citation use to inform their research community readers (Mansourizadeh & Ahmad, 2011; Samraj, 2008), student writers may have not yet developed citation skills to the extent that they could effectively integrate citations and their own argument.

Disciplinary difference, a factor investigated in the current study, also plays a role. While discrepancies were found reported in past research in citation use in the AL discipline, citation use in the BIO discipline was more consistently reported. The BIO writers were found to use significantly more non-integral citations, consistent with the majority of the findings of previous studies (Bahadofar & Gholami, 2017 on Discussions; Hyland & Jiang, 2019 on entire RAs; Mansourizadeh & Ahmad, 2011 on entire RAs; Samraj, 2013 on

Discussions of L1 writers). Hyland and Jiang (2019) also found that RAs in Biology have increased the number of non-integral citations overall and reduced the number of integral citations over time. The similarities in the findings suggest that the use of more non-integral citations might be in line with the citation practices in the BIO discipline (Ädel et al., 2006; Hyland & Jiang, 2019; Samraj, 2013). For example, the numerical citation convention is known to predispose writers to use non-integral citations (Charles, 2007; Swales & Feak, 2004). Four BIO Discussions in the present study followed the numerical citation convention (e.g. [1]), among which two did not use any integral citation forms. Swales (1990) explained that this practice resulted in a significant decrease in the use of integral citations. However, some scholars argue that overuse of a particular form of citations among student writers may reveal their limited understanding of the purposes of citation and lack of linguistic resources to more effectively integrate citations (Thompson & Tribble, 2001).

Finally, the significant difference in the use of citation forms between soft and hard sciences resonates with a number of past studies (Bahadofar & Gholami, 2017; Hyland, 1999; Hyland & Jiang, 2019). This may be attributed to the different epistemological bases and knowledge construction between the hard and the soft disciplines (Charles, 2007; Hyland, 1999). While integral citations reflect the soft disciplines' argumentative and persuasive nature (Hyland, 1999; Hyland & Jiang, 2019) where human involvement is an integral part in advancing disciplinary knowledge, hard sciences, such as BIO, use more non-integral citations as an objective approach to downplay the role of human agency in knowledge construction (Hu & Wang, 2014).

Rhetorical Functions of Citations

In the Discussion section, writers are expected to interpret the results they present in the Results section, discuss and justify the results in relation to both their research question and the results of previous research in the field (Samraj, 2013; Swales & Feak 2004). Some studies revealed that the AL and BIO MA thesis writers employed various rhetorical functions: *Comparison of one's own findings or interpretation with that of others (Comparison), Application, Attribution, Establishing links with other sources, Exemplification, Statement of use, Evaluation, Other,* and *Further reference.* However, other studies (e.g., Jalilifar, 2012;

Mansourizadeh & Ahmad, 2011; Nguyen & Pramoolsook, 2016) reported that insofar as EFL student writers are concerned, they used limited citation functions in their theses. Regardless, Samraj (2013) argued that while both student and professional writers may display a variety of purposes in using citations, student writers still were challenged in establishing macro-level or higher order connections with past research.

In terms of the frequency of functions deployed, the three most frequently used functions by AL writers are *Comparison, Application,* and *Attribution*. A few studies (Bahadofar & Gholami, 2017; Mansourizadeh & Ahmad, 2011; Samraj, 2013; Zhang, 2022) also reported that making comparison and contrast with past research is most common in Discussions, and is associated with establishing "soundness" of one's claims (Andrews, 2005; Bitchener & Basturkmen, 2006). Using the three functions mentioned above is also often linked to genre awareness (Jalilifar, 2012; Samraj, 2013) as comparison, explanation and justification of own results/findings are an important communicative purpose of the Discussion sections (Mansourizadeh & Ahmad, 2011; Samraj, 2013; Yeh, 2009). By comparison, the three most frequent functions for the BIO discipline are *Attribution*, *Comparison,* and *Application*, with *Attribution* demonstrating great margins from the latter two. *Attribution* is considered to be the simplest rhetorical citation function, which does not require advanced rhetorical skills compared to other functions (Petrić, 2007). The frequent use of *Attribution* by the BIO student writers is consistently reported in this and previous studies (Mansourizadeh & Ahmad, 2011; Mastura, 2013; Nguyen & Pramoolsook, 2016; Petrić, 2007). Some researchers (Borg, 2000; Shi, 2004; Petrić, 2007) speculated that the overuse of *Attribution* citations among novice writers, such as the EFL writers in the current study, may be instruction-induced. Shi (2004) explained that EFL classrooms usually focus on teaching summaries (e.g. literature review writing) without elaborating on the connections to the writer's own study. And while EFL graduate students from the TESOL field may exhibit a similar tendency as expert writers in summarization and generalization, found by Yeh (2009), when citing, they resorted to long quotes and were at times inaccurate. More explicit instruction beyond making summaries, therefore, is warranted.

In all, while research (e.g., Hyland & Jiang, 2019; Samraj, 2013) has shown that citation use has trended toward non-integral citations, regardless of linguistic backgrounds and disciplines, the EFL AL writers investigated in this study used an equal number of both types.

Their almost equal and frequent use of the two rhetorical functions, *Comparison* and *Application*, might have a facilitative role. While *Comparison* often requires explicit linguistic cues in making the comparison between their own and past research, the *Application* function, on the other hand, requires no such cues when citing. This may drive the student writers to foreground phenomenon or information, thus showing more non-integral citations, different from Bahadofar and Gholami (2017) and Nguyen and Pramoolsook (2016). Similarly, *Attribution*, the most frequent function in BIO writing, serves to attribute activity or information to an author, thus embodying non-integral styles. *Attribution* allows these writers to simply drop in information without expressing any similarities or differences, different from *Application*, which requires writers to make connections between the cited and the writer's work. The frequent use of *Attribution* therefore makes it difficult to decide whether the writers contested with or simply endorsed other researchers' views.

Some pedagogical implications can be drawn. The cross-disciplinary comparison revealed relative citation practice patterns pertaining to each field, which may offer novice writers perspectives in attaining more effective citing. Through comparing and contrasting different disciplinary practices, student writers may deepen their understanding of the distinctive citational practices in their field, and also obtain a more coherent picture of citational practices in research writing. Additionally, while the two citation forms may be introduced in research writing textbooks or instructional materials, the function a citation serves in Discussion is rarely a part of the curriculum. Understanding of the function a citation serves may help student writers to strengthen their argument by taking advantage of a wider range of citational functions and making a more critical evaluation, both found in experts' arguments. To attain this goal, more explicit instruction is required. Instruction which more explicitly introduces the various types and functions of citations, such as the frameworks by Swales (1990) and Petrić (2007) used in the present study, may benefit novice writers in better accounting for past research, as opposed to making a superficial mention.

Specifically informed by the findings of the current study, more advanced writers, such as those AL thesis writers investigated in the current study, and experts more often used a non-integral style. More emphasis can be placed on training soft discipline students to foreground ideas by incorporating non-integral citations. Also, even though the current study found the AL thesis writers demonstrated

more *Comparison* functions, they resorted only to a small set of citation functions, predominantly *Comparison and Application*. More explicit instruction, as mentioned above, is warranted.

On the other hand, while the BIO writers appeared to conform to the hard science citation convention in presenting a higher proportion of non-integral style citations, they mostly resorted to *Attribution* when citing, lacking integration or comparison of ideas, a critical move in Discussion. Given the multifaceted communicative purposes Discussion serves, the hard discipline students may be made aware of the different citation functions they can display, as a way to stimulate their thinking in the need to better integrate their own argument and citations. Also, as *Attribution* is often expressed by an absence of metadiscursive cues (e.g. hedges or emphatic expressions), overusing this function often results in a monologic and writerly writing style and so compromises readability, which deserves more instructional attention.

The present study was not without limitations. First, the study only included a relatively small corpus comprised of only 40 Discussion sections from Applied Linguistics and Biology as representatives of the soft and hard disciplines, respectively. The findings then cannot be generalized to those of other soft and hard disciplines. Second, the present study took a textual approach in analyzing the forms and functions of citations. Conducting interviews with the thesis writers may provide more insight to inform the teaching and learning of citation use. Third, linguistic cues were the main criteria on examining the functions of citations. Other criteria such as the contexts of the surrounding sentences were only considered in the absence of the linguistic cues. In the future, the study of linguistic cues may be expanded to include contextual cues, alongside students' views of the composing process mentioned above, to better understand the phenomenon.

To conclude, the present study investigated the forms and rhetorical functions of citations in the Discussion sections of English MA theses between two disciplines in Taiwan. The study sought to fill the research gap regarding the absence of investigation of EFL writers' research writing, targeting Discussion chapters. Different from past studies, the AL writers in the current study demonstrated a balanced use of both integral and non-integral citations, which aligned with the different rhetorical functions they chose when citing. The most prominent use of the two rhetorical functions, *Comparison* and *Application*, also often characterize expert RA writers who use them to discuss similarities and gaps between their own and other

research. Their BIO counterparts, on the other hand, used mostly non-integral citations, consistent with most past studies and functioning mostly to attribute information. While this may suggest alignment in disciplinary practice in citing, the predominant use of non-integral citations in these student writers may suggest a lack of a more sophisticated understanding of deploying citations, as the absence of linguistic cues in attributing information to authors can cause confusion in teasing out an author's intention and perspective. This may explain why the *Attribution* function is a feature often found to characterize novice writers. The study offers evidence in the need to guide EFL writers of different disciplines to becoming more aware of their citation practice.

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