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A corpus-based comparison of linguistic markers of stance and genre in the academic writing of novice and advanced engineering learners

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Stance-taking in academic writing plays a crucial role in enabling tertiary academic writers to express their positions about their topics and other voices. Based on a corpus linguistic analysis of academic reports by civil and environmental engineering (CEE) undergraduate students and student papers in the Michigan Corpus of Upper-Level Student Papers (MICUSP), this article investigates the use of stance markers in the genres of persuasive and argumentative writing as well as analytical explanatory writing. This study compares the stance markers used by L2 engineering students (Hong Kong University) and native engineering students (U.S. University) to investigate the genre-specific lexical stance patterns used by academic writers. This study found that stance within the CEE reports and MICUSP was expressed through approximative hedges and boosters, code glosses, and adversative and contrast connections, pointing to a specific developmental trajectory as academic writers. Non-native engineering students were found to use a significantly smaller number of approximative, self-mention, and evidential verb hedges. In addition, they tend to use a more significant number of modal hedges compared to native English speakers. The CEE students' reports also tended to be characterized by the underuse of boosters, contrastive connectors, emphasis, and counter-expectancy markers. However, the study found no significant difference in the use of exemplification markers between the CEE and MICUSP. The findings of this study support the construction of the academic stance as a process of delimiting one's perspective. This is achieved by deploying selected stance features to account for other scholarly perspectives.

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Introduction

In academic writing, linguistic devices are strategically deployed by writers to communicate with their readers (Jin, 2015). In technical terms, such attempts to interact with readers may be understood as 'stance' (Alghazo et al., 2021a). 'Stance' is defined here as 'the speaker's or writer's feeling, attitude, perspective, or position as enacted in discourse' (Strauss and Feiz, 2013). In an academic context, this allows academic writers to take charge of their work by expressing knowledge-based evaluations of the topics within their writing to convince their readers of their authorial position (Jiang and Hyland, 2015). In the realm of academia, writing assumes a formal and enduring style of communication, where individuals from diverse linguistic backgrounds employ stance to share knowledge and actively contribute to the advancement of scientific knowledge, (Alghazo et al., 2021a; Abusalim et al., 2022).

As part of their studies, undergraduate and graduate engineering students undertake various types of scholarly writing, with academic reports comprising one of the most common writing tasks assigned to them. A vital imperative of an effective academic report is the need for students to formulate and present their position or stance towards the topic of scholarly voices within the field. Numerous scholars have identified stance as playing a pivotal role in academic writing research, particularly in linguistics-based studies (Hunston and Thompson, 2001; Hyland, 2005b, 2012; Silver, 2003; Afzaal et al., 2021, 2022; Strange, 2023; Keisling, 2011; Lu, 2023; Alghazo et al., 2023). In light of this context, the current study undertakes a comparative analysis of stance markers employed by L2 engineering students and native engineering students with the aim of investigating genre-specific lexical stance patterns utilized by academic writers. Consequently, this research concentrates on undergraduate students pursuing civil engineering, specifically those who have submitted their final-year projects and hold the potential to publish their reports in high-caliber academic journals.

Over the past two decades, various linguistic features have been examined to gauge how writers express stance (Hunston and Thompson, 2001), namely: appraisal (Martin and White, 2005), evidentiality (Chafe, 1986), metadiscourse features (Hyland, 2005a; Vande Kopple, 1985), and positioning (Harré and Van Langenhove, 1999; Aull and Landcaster, 2014). As this body of research shows, the importance of posture is evident in academic writing across early and upper-level English second language (L2) writing and published academic writing (Hyland and Jiang, 2018). Stance-taking and stance-support are considered to be defining acts in the argumentative or expository essay, a text type often used as an assessment tool in academic settings (Chandrasegaran and Kong, 2006). Furthermore, stance is viewed as part of an expert writer's tacit genre knowledge awareness, which can help student writers succeed in college-level writing (Soliday, 2011, p. 37).

In academic writing, stance is considered vital because it expresses the communicator's "attitudes, feelings, judgments, or commitment concerning the propositional content of a message" (Biber, 1999, p. 23). Biber (2006) elaborates that stance expressions "convey many different kinds of personal feelings and assessments, including attitudes [towards] certain information, how certain they are about its veracity, and how they obtained access to it and what perspective they are taking". Stance can be achieved through "grammatical devices and lexical words, which express epistemic knowledge (e.g., might, suggest, probably, possibly, likely) and authors' attitudes towards propositions (e.g., unfortunately, surprisingly)" (Biber et al., 1999 in Shen and Tao, 2021, p. 2). As a linguistic mechanism, stance is studied from the perspectives of evidentiality, affect, attitude, attitude, evaluation, appraisal, and meta-discourse (Shen and Tao, 2021). Drawing upon these linguistic mechanisms, writers can convey their position and feelings about the proposition within their discourse and establish an effective interpersonal relationship with their readers (Kiesling et al., 2018; Shen and Tao, 2021; Zhang and Zhang, 2023).

Metadiscursive cues for facilitating "social negotiations embedded in discourse" are prominent in all "university registers" (Biber, 2006 in Aull, 2019, p. 268). However, they are particularly significant in scholarly discourse in which "stance is constantly adjusted in interaction with the construed readership" (Wharton, 2012, p. 262). Drawing upon Hyland (2012) and Soliday (2011), Aull (2019) observes that for learners entering tertiary education programs, linguistic mechanisms for expressing stance tend to be "tacit". Hence, it is difficult for novice academic writers to comprehend scholarly writing as a discourse that acknowledges, creates, and navigates social relations through the use of stance devices, thus enabling them to evaluate propositions and address alternative perspectives. This is something that is unlikely to be unattainable if the text lacks the use of stance. Under such circumstances, the text is likely to reflect impersonality.

Although stance markers are present in all university registers, they tend to be more prominent in scholarly writing, wherein stance experiences ongoing modification while interacting with an imagined audience (Wharton, 2012, p. 262). Changing one's stance is contingent upon disciplinary preferences and broader academic practices (Afzaal & Du, 2023; Hyland and Tse, 2004). Using stance norms is also important because it directly impacts the grades achieved by native speakers and English language learners who write for school (Lee and Deakin, 2016).

Research interests in linguistic stance markers within undergraduate writing have been growing as students who are new to higher education tend to be unaware of these linguistic devices (Hyland, 2012). In addition, studying Stance in the writings of L2 writers is also necessary because they employ fewer linguistic resources to alter epistemic commitment when compared with L1 writers (Hyland and Milton, 1997). The academic writing of L2 writers differs noticeably, indicating that undergraduates are still learning to apply these linguistic markers. Compared with seasoned scholarly writing, the written output of undergraduate learners tends to make more extensive use of boosters and significantly limited use of hedges (Hyland, 2012).

Against this backdrop, the present paper compares the stance markers used by L2 engineering students (from the Hong Kong Polytechnic University) and native engineering students (U.S. University) to investigate the genre-specific lexical stance patterns used by academic writers. Therefore, this study focuses on undergraduate students studying civil engineering who have submitted their final-year projects and have the potential to publish their reports in top-quality academic journals.

Understanding how to identify what constitutes valuable stance patterns in student writing is another difficulty the students face. For instance, a valuable stance pattern may depend on the purpose of writing, ranging as it may from laying out the facts to persuading the readers. For the most part, undergraduate student writing does not resemble published academic writing in terms of level and genre. Students are far more likely to respond to assignments rather than produce writing for scholarly journals. For instance, the writing of undergraduates studying language, philosophy, and education reflects a greater tendency towards the expression of opinions as well as mental processes in the form of lexical verbs and phrases compared with the writing of graduate-level engineering students (Hyland and Jiang, 2018). In research comparing authorial attitude expressed via stance adverbs in abstracts within Chinese and American doctoral engineering dissertations, Bao (2022) found that the Chinese writers tended to

deploy more boosters (a category of epistemic stance adverbs) and to use stance adverbs for the expression of affect rather than evaluation. It was observed that the language used to express thoughts and mental processes tends to be more prevalent in reports and research documents than in the assignment genre within the advanced writing corpus (Hardy and Friginal, 2016; Rhee, 2023). Hitherto, stance research on student writing has confined itself to common genres. While Charles (2007) has investigated theses and Hyland and Tse (2004) have focused on abstracts, Hyland (2012) has explored dissertations, and Aull et al. (2019) have turned their attention to argumentative essays.

The present paper undertakes a corpus-based comparative analysis of stance expressions in a corpus of final-year projects of engineering students (L2) and an L1 engineering academic writing corpus. As researchers have yet to explore the MICUSP assignment category from this perspective, the present study's focus represents an attempt to address this gap.

Stance in academic writing

There has been considerable research into using hedges and boosters in academic writing. According to Hyland and Jiang (2016), these markers demonstrate that "the writer has expressed commitment to the veracity of the propositions he or she offers and the prospective influence on the reader". Epistemic position markers such as "perhaps", "maybe", or "might" allow the creation of a dialogic space. They downplay the degree of confidence ascribed to an accompanying claim, thus allowing for the potential of other ways of thinking and divergence in opinion. On the other hand, boosters such as "unquestionably" sequester the dialogic space by allowing no room for dissent. Existing literature suggests that hedges and boosters enable authors to introduce more indirectness and politeness in academic prose (Hyland, 1998; Li and Wharton, 2012; Vande Kopple, 2002). Based on their studies of hedges and boosters, researchers such as Aull (2015) and Aull and Lancaster (2014) observe that successful academic writing is characterized by carefully calibrated epistemic commitment achieved through the strategic deployment of boosters and more liberal use of hedges.

Additionally, according to the studies mentioned above, students transitioning from secondary to postsecondary writing are not always aware of this expectation. Aull et al. (2017) and Hyland (2012) pointed out that learners transitioning to postsecondary writing are not always familiar with the notion of epistemic commitment or how to achieve it. Secondary and postsecondary writing is characterized by greater certainty and generality, even though teachers appear to prioritize writing with lower levels of certainty and generality. For instance, while the deployment of hedges in late secondary essays was associated with higher ratings of writing quality (Uccelli et al., 2013), Brown and Aull (2017) reported "emphatic generality" to be evident in low-attainment writing and "elaborated specificity" to be evident in high-attainment writing in advanced placement (AP) English. Research shows a predominant use of hedges in A-awarded argumentative essays (in contrast with B-graded essays) written by Chinese writers of English and native writers of English in their first year of college (Lee and Deakin, 2016). According to Thompson (2001), interactional techniques include questions or views potentially belonging to the reader (Aull and Lancaster, 2014). Interactional resources are modeled more generally as functioning either as "stance" or "engagement" devices in Hyland's more lexically focused approach (see, for example, Hyland, 2005a, 2005b). Hyland (2005) introduces the model of interactional metadiscourse features; within the context of this model, "interactional macro functions" are served by stance and engagement (Hyland, 2005b, p. 176).

Novice and advanced academic writers

Aull and Lancaster (2014) identified a greater use of hedges and limited generality compared to writing done by novice undergraduate learners (Aull and Lancaster, 2014). Investigating instructor evaluations of advanced undergraduate prose, Aull and Lancaster (2014) notes that while the writing teachers support the strategic use of boosters, they show a preference for student writers demonstrating critical neutrality from the claims. While research suggests that academic writers mould their writing in response to the discursive practices prevalent in their disciplinary field (Hunston, 1994), advanced academic prose, irrespective of the discipline within which it is produced, integrates characteristics that are obstructive rather than supportive of the writer's argument (Mei, 2007). For instance, while observing that clausal features that explicated ideas and relationships supported strongly critical claims in undergraduate argumentative writing, Staples et al. (2016) found that in more explanatory genres, the student academic writers tended to deploy passive voice and complex phrases to distance themselves from critical statements. Therefore, this study focuses on comparing novice and advanced academic writers.

The study. This study investigates stance-taking/interactional strategies deployed by L2 writers compared to native English writers in their report writing. The linguistic aspects of text-based analytical writing asking students to assess a nonfiction article's theme, make claims about the author's message, provide evidence to support the claim, and analyze the author's craft remain unexplored. It is essential to explore these because understanding these aspects enables student writers to express their position and stance toward a topic, author, or issue more effectively. Writing in this style differs from the more common source-based, argumentative style. The present study is significant as it contributes to the existing literature by focusing on the idea that academic argumentation "involves articulating a viewpoint on matters that matter to a discipline" (Hyland, 2012, p. 134) which can be improved through attention to stance in undergraduate writing. Therefore, the study addresses the following research questions.

The following research questions framed our investigation:

RQ1) What stance-taking/interactional strategies were deployed by L2 writers compared to native English writers in their report writing?

RQ2) What are the key patterns in stance markers deployed by writers in assignments from the CEE and MICUSP corpora?

RQ3) What are the implications of these patterns for the development of L2 writers in the argumentative genre?

Methods

The study investigated the stance-taking/interactional strategies used by the L2 writers in relation to upper-level writers in English in an L1 university setting. Therefore, MICUSP is used as the expert corpus, whereas CEE is used as the L2 corpus. A detailed description of the corpora is given in the next section.

The MICUSP corpus. The MICUSP is an online corpus of 829 upper-level student writing documented at the English Language Institute at the University of Michigan (see Romer and O'Donnell, 2011). It comprises the writings of 'highly advanced student writers whose written assignments have been awarded the grade 'A' (Ädel and Römer, 2012, p. 3). This online corpus is freely available to the public. The writing in MICUSP represents a very high standard of upper-level student writing because of the competitiveness of the University of Michigan (UM) undergraduate and post-graduate programs and the high ranking of

UM itself, which was ranked as the 28th best undergraduate school in the country in the 2018 US News and World Report rankings (Romer and O'Donnell, 2011). Each post-graduate-level UM program included in this research is likewise very selective, placing amongst the top 15 in the country. These programs range from psychology and education to engineering and political science. The study focused on the essays written by civil and environmental engineering departments uploaded to the official corpus of the MICUSP. The upper-level writing in civil and environmental engineering was included to compare the final year reports of Hong Kong Polytechnic University undergraduates.

We extracted 155 Upper-Level Student Papers from the Michigan Corpus of (MICUSP) for our analysis. The MICUSP contains A-graded papers written by native students in the final year of undergraduate education or the first three years of graduate school, thus offering insights into 'successful university writing models in terms of their linguistic composition, format, and style'"(Hardy and Römer, 2013).

The CEE corpus. The Polytechnic University corpus of civil and environmental engineering (CEE) was based on the final year reports submitted by undergraduates studying in the civil and environmental engineering department at the Hong Kong Polytechnic University. This study's unit of analysis comprised 97 final-year reports written by L2 undergraduates at the Hong Kong Polytechnic University in Hong Kong. Students write final-year project arguments using evidence from expository texts and take their time reading, drafting, writing, and revising them. The CEE corpus comprises a significant collection of writing completed by students transitioning to the next level of their education. The writing was in the form of an argumentative response to readings that were not discipline-specific and included time for the stages of the writing process. The length of the reports in the corpus varies. The average word count of the reports in the entire sample is 8362.69, and the total number of tokens in the CEE corpus are 811,181 (Table 1).

Analysis procedure. The research employs a mixed-method approach to analyze the data, encompassing both quantitative and qualitative methodologies. Initially, the study employs quantitative analysis, statistical analysis, and corpus-based analysis using Sketch Engine. Texts in the CEE and MICUSP were uploaded to Sketch Engine (Kilgarriff et al., 2014) and annotated with TreeTagger Tag Set (Santorini, 1990). The targeted searches of stance markers corresponding to each functional category were adopted from Aull and Lancaster's (2014) analysis, which was compiled based on a large strand of relevant literature. In addition, several studies have also utilized Python to extract stance features from political discourse and narratives, as well as for the acquisition of discourse markers. This approach is exemplified in the works of Aminu and Chiluwa (2023) and Polat (2011). Corpus query language was written to extract stance markers. Then, each concordance line was manually scrutinized to confirm whether the retrieved item was used as a particular stance marker. For example, we first used the query language [lemma = " particularly"] to extract concordances containing the word *particularly* and then manually eliminated those in which *mainly* was used as an adverb, instead of a code gloss, for example, *particularly complicated*. Subsequently, it transitions to qualitative analysis to delve deeper into the data and gain a comprehensive understanding of the research phenomena. The mean and standard deviation of stance markers used in each corpus are summarized in Table 2.

Table 1 Summary of the data corpus.

	CEE	MICUSP
Number of texts	97	155
Average words per text	8362.69	3060.52
Tokens	811,181	474,380
Types	16,405	17,653

Table 2 Stance markers used in CEE and MICUSP.

Stance markers	Subconstructs	CEE		MICUSP	
		M	SD	*M*	SD
Hedges	Approximative hedges	26.96	20.74	15.08	12.93
	Self-mention hedges	0.10	0.31	0.59	1.73
	Evidential verb hedges	11.26	12.95	6.36	6.60
	Modal hedges	68.28	51.95	19.10	17.43
Boosters		93.17	46.51	34.89	29.95
Code glosses	Elucidation	4.95	7.12	1.46	1.95
	Exemplification	14.76	12.03	4.96	5.20
	Emphasis	2.76	3.33	2.05	2.74
	Counter-expectancy	0.46	6	0.85	1.35
Contrastive connectors		28.55	23.93	22.09	17.32

Results

This study compares the use of stance markers in reports written by non-native civil engineering students (CEE corpus) with reports produced by native English academic writers (MICUSP corpus). Both hedging and boosting assist authors in expressing a greater or lesser level of commitment to their claims; the phenomenon is examined in our analysis. Hedging is typically realized through appearance-based evidential verbs (*seems, appears*), self-mention phrases (*we believe, from our perspective*), modal verbs of probability (*may, might, and could*), and approximative adverbs (*approximately, about*). In contrast, boosting refers to efforts made to increase epistemic commitment. This is typically accomplished by exaggerating or intensifying adverbs, such as *completely* and *definitely* which boost authors' expressions of stance. Boosting is a form of embellishment (Biber et al., 1999; Hyland, 2005b; Quirk et al., 1985).

The proportion of each metadiscourse category. Considering that the MICUSP has different sizes, the frequencies of stance markers used in each corpus are normalized to a common base, i.e., per 10,000 words. Figure 1 compares the normalized frequencies of metadiscourse in reports written by the CEE students and MICUSP writers. The most striking observation to emerge from the data comparison is that these metadiscourse categories are employed in loosely similar proportions in the CEE and MICUSP corpus. Hedges are used most frequently by native and non-native university students, with boosters coming in second place and contrastive connectors in third place. Moreover, the least frequent use is code glosses. Although Biber (2006) divides epistemic adverbs into four different categories, namely certainty, attitude, and style, these categories are not mutually exclusive. Our results indicated that civil engineering students used fewer phrases of clarity for expressions of likelihood. For example, a claim that is described as either *extraordinarily likely* or *certainly unlikely* is a boosted assertion along these lines.

Figure 1 indicates that both native and non-native undergraduates used hedges more frequently than other categories of

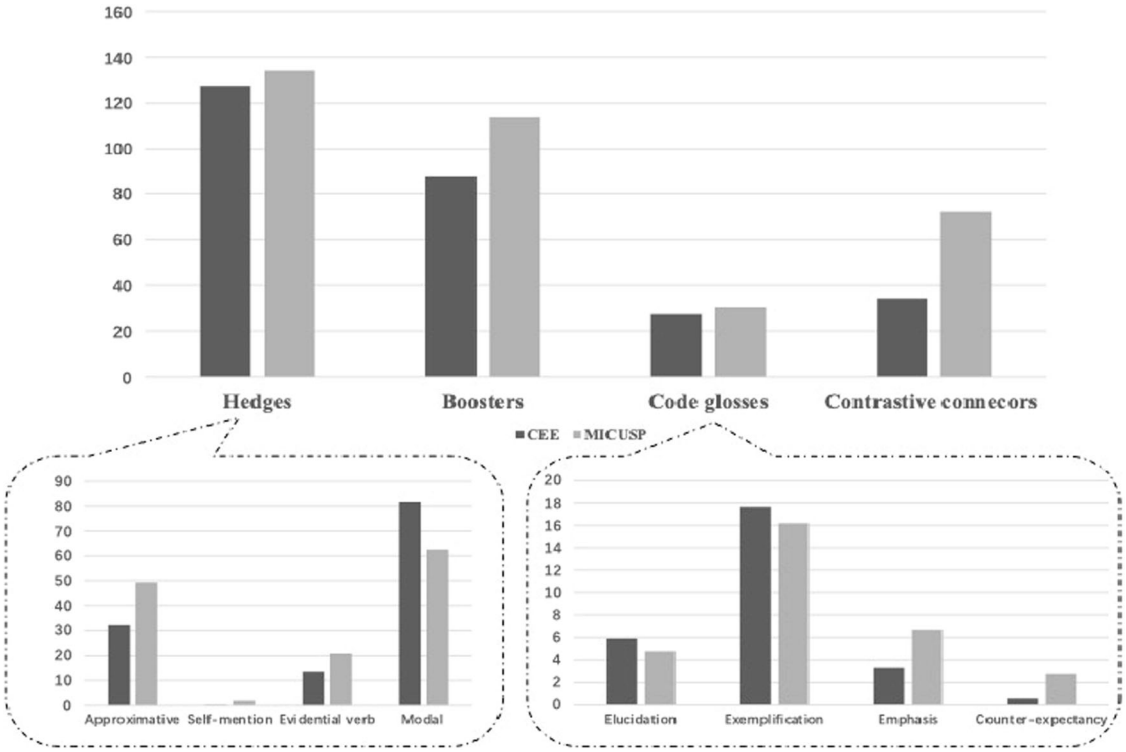

Fig. 1 Frequency Distribution of Metadiscourse Features in the CEE (Black) and MICUSP (Grey).

Table 3 Comparison of the stance marker use in CEE and MICUSP.

		Normalized frequencies		Pearson's chi-square test	Fisher's exact test
		CEE	MICUSP		
Hedges	Approximative hedges	32.24	49.26	226.17***	0.000 ***
	Self-mention hedges	0.12	1.92	122.77***	0.000 ***
	Evidential verb hedges	13.46	20.76	98.95***	0.000 ***
	Modal hedges	81.65	62.42	149.56***	0.000 ***
Boosters		87.49	114	218.41***	0.000 ***
Code glosses	Elucidation	5.92	4.76	7.25*	0.007*
	Exemplification	17.65	16.19	3.75	0.055
	Emphasis	3.30	6.66	74.31***	0.000 ***
	Counter-expectancy	0.55	2.76	106.49***	0.000 ***
Contrastive connectors		34.14	72.16	902.77***	0.000 ***

*$p < 0.05$; ***$p < 0.001$.

stance markers. The result highlights a general trend that writers, especially advanced language users, tend to open dialogic space using hedges in their writings (Aull, 2019). Moreover, the result suggests that boosters are the second most frequently used stance markers in both CEE and MICUSP. The finding is consistent with that of Hyland (2005) and Lancaster (2016), who found that advanced language users appear to employ hedges to open dialogic space while using boosters to close dialogic space to achieve more measures and less blunt tone of scholarly writing. Table 3 presents the normalized frequencies of stance makers used in the CEE and MICUSP. A chi-square test of independence was performed via SPSS to examine the relationship between native university students and non-native undergraduates in their use of metadiscourse features. Moreover, Fisher's exact test was conducted for additional information about the significance value.

As shown in Table 3, statistical analysis reveals that the use of modal hedges in the MICUSP was significantly less (62.42) than in the writings within the CEE corpus (81.65). However, native college students used a significantly greater number of approximative hedges (49.26), self-mention hedges (1.92), and evidential verb hedges (20.76) than non-native university students (respectively, 32.24, 0.12, and 13.46). In addition, the use of boosters in the MICUSP was greater (114) than evidenced in the writings within the CEE corpus (87.49).

The use of code glosses presents mixed results. Essays written by native college students were found to make significantly more frequent use of emphasis (3.30) and counter-expectancy markers (0.55) and less frequent use of elucidation markers (5.92). Moreover, there was no significant difference between the CEE (17.65) and MICUSP (16.19) concerning the use of exemplification markers. In terms of contrastive connectors, the frequency of contrastive connectors in the MICUSP (72.16) is significantly higher than in the essays written by the CEE students (34.14).

Further analysis of the most frequently used stance words or phrases by native and non-native university students shows more similarities than differences between the corpora from MICUSP and CEE. Table 4 presents the frequently used stance markers in the CEE and MICUSP in the order of their frequencies. For example, the most frequently used evidential verb hedges and self-mention hedges in the two corpora are identical.

Elucidation and exemplifying: use of code glosses. The analysis of the results focuses on code glosses because these are linguistic resources that "assist readers in grasping the acceptable interpretations of components in texts" (Vande Kopple, 1985, p. 84). Many different code glosses, like approximative hedges, are used to express meanings with greater precision. Furthermore, by indicating that a proposition requires careful elaboration or

Table 4 The most frequently used metadiscourse markers.

		CEE	MICUSP
Hedges	Approximative hedges	*possible, about, mainly, relatively, around, usually*	*often, possible, likely, perhaps, generally, usually, almost*
	Self-mention hedges	*I believe, I think*	*I believe, I think*
	Evidential verb hedges	*suggest, indicate, seem, tend*	*seem, suggest, indicate, tend*
	Modal hedges	*can, may, could, might*	*can, may, could, might*
Boosters		*more, should, show, find, most, know, very, must, certain(ly), clear, always*	*more, find, should, very, most, must, show, know, certain(ly), clear(ly), actually*
Code glosses	Elucidation	*i.e., which means, in other words, defined as, known as*	*i.e., known as, defined as, namely, in other words*
	Exemplification	*such as, for example, for instance, an example, e.g.*	*such as, for example, e.g., for instance, an example*
	Emphasis	*especially, particularly, specifically*	*especially, specifically, particularly*
	Counter-expectancy	*in fact, as a matter of fact*	*In fact, indeed*
Contrastive connectors		*however, but, while, although, on the other hand*	*but, however, while, although, though*

clarification, code glosses can implicitly elevate the status of material as deserving readers' attention.

One clear difference between types of code glosses is the distinction between elucidation and exemplification techniques (Hyland, 2007). As illustrated in examples 1 and 2 below, extracted from the CEE corpus, the former category comprises moves for explaining, paraphrasing, or specifying a point (made by the writer or someone else), whereas the latter includes moves to further illustrate a point with examples.

Example 1

Elucidation: The microplastics cannot be treated by a normal wastewater treatment process because it is too small to screen and settle. In other words, microbead finally will discharge to the river or ocean directly and causing plastic resin pellet pollution. (FYP-CEE)

Example 2

Exemplification: Sources of microplastics in the oceans of the world. Microbead can be defined as a 5 micrometre (μm) to 1 mm plastic fragments or beads made of synthetic polymers. For instance, polyethene, polylactic acid and polypropylene (Rochman, 2015). It can usually be existed in various exfoliating personal care and cosmetic products, including body wash, face wash and cosmetics instead of natural ingredients, including oatmeal, walnut husks, and pumice (FYP-CEE).

According to our findings, the CEE used more elucidation than the MICUSP students. Figure 1 also shows that CEE writers use other categories such as counter expectancy of code glosses less frequently than MICUSP writers. While there is a slight increase in the use of exemplification between CEE and MICUSP writers, the differences are minor. The CEE students, like the MICUSP students, include many examples in their argumentation, denoted by *such as, for example*, and other wordings.

Expressing concession and contrast. Our analysis of frequently occurring adversative/contrast connectors such as *however, but*, and *nevertheless* revealed the need to differentiate between two related functional categories: concessive/counter connectors on the one hand and contrast connectors on the other (see, e.g., Halliday and Hasan, 1976; Izutsu, 2008). Stance features appear in bold and are discussed below each passage. For example, example 3 comes from a research report written by an undergraduate student in civil engineering in the CEE corpus. Fu and Wang (2022) suggest that interpreted and spontaneous speeches tend to follow distinct hedging patterns in terms of preferred linguistic choices. In addition, hedges can assist researchers in defending their positions while also assisting them in applying plausibility and clarity to their assertions (e.g., Lakoff, 1972; Hyland, 2000, 2005).

Example 3

Concessive/counter: The supply of fresh water supplies declines, wastewater reuse after treatment is gaining recognition around the world. However, it is also important to remember the social and cultural disparities that in various parts of the world, particularly those in which wastewater reuse for food production or some other domestic usage is not yet suitable (FYP-CEE).

Example 4

Contrast: People use these personal care and cosmetic products every day so that the microbeads flow to the wastewater treatment plant with wastewater. The microplastics cannot be treated by a normal wastewater treatment process because it is too small to screen and settle. In contrast, microbead finally will discharge to the river or ocean directly and causing plastic resin pellet pollution (FYP-CEE).

Concessive/counter connectors, such as those used in Examples 3 and 4, seek to establish an assertion as being contrary to the imagined reader's anticipation, which falls under the functional category of counter expectancy (e.g., Martin and White, 2005). However, there is one more distinction to be made within this category. Whereas 'however' follows an earlier conceded element in example 3 (Gladwell is correct), it works in example 4 to signal a counter to an earlier conditional statement. If there is a concession element in the first sentence, it is not stated explicitly (e.g., through signals like certainly, of course, obviously, or is correct). Because these two meanings are related—the element being countered is projected as a possible view—we classified them as concessive/counters. However, contrast expressions such as *in contrast* and *on the other hand*, as seen in example 3, work to distinguish between two opposing ideas or views rather than to contradict an earlier statement's expectation.

In the third example, the author presents both his or her own analytical technique as well as an alternate strategy, emphasizing the distinction between the two by employing a contrastive phrase. In these descriptions, the student allots roughly the same amount of textual space to each strategy, and they place an emphasis on processes (rather than, for example, human actors) and the assumptions that support each strategy.

Example 5

The need for water in the residential, farming, manufacturing, and urban sectors grows as the human population grows. Whereas the effect of effluent reuse on human health and environmental risk are the two main issues. The effluent reuse should be approached cautiously and only with close analysis of the possible consequences and risks (FYP-CEE).

Example 6

It became evident shortly after installation that the membranes were fouling. Because the water in Dundee is supplied from Lake Eerie, Enviroquip assumed that there should be no problems with mineral deposits in the Dundee plant. Therefore, in order to solve the fouling problem, the plant began flushing the membranes with a 1% sodium hypochlorite solution. Due to the frequent recurrence of the problem, the plant has used the cleaning solution every two months since the membranes were installed. Recently, the membrane racks were removed for cleaning, at which point mineral deposits were observed on the membrane surfaces. This means that the plant will also have to add flushes of 1% citric acid. However, it is possible that the fouling problems will be resolved by using the proper chemicals because the problem was related to mineral deposits rather than to biomass. As a result of the membrane fouling, the plant is forced to treat a lower quantity of water than it is capable of treating, making the current plant maximum capacity 3.3 MGD instead of the 4.0 MGD possible with the new raw wastewater pumps. Additionally, Enviroquip suggested that they lower the Mixed Liquor Suspended Solids (MLSS), which means that they are wasting a higher volume, and therefore producing more sludge. (FYP-MICUSP Corpus)

Example 7

Common problems of prairie re-creation and restoration may be further complicated by managing LIHD systems for biofuel production. For example, degraded fields can be so dominated by persistent invasive species such as spotted knapweed (Centuarea maculosa), Kentucky bluegrass (Poa pratensis), and orchard grass (Dactylis glomerata) that increasing native diversity is nearly impossible. Many subdominant prairie species, important for overall diversity, have conservative establishment characteristics that limit their ability to compete with invasives. However, the greatest biomass, and thus the most energy, is available after the summer growing season (FYP-MICUSP Corpus)

When compared to the CEE corpus, the MICUSP students use more reformulation strategies, almost around half as often as noted in the examples from the experienced student writers. The bulk of these resources implement a certain kind of reformulation move, referred to as a particular reformulation move, which is perhaps the most significant point to substantiate their work.

Discussions

The study analyzed selected assignments from the CEE Corpus and the MICUSP to identify overlapping patterns in the CEE and the MICUSP corpora. Textual signals that signify reformulation, on the other hand, appear to be equally appreciated in both genre groups. In addition, the study suggests that second language (L2) writers need to be familiar with academic writing rules and the formal code. It is essential for students to understand what linguistic options they have and why and when these options are appropriate. A multi-faceted pedagogical approach may be necessary for teachers to help L2 students develop their language resources and repertoires. The findings presented in the "Results" section also resonate with previous research on boosters and hedges, which suggests that in general, and across all academic fields, skilled academic writers use more hedges than boosters (Hyland, 2005b; Hyland and Milton, 1997; Piqué-Angordans et al., 2002). This approach should include exposing students to a variety of materials and activities that are representative of academic writing and align with its conventions, as well as providing explicit instruction that focuses students on syntactic structures and lexical use, as well as strategy instruction that shows how language is used to construct meaning (Maamuujav and Olson, 2018). Teachers can assist students in understanding how writers make meaning from and with texts and how linguistic choices are influenced by socially established genre conventions through this approach. Investigating paper categories in the MICUSP, Hardy and Friginal (2016) found that while more objective genres like reports or research papers featured a greater number of passive voice constructions, argumentative writing was more dialogic, reflecting the linguistic devices of the conversation (e.g., pronouns and adverbs). Students' performance, academic writing, and metadiscourse markers have been studied extensively. These studies have investigated the ways L2 students write, adjust degrees of doubt and certainty (Hyland and Milton, 1997), engage and recruit readers into the discourse, intrude interpersonally in the text through sentence beginnings or themes (Ebeling and Wickens, 2012). Research based on secondary and early undergraduate writing has studied the connections between corpus patterns and the genre of assignments. For example, keyword analysis by Aull et al., (2017) revealed notable divergences between argumentative and explanatory writing in a composition module.

Overall, our investigation of stance markers or metadiscoursal features across all three levels revealed that there appeared to be a clear developmental trajectory in terms of frequency for three categories: hedges, boosters, code glosses, and connectors. These results align with Alharbi's (2023) findings, indicating that Arabic writers prioritize the substance of their writing over captivating their audience. Notably, the Arabic corpus demonstrates a significant utilization of self-mentions, with a frequency of 4.2 occurrences per 1000 words. In addition, the most apparent discrepancies were seen between CEE students in more advanced writing corpus MICUSP. As a result of this, the response to our first question is that the CEE students have underused stance markers such as hedges, code glosses, and contrast expressions. In contrast, their more advanced peers and native English learners within MICUSP tend to draw on these linguistic resources more frequently. Moreover, as compared to second language learners of Arab countries extensively employ literary techniques like repetition and emphasis in their scientific writing.

Conclusion

The study found that metadiscoursal resources (e.g., hedges/boosters, code glosses, and adversative/contrast connectors) appeared with greater frequency in the MICUSP corpus (advanced writers) than in the CEE corpus (novice writers). Final-year students studying civil and environmental engineering programs used fewer metadiscourse markers than native English writers whose writings were part of the MICUSP. Specifically, the CEE students tended to underuse approximative hedges, code glosses, concessions, and contrast expressions, while the MICUSP academic writers made more frequent use of these.

These results help to identify the areas where learners might need further support with their academic writing. This highlights indicators that help language teachers to arrange workshops and engage students in writing practice to improve their academic writing skills. Our study is limited to the students enrolled in environmental and engineering school of the Hong Kong Polytechnic University, but future studies may find it valuable to study the reports from other schools because stance analysis is key to preparing student writers effectively for meeting the writing requirements in a variety of genres and disciplines.

These findings have pedagogical implications' making clear to the reader that these findings have meaning in the real world. For instance, accommodating perspectives, negotiating stance, rebutting alternatives, and persuading the readers can be done more effectively if L2 writers learn to use contrastive connectors within argumentative essays more strategically. The students may also learn about deploying hedging more effectively to contribute to the overall impact of academic writing. Further, corpus-based studies such as this one are vital for identifying variations in stance patterns across writing proficiency levels and study majors.

Data availability

All data generated or analyzed during this study are included in this published article in the supplementary files.

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Author contributions

SWYB played a pivotal role in supervising the study, offering substantial assistance in both the data collection process and the meticulous proofreading of materials. YA was instrumental in the analysis phase and made significant contributions to the initial /final drafting of the manuscript. HSA was deeply involved in conducting the literature review and played a critical role in the comprehensive drafting and refinement of the manuscript throughout the revision process.

Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

Informed consent

This article does not contain any studies with human participants performed by any of the authors.

Competing interests

The authors declare no competing interests.

Additional information

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