An Investigation of Interactive Metadiscourse in Research Papers of Arts and Science Disciplines Published in Yadanabon University Research Journal, 2022

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Abstract

This study investigates interactive metadiscourse in the published research papers of Arts and Science Disciplines from Yadanabon University Research Journal 2022. In this paper, the taxonomy of metadiscourse proposed by Hyland (2005) and the corpus software AntConc 4.2 were used to analyse the data. There are two categories of metadiscourse: interactive resources and interactional resources. This research only focuses on interactive metadiscourse, which is divided into five sub-categories: transitions, frame markers, endophoric markers, evidentials, and code glosses. The findings revealed that transitions were the most common interactive metadiscourse features in both disciplines. It is clear that the high use of transitions, representing internal connections in the discourse, is an important feature of academic writing. Moreover, it was also found that both disciplines employed all interactive metadiscourse features differently in terms of types and frequencies. If interactional metadiscourse could also be investigated, the results would be more reliable.

Keywords: metadiscourse, interactive resources, transitions, frame markers, endophoric markers, evidentials, code glosses

Introduction

Language serves as a medium through which ideas, emotions, and information are shared. The study of language is linguistics that extends beyond mere words and grammar, delving into how language shapes and reflects human thought. At its core, linguistics examines the structure and function of language, dissecting its components to reveal the underlying patterns that govern communication. Discourse, as a subfield of linguistics, shifts the focus from isolated linguistic units to the broader context in which language operates. It investigates the ways in which conversations, narratives, and texts unfold, considering the social, cultural, and cognitive factors that influence meaning construction. (Akmajian et al., 2004)

The concept of metadiscourse has been defined by many scholars. According to Hyland (1998b), metadiscourse is the use of linguistic devices that organise the text (spoken or written), express the text producer's stance towards the text and the audience, and engage the audience with the text. Metadiscourse is the set of cues that the writer provides to the reader about understanding the writer's meaning and participation in the text.

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Despite the growing interest in interactive metadiscourse in academic writing, less attention has been paid to the published research papers of arts and science disciplines.

Aim and Objectives

The aim of this study is to investigate interactive metadiscourse used in the research papers of arts and science disciplines published in Yadanabon University Research Journal, 2022.

The objectives are to identify metadiscourse in the published research papers of arts and science disciplines, classify them based on the taxonomy of Hyland (2005), and find out the most common interactive metadiscourse features employed and how these usage patterns vary between arts and science research papers.

To be more specific, the two research questions are proposed as follows:

1. What types of interactive metadiscourse features are employed in the published research papers of arts and science disciplines in the Yadanabon University Research Journal?
2. Do arts and science research papers significantly differ in the use of interactive metadiscourse features in terms of types and frequencies?

Literature Review

There were altogether (39) research papers published in the Yadanabon University Research Journal in the Volume (12), No. 1, in 2022. Two research papers are in Myanmar, so they were left out of this research. So, the analysis was only done on 37 research papers: 17 from the arts disciplines and 20 from the science disciplines. This paper was based on corpus analysis. So, the corpus software AntConc 4.2, designed by Laurence Anthony in 2022, was used to collect and analyse the data. The corpus consists of five academic arts disciplines: English, Geography, History, Oriental Studies, and Law, and four academic science disciplines: physics, chemistry, mathematics, and Industrial Chemistry. The scanned texts produced an electronic corpus of 65860 words: 41455 in the arts disciplines and 24405 in the science disciplines.

Theoretical Background

There are various models and taxonomies of metadiscourse proposed by different scholars such as Crismore (1989), Vande Kopple, (1985, 2002), Hyland (2005), and Adel (2010). However, from among these categories, the one selected for the current research was Hyland's model of metadiscourse features, as it is the most recent and the most comprehensive taxonomy of metadiscourse features. In Hyland's (2005) taxonomy of metadiscourse features, there are two main categories of metadiscourse: interactive resources and interactional resources. Each is subdivided into five subcategories. In this research, interactive resources are only focused to narrow down the scope of the research. The interactive category of metadiscourse features concern the writer's awareness of a participating audience and the way he or she seeks to accommodate its possible knowledge, interests, rhetorical expectations, and processing abilities" (Hyland, 2005, p. 49). As a matter of fact, the writer structures the text in such a way that it can meet the requirements of the writer and shape the text so that the audience can react in such a way that the author intends. Interactive metadiscourse has five subdivisions as transitions, frame markers, endophoric markers, evidentials and code glosses.

(i) Transitions: transitions are mainly conjunctions such as *in addition, but, thus, and*, used to mark additive, contrastive, and consequential steps in the discourse.

(ii) Frame Markers: frame markers are references such as *then, finally, to conclude, my purpose is*, to text boundries or elements of schematic text structure, including items used to sequence, to label text stages, to announce discourse goals, and to indicate topic shifts.

(iii) Endophoric Markers: endophoric markers make additional material salient referring to other parts of the text. Some examples of endophoric markers are "*noted above, see Fig, in section 2*."

(iv) Eivdentials: evidentials indicate the source of textual information which organizes outside the current text. "*According to X, Z states,* etc." are some examples of evidentials.

(v) Code Glosses: code glosses signal the restatement of ideational information by using the words "*namely, e.g., such as, in other words*."

Related Research

One related research that supports the better understanding of interactive metadiscourse used in the present study is "Patterning of interactive metadiscourse markers in result and discussion sections of academic research articles across disciplines," was written by Khedri, Ebrahimi, and Heng in 2013. That paper explored on interactive metadiscourse markers in the result and discussion sections of academic research articles across four disciplines, namely, English Language Teaching, Civil Engineering, Biology, and Economics, to clarify the manner of metadiscourse use among the varied disciplines. In that study, the researchers employed Hyland's (2005) Taxonomy of Metadiscourse. The findings indicated some cross-disciplinary similarities and differences in the use of interactive metadiscourse markers. It was recommended that the results could be of value especially for novice research article writers who belonged to disciplinary communities, so that they could get entry into their own particular research communities.

Another research "Metadiscourse in academic writing: An investigation of Saudi EFL students' research articles" was conducted by Majdah Alkhathlan in Saudi Arabia in 2019. That study examined the type and frequency of metadiscourse markers used in fifty research articles written by Saudi EFL college students. In analyzing the data, Hyland's (2005) model of metadiscourse was adopted. The findings showed that there were significant differences in the frequency of interactive and interactional metadiscourse. The students employed more interactive metadiscourse markers than interactional ones. The analysis also revealed that transitions occurred most often in the research articles, followed by hedges. The least used metadiscourse markers were endophoric markers and attitude markers. It was recommended that Saudi EFL students must be more aware of the importance of using metadiscourse in improving their writing skills in general.

Research Methodology

This study is an attempt to focus on interactive metadiscourse used in 37 arts and science research papers published in the Yadanabon University Research Journal, 2022. The scanned texts of arts and science research papers were converted into corpus separately through Corpus Software, AntConc 4.2, and the data were collected and identified according to the theoretical framework of Hyland (2005).

Data Collection & Data Analysis of Interactive Metadiscourse Features

In this study, a corpus-based approach is employed. There are two corpora containing 37 published research papers, written respectively by university teachers from the arts and science disciplines of Yadanabon University, in the fields of English, Geography, History, Law, Oriental Studies, Chemistry, Physics, Mathematics, and Industrial Chemistry. The word counts of arts and science disciplines are 41,455 and 24,405, respectively.

The first thing to do for the present research is to scan the text of the research papers from the Yadanabon University Research Journal, 2022, for analysis. Then, they are sorted out into arts research papers and science research papers. After that, they are respectively categorized into interactive metadiscourse features through corpus software, AntConc4.2. Sample data collection and data analysis can be seen as follows:

Table 1: Some Sample Instances of Transitions in the Research Papers of Arts and Science Disciplines

Sr. No.	Name of Disciplines	Context on the Left	Meta-discourse	Context on the Right
1	English	L3 is the most frequent type	and	the percentage of this type is 63.92%.
2	Geography	The highest annual rainfall occurred in 1994, amounting to 60,66 inches	and	the lowest annual rainfall was found in 2012 with 14.19 inches.
3	Physics	AC pilot lamps and a plug are wired to the outputs of the 4- channel relay module	and	the completed circuit diagram is shown in Figure (10).
4	Chemistry	Plants contain many kinds of natural organic compounds	and	their compounds possess many useful properities.
5	Mathematics	The section 1 is 6m above the datum	and	the section 2 is 4m above the datum.

Table 2: Some Sample Instances of Frame Markers in the Research Papers of Arts and Science Disciplines

Sr. No.	Name of Disciplines	Context on the Left	Meta-discourse	Context on the Right
1	English	This paper used the eight kinds of translation method proposed by Newmark (1988).	Then,	the data were interpreted and the result was discussed.
2	History	After the annexation of Upper Myanmar, the British government confiscated all of the lands and	then	the British enacted the "Upper Burma Land Revenue Act of 1889
3	Industrial Chemistry	the clay was washed several times deionized water followed by decanting until the discard water became neutral.	Then,	the clay ass littered off by a Buchner funnel.
4	Mathematics	If the pressure at section 1 is 39.24N/cm²,	then,	the intensity of pressure at section 2 can be found.
5	Chemistry	This mixture was boiled for 15 min and filtered the solution.	Then,	it was blended until it became mush.

Table 3: Some Sample Instances of Endophoric Markers in the Research Papers of Arts and Science Disciplines

Sr. No.	Name of Disciplines	Context on the Left	Meta-discourse	Context on the Right
1	English	The majority amount is fair learners. In	figure (3)	there is no weak learner in the last phase and the percentage is 0%.
2	Geography	classified Images are shown as outputs of classification step in	Figure (3).	Total 124 ground control points were collected during field survey,
3	Mathematics	… and they are wed by edges. From this	Figure (10),	we obtained the minimum dominating set.
4	Physics	The photograph of the constructed Wifi smart plug is shown in	Figure (11).	Node MCU, relay and Blynk application are used to construct Wifi smart plug…
5	Chemistry	The sample S has the lowest relative concentration of Chlorine (CI) in	Figure (5).	The sample S, has the highest relative concentration of …

Table 4: Some Sample Instances of Evidentials in the Research Papers of Arts and Science Disciplines

Sr. No.	Name of Disciplines	Context on the Left	Meta-discourse	Context on the Right
1	English	Adaptation method was the most frequently used method.	According to	Newmark (1988), adaptation is the freest form of translation …
2	Law	Ma Lay would repay by serving as a house servant.	According to	the loan contract dated 1877, if the loan could …
3	Geography	It is in Sagaing Region and is moderately populated.	According to	the censuses, the township's population totalled 139,479 in 2020.
4	Chemistry	… This process was done	according to	the ultrasound-assisted extraction …
5	Physics	Consider the fluid flowing through a pipe in which Q= the rate of flow or discharge.	According to	Newton's second law of motion, the net …

Table 5: Some Sample Instances of Code Glosses in the Research Papers of Arts and Science Disciplines

Sr. No.	Name of Disciplines	Context on the Left	Meta-discourse	Context on the Right
1	English	A material process can also involve other participant roles	such as	Scope, Recipient, Client and Attribute.
2	Oriental Studies	A person who commits abhijjhā duccarita will face the drawback,	such as	not getting what he wants, not possessing the
3	Geography	The aim of this research is to describe changes in Tabayin Township, using multi-temporal satellite imaging, with digital image processing	such as	geometric correction, radiometric calibration, image sub setting and classification
4	Chemistry	… it was characterized by their physical properties	such as	melting points, R, values, solubilities in some solvents.
5	Physics	… properties which are considered quite essential for special applications,	such as	Electronics and marine constructions coil platforms.

Findings and Discussion

In this section, the frequency and percentage of transitions, frame markers, endophoric markers, evidentials, and code glosses shown in Table 6 illustrate the distribution of interactive metadiscourse used in 17 arts research papers and 20 science research papers published in the Yadanabon University Research Journal, 2022.

Table 6: Frequency and Percentage of Interactive Metadiscourse Found in Published Research Papers of Arts and Science Disciplines

Sr. No.	Types of Interactive Metadiscourse	Research Papers of Arts Disciplines		Research Papers of Science Disciplines	
		Frequency	Percentage	Frequency	Percentage
1	Transitions	2070	70.8 %	1008	61.5 %
2	Frame Markers	252	8.6 %	200	12.2 %
3	Endophoric Markers	64	2.2 %	182	11.1 %
4	Evidentials	134	4.6 %	60	3.7 %
5	Code Glosses	403	13.8 %	188	11.5 %
	Total	2923	100 %	1638	100 %

Table 6 illustrates the frequency and percentage of interactive metadiscourse found in published research papers in arts and science disciplines from the Yadanabon University Research Journal, 2022.

It can be seen that transitions are obviously the most commonly used interactive metadiscourse in both arts and science disciplines. Transitions constitute more than two-third of the interactive metadiscourse features in both arts and science research papers (70.8% of the arts research papers and 61.5% of the science research papers). The use of these high frequencies in transitions pinpoints the writer's concern in guiding readers through these research papers to the areas of argument in the discourse, and they help to unearth their reasoning and claims in an unambiguous way. Code glosses appear as the second leading category in the arts research papers, with 403 cases (13.8%), while in the science research papers, the second leading category is frame markers, with 200 cases (12.2%). Table 6 also shows differences between academic writers in these two groups in using the remaining three metadiscourse categories. The third interactive metadiscourse used in arts research papers is frame markers, with 252 occurrences (8.6%), followed by evidentials and endophoric markers, with 134 occurrences (4.6%) and 64 occurrences (2.2%), respectively. The use of interactive metadiscourse in science research papers has a different order. In science research papers, code glosses form the third category, with 188 occurrences (11.5%) of the total interactive metadiscourse, followed by endophoric markers, with 182 occurrences (11.1%). The use of evidentials is the least, with the occurrences of 60 (3.7%) of the total interactive metadiscourse features in science research papers.

In comparing with the interactive metadiscourse features in the arts and science research papers, there were variations in their percentage, which can be seen in Figure 1 as follows:

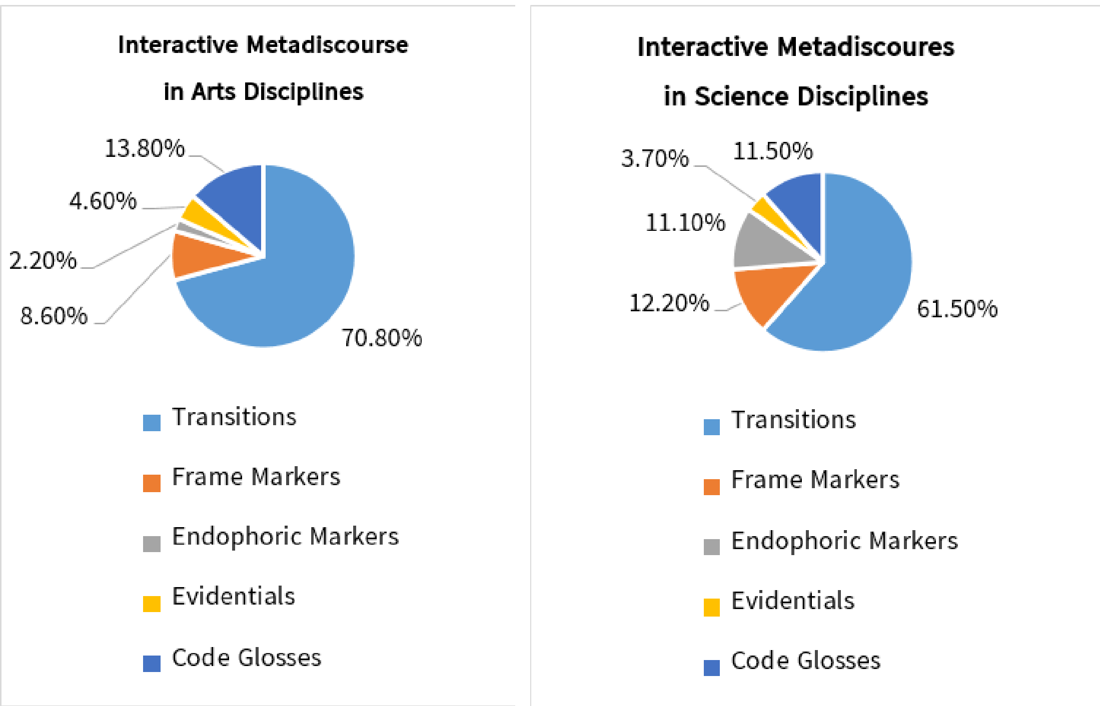

Figure 1: A Comparison of the Use of Interactive Metadiscourse Features among the Research Papers of Arts and Science Disciplines

The above figure shows the comparison of the use of interactive metadiscourse features among the research papers of Arts and Science Disciplines. This finding indicates that researchers from arts disciplines are more likely to use interactive metadiscource features than those from science disciplines. However, based on the data analysis, some findings were surprising. There were 2923 metadiscourse features in 41455 words of research papers in the arts disciplines. Thus, the average use of interactive metadiscourse features in the arts disciplines' research papers was (41455 words: 2923 metadiscourse features) 14.2. It means that researchers from arts disciplines used one interactive metadiscourse feature in every 14.2 words. On the other hand, there were 1638 interactive metadiscourse features in 24405 words of research papers in the science disciplines. The average use of interactive metadiscourse features was (24405 words: 1638 metadiscourse markers) 14.9, meaning that researchers from science disciplines employed one interactive metadiscourse feature in every 14.9 words.

According to the above calculation, it was interestingly found that not only arts researchers but also science researchers utilized interactive metadiscourse features in every 14 words.

Discussion

The researchers' job is to produce a piece of writing that encodes the meanings and organize the discourse. On the other hand, it is the readers' responsibility to decode the preferred meanings intended by writers. It is quite clear that it is a two-way process but it seems that the readers' success in going through the text and grasping the flow of information smoothly is somewhat subordinated to writers' profession while creating the text. Interactive metadiscourse features are devices which can be of help for writers to organize the discourse and produce a more cohesive, reader-friendly, and well-organized text in a way that readers be able to share the flow and rhythm of ideas in the text.

The main purpose of transitions is to help readers interpret the connections between ideas pragmatically. As quoted by Hyland (2005, p. 50), their syntactic coordination and subordination are of secondary importance, and it is the writer's internal duty to guide readers in understanding and interpreting the logical links between ideas, which is of primary value. In the present research, the use of transitions is the most significant occurrence of interactive metadiscourse in the research papers of arts and science disciplines. Since transitions are effective in developing coherence and interconnectivity between sentences (Duke, 1983), this might be a possible reason for greater employment of transitions by researchers in both arts and science disciplines. Moreover, academic researchers in both domains are inclined to produce writer-responsible texts by using words that show textual additions, comparisons, and consequential information.

Through the use of frame markers, writers try to frame the proposition and to show explicit additive relations, label text stages, announce discourse goals, or alter topics. The data showed that frame markers were the third most common interactive metadiscourse employed by arts researchers, whereas for the science researchers, frame markers were the second most common used interactive metadiscourse. These findings suggest that writers in both groups employed these frame markers to signpost internal organization, text boundaries and the shift of arguments, all of which make the discourse clear for the target readers.

Endophoric markers are at the readers' disposal for decoding the intended meanings for better comprehension and arguments' support. In order to achieve this, writers refer backward and forward textually. In science disciplines' research papers, researchers were more accentuated to steer readers to their preferred meanings by means of endophoric markers. According to Hyland (2004b), endophoric markers are utilized to provide the readers with directions for facts, theoretical concepts, methodology, and findings of the research that are described in the text. So, these markers were less used by the arts researchers, and there were significant differences in the employment of endophoric markers between arts and science research papers.

The next category, evidentials, signposts references to information external to the texts. Researchers normally take advantage of these markers to cite a number of earlier works in order to support their own work and make new findings more acceptable to the discourse community they belong to. This need was more prevalent among arts researchers, who tend to compare and contrast their findings to previously found results and use other works to support their argumentations and claims. On the other hand, researchers from the science disciplines pay the least attention to having to justify their claims in relation to other previous studies.

In terms of code glosses, researchers resort to their use by rephrasing, explaining, or elaborating so as to provide readers with extra information with the aim of becoming more precise and accurate in the decoding of their own intended meaning. Code glosses are helpful to determine connectivity and coherence between items during the process of reading (Hyland, 1999, 2010). The majority of researchers in the arts disciplines gave code glosses the second highest preference. This high inclination towards applying such markers signals that researchers in arts disciplines generally tend to predict their readers' existing knowledge base and see a need to provide them with the information they feel. As a result, they utilized much more code glosses than researchers in the science disciplines.

To answer the first question of this present research, academic authors from arts and science disciplines employed all types of interactive metadiscourse features in their research papers published in the Yadanabon University Research Journal 2022. They made considerable use of transitions in their research papers. To answer the second question of this research, academic authors in arts and science disciplines do not significantly differ in the use of interactive metadiscourse features in terms of types and frequencies. It is concluded that researchers in the arts disciplines used interactive metadiscourse features in their research in the same way as researchers in the science disciplines.

Conclusion

The present study investigates the use of interactive metadiscourse in arts and science research papers published in the Yadanabon University Research Journal in 2022. In this study, the taxonomy of Hyland (2005) and the corpus software AntConc4.2 were utilized to analyse the data. According to Hyland, there are two categories of metadiscourse: interactive and interactional resources, but only interactive resources were focused on to narrow down the scope of the research. It was revealed that all researchers in both arts and science disciplines applied all five categories of interactive metadiscourse in different ways. The most frequently used metadiscourse in both arts and science disciplines is transitions, which signal additive, causative, and contrastive relations in the writers' thinking, expressing relationships between stretches of the discourse. Moreover, the least commonly used categories in the two domains are endophoric markers in the arts disciplines and evidentials in the science disciplines. Researchers in the arts disciplines tended to use more evidentials than endophoric markers, while science researchers employed more endophoric markers than evidentials. One possible reason is that academic writers of arts disciplines are inclined to project their presence in making claims, while those of science disciplines tend to be objective. From these results, it was revealed that researchers in arts and science disciplines used interactive metadiscourse features in different ways to manage the information flow and explicitly establish their preferred interpretations. Hyland (2005) points out that explicit instruction in metadiscourse is valuable in academic writing to raise learners' awareness on how to use stance resources appropriately to achieve communicative functions and improve the quality of academic writing. However, there is a limitation that interactive metadiscourse has been a major research focus on published research papers of arts and science disciplines in the Yadanabon University Research Journal 2022. Therefore, if research on interactional metadiscourse features could also be carried out in the published research papers of arts and science disciplines, there would be a robust result.

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