

EXAMINING LANGUAGE USE IN HIGHER EDUCATION RESEARCH

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ABSTRACT: *The issue of publishing or perishing in higher education has long been debated. In higher education, the academicians are expected to write in scholarly journals for various reasons such as for career advancement, knowledge sharing, research funding, and performance measures. There are many challenges and one of them is the English language barrier especially to those with imperfect command. Language teachers assigned to teach technical writing for research publications often find it difficult to relate to the language used, particularly when they themselves have little experience in publishing research articles. There are many aspects of language use and one of the most prominent is the use of transition which indicates the shifts of ideas. Despite the significant and extensive explanation of the use of transitions, language teachers require more explanation on how and why transitions are used in research articles. The description on it is used to provide practical reasoning in the teaching and learning of research writing in higher education. This study aims to investigate how transitional words are used in 125 introduction sections of research articles. The study on the corpus reveals that transitions are used most by the writers to establish the research niche, particularly in adding to what is known, in presenting positive justification and also in indicating the research gap*

Contribution/Originality: This study contributes to the existing literature of higher learning, teaching practices particularly in the teaching of research writing. The primary contributions are in the identified language use in research writing specifically on the use of transition which indicates the shifts of ideas. The descriptions on how prolific writers use language to accomplish the rhetorical strategies in research writing benefit not only the language instructors but also, research supervisors and postgraduate students.

Keywords: Language use, move, research article, writing, technical writing, Computer Science, Rhetorical strategies

INTRODUCTION

The issue of publishing or perishing among academicians has long been debated [1, 2, 3]. Globally, academicians in the role as researchers are expected to write research articles [4]. The articles must be disseminated through publication especially in scholarly journals of some repute. Higher education demands research articles publications for various reasons such as for career advancement, sharing knowledge, securing research funding, for prestige, research funders who require publications and for keeping up with the performance measures.

In order to increase the quality and quantity of research articles, researchers have to overcome many challenges and some of the ordeals listed are the English language barrier [5], time constraint, and cultural issues. Zakaria & Rowland mentioned that “language difficulties are another factor limiting publication – to achieve publication in journals recognized by the Web of knowledge, whether international or local, scientists must write in English, of which some of them have only an imperfect command” (p.233-234). Moreover, the predicament of inadequate flair in English faced by the writers was expressed by a few researchers [6,7]. The predicaments faced by the writers are not surprising since many researchers [5, 8] have highlighted many more problems faced by non-native English writers who have attempted to publish research articles. The problems can be categorized into three aspects of lexicogrammar [8], discourse structure [9, 10], and cultural differences [1, 12].

While there are many existing models that can be used as guidance for researchers to write research articles, educators have been alerted on the applicability and limitation in using these models as pedagogic tools particularly for different disciplines [13, 10]. Despite the availability of these guides and models, the understanding on how to use these guides

and models as pedagogic tools is still needed [14]. Shehzad, W. [10], concurs that “one rhetorical model for all disciplines is not advisable” because research articles of different disciplines vary in structure and style and therefore, the same rhetorical strategy may not be adapted. Anthony pointed out the need to study the model in pedagogic applications because “the danger, of course, is that many teachers of technical writing, coming from backgrounds unrelated to the target discipline, will be unable to correctly interpret the model and inevitably use it as it is.” He illustrates the problem with the case in Japan where language instructors with literature backgrounds were assigned to teach technical writing courses to scientists and engineers; using a textbook that uses the CARS model, but it does not address the interpretation issues and often treated the differences simply as exceptions to the rule. Anthony highlighted the issue of which the exceptions to the rules which may be in fact the standard practice of certain disciplines. Relative to using the existing model as a pedagogic tool, the applicability and limitation of the models particularly in different disciplines must be understood.

To further understand the problems that have been highlighted, this study intends to explore the problems further, specifically on how transitional words are used in 125 introduction section of research articles

In short, there are existing models that can be used as guidance for researchers, however, for pedagogic application, the applicability and limitation of these models must be understood. As such, understanding the applicability and limitation of the existing model in real practice and understanding how the particular discourse community fits the model need to be studied and described

Transitional word is one of the substances for good writing [15]. Besides, the use of transitional words has been reported

to support coherence and to establish sequence within and between paragraphs. Appropriate use of transitional words has been notified to contribute to the writing discourse cohesion and coherence. In addition, students and teachers also have reported that their writing skills have improved with more transitional words introduced [16]. Furthermore, language teachers should be provided with a list of commonly used transitional words as to improve the clarity in the writings of English Second Language users. Due to the importance and salient function of transitional words in writing, transitional words have been used as an indicator for linguistic accuracy in writing rubrics [17, 18]. Following the valuable functions of transitional words in supporting clarity and coherence in writing, this study investigates the most frequent transitional words used in the research article introduction section.

Many researchers have highlighted the importance of having a good introduction paragraph [8, 10, 11]. Often, a research article is more than 6000 words in length, and with technology; there are many articles available for reading; as such competition for readership is stiff. The Introduction section of the research articles often has an effect on the readers' interest, whether the article "is significant and worth exploration" [10, p.15] and whether it is worthy enough for further reading. The Introduction section has been considered as very important in determining the "chances for publication" and "situates (ing) the study among other studies" [11, p.111].

Even though the Introduction section of research articles between disciplines appears to be similar to the readers, studies have also shown that writers from different disciplines employed different strategy moves [19, 20, 21, 22]. Many studies have been done the rhetorical moves in a research article in various disciplines such as in Social science and humanities [23], Biochemistry [24]. and Computer Science [25] and has indicated the different rhetorical strategies used in a different discipline. [26] pointed out the non-prevalent use of "indicating the research gap" move in Philosophy research articles, this move is reported to be utilized by 95% of the computer science research articles introduction [10]. Apart from that, Biochemistry research article introductions were found to have a more cyclical occurrence of "reviewing items of the previous research" [12] whereas the Computer Science research articles seldom attempted this move [25] and this could be attributed to the relatively short history of Computer Science [12]. In short, even when the Introduction section of research articles between disciplines appears to be similar to the readers, studies [12, 25, 26] have shown that writers from different disciplines employed different strategic moves. With regard to the dissimilar practices between disciplines, this paper is focused on the introduction section written in the Computer Science discipline knowing the practices in the learners' discourse community would benefit the language instructors.

Briefly, teaching research writing has been a predicament to many language teachers. Even though models and guides are plentiful, presenting authentic examples and bringing relevant practices into the classroom is a challenge to the teachers. The countless scientific articles are not only difficult to decipher by them but also difficult to apply in the classroom

context. With regard to these problems and due to the importance and salient function of transitional words in writing, particularly in research writing, this study examines the transitional words in the language use of research articles. The findings are hoped to provide the needed description of language use and authentic examples that can bridge the gap between teaching research writing and the existing models and guides available.

Methodology

With regards to the issues on the importance of transitional words, the importance of the introduction section, and differences in the discipline this study analyses the use of transitional words in 125 Computer Science research article introductions. The study identified the most commonly used transitional words, illustrate the purpose, and describe how the words are used by the accomplished writers to realize the rhetorical strategies. It is hoped that the description of the transitional words would give an understanding of technical writing, particularly by providing authentic examples for teaching purposes.

The analysis of the transitional words is conducted by counting the frequency of transitional words. The texts are read and the transitional words are marked. Each of the transitional words is recorded in a list. The list records the transitional word according to the occurrence of the rhetorical strategies to establish the research niche particularly in adding to what is known, in presenting positive justification and also in indicating the research gap. These strategies are rhetorical strategies suggested in CARS model [27]. The occurrence of the transitional words are then noted in the list and added for the frequency count. And then, the most occurring transitional words for each move and step are studied for differences and similarities in the usage.

FINDINGS AND DISCUSSION

Besides explaining in detail on the types of transitional words used for these rhetorical purposes, this paper also illustrates on how these transitional words are used to achieve the rhetorical moves. The following paragraphs describe the transitions used most by the writers to accomplish the rhetorical strategies which are establishing the research niche, adding to what is known, presenting positive justification, and indicating the research gap are

Table 1: Frequency of transitional words according to the rhetorical strategies

Move/ Step	Frequency
Move 1: Establishing a territory	87
Move 2 Step 1A: Indicating a gap	183
Move 2 Step 1B: Adding to what is known	310
Move 2 Step 2: Presenting positive justification	74
Total	654

Table 1 shows that the transitional words are most frequently used to realize Move 2 Step 1B "Adding to what is known" whereby 310 transitional words are used. Next, a total number of 183 transitional words is used to accomplish Move 2 Step 1 A "Indicating a gap", followed by 87 for Move 1 "Establishing a territory". Move 2 Step 2 utilized the

transitional words for 74 times. The following tables show the most frequent transitional words used in Move 1, Move 2 Step 1A, Move 2 Step 1B, and Move 2 Step 2. Table 4.5 shows the most frequent transitional words used to realize Move 1 "Establishing a territory". The illustrations on how transitional words are used are also explained in the next sections.

Table 2: Most frequent transitional words used to realize Move 1: Establishing a territory.

No	Transitional word	Frequency
1	However	10
2	Therefore	7
3	Hence	5
4	Although	4
5	Moreover	4
6	In order	4
7	Recently/ In recent	4

Table 2 shows a total of 87 transitional words found in the realization of Move1: "Establishing a territory". The writers used 34 types of transitional words which include "However" which has the highest frequency at 10 occurrences. Other frequently used transitional words are "Therefore", "Hence", "Although", "Moreover", "In order" and "Recently/ in recent". The transitional words in Move 1: Establishing a territory are used to highlight the increasing specificity of the research territory before moving into the research niche. The first sentence is usually at a general level, followed by the second sentence which poses more specificity to the topic of the research and the third sentence links the general topic of the research to the existing body of knowledge as preparation to lead to the niche of the research. It is observed that the transitional words are used to link the general statements to the specific research and existing body of the knowledge. Even though, 125 research article introductions in the study fulfilled Move 1: Establishing a territory, the transitional words used in this strategy only occur for 87 times. Considering that Move 1: Establishing a territory. is realized in a few sentences, the frequency of the transitional words for Move 1 is low indicating it as a lesser choice. The frequency is also low when compared to the frequency of transitional words used in realizing the strategies in Move 2 which are "Indicating a gap" and "Adding to what is known". Table 2 shows the frequency of the transitional words used in realizing Move 2 Step 1A: Indicating a gap.

Table 2: Frequency of the transitional words used in realizing Move 2 Step 1A: Indicating a gap

No	Transitional word	Frequency
1	However	63
2	Due to	13
3	Therefore	12
4	Although	10
5	Since	7

The total number of transitional words used to realize the strategy of "Indicating a gap" is 183 and the most frequent transitional word is "however", followed by "due to", "therefore", "although", and "since" respectively. In this

step, the writers acknowledge the works that have been done in the area and then proceed to point out the problems concerning the works that have been done. The transitional words such as "however" and "although" are used to highlight the limitations of the existing research and to identify the research gap. The following excerpt illustrates how these transitional words are used to indicate the research gap.

Many codes have been proposed for OCDMA such as Optical Orthogonal Codes (OOCs) [1], prime codes, and Modified Frequency Hopping (MFH) codes [8]. However, these codes suffer from various limitations one way or the other. (F13UniMAP2

...they are potentially good in finding high quality solutions. However, they can be quite inefficient too in the use of computational resources. (UM7)

Although this successfully decoupled the disturbances from the fault reconstruction, it requires very stringent conditions to be fulfilled... (IUM8)

These excerpts illustrate how the transition words of "However" and "Although" are used to signify the limitations that still exist in the research area. While highlighting the research gap, the link with the existing body of knowledge is maintained. Another transitional word that is highly used is "therefore" which is used to indicate the research gap by highlighting the research problems through presenting the advantage of solving the problem, or by presenting the disadvantage of not solving the problem. In this technique, the writers resort to using the next popular transitional word which is "therefore" as illustrated in the excerpt.

...the seeds are usually broadcast at random. As a result, the corps stands in the field without any specific rows. Therefore, the operation of rotary type rice weeder is not possible and the farmers are compelled to use indigenous hand tools for weed control operation. (1P10)

...these two pairs of isomers have caused their respective ratios to unexpectedly remain constant, and therefore provide a tracer of PAHs from origin through environmental transport...(1P16)

After presenting the existing research, the problems in the research area are pointed out followed by statements relating the need for the problem to be resolved. At this point, the transitional word "therefore" is used to draw upon the advantage of resolving the problem. Conversely, the disadvantage of not solving the problem may also be presented with the help of the transitional words "therefore". Other transitional words that have been highly used are "due to" and "since". These transitional words are used to emphasize on the reasons or the causes of the problem that lead to the research gap.

Problems arise due to precise positioning requirements, system flexibility leading to vibration, the difficulty in obtaining an accurate model of the systems... (1P7)

Due to this massive traffic growth and higher axle loads, together with environmental and aging effects, there is a growing concern over rapids deterioration of the pavement (1P3)

Since the total population of these countries is approximately 340 million, a reasonably large number of people use the Jawi script in writing and typing. (2P5)

In this context, the emphasis is on the research gap which is related to the general problem in the research area. The problem is considered general because it is not directly related to the research niche. For example, in the excerpt (2P5) the general problem is the big population of the countries which is not a direct problem to the intended research that is on the Keyboard layout for Jawi script. However, the transitional word "since" has been linked to the general problem of having a big population with the idea of having a large number of people using Jawi. Henceforth, the link provides research space for Jawi scriptwriting and typing. The transitional word "since" signifies the transition of an idea from the general problem into a passage related to the intended research problem.

After creating a research space or indicating a research gap, the next strategy suggested in CARS model [27] is to focus on the research niche by giving more information that is related to the specialized area. The step is Move 2 Step 1B "adding to what is known". The following table illustrates the frequency of the transitional words used in realizing Move 2 Step 1B "Adding to what is known". The highest use of the transitional word for this step is "therefore" followed by "while/whilst"

Table 3: Frequency of the transitional words used in realizing Move 2 Step 1B: Adding to what is known

No	Transitional word	Frequency
1	Therefore	24
2	While/ whilst	21
3	However	18
4	Thus	15
5	Since	12
6	In addition	12
7	Moreover	12

The strategy of "adding to what is known" is accomplished by giving more information about the research niche, citing the works of others while adding comments to develop the idea cited. It is an important step as it increases the audience acceptability and increases the target community's recognition [10]. The analysis shows that the most frequently used transitional words in accomplishing this step are "therefore", "while/whilst", "however", "thus", "since", "in addition" and "moreover". Even though some of the transitional words such as "therefore", "however", "moreover" and "since" listed for this step are similar to those identified as commonly used in the strategies of "Establishing a territory" and "Indicating a gap" the usage of the transitional words in this step is different from those two strategies which are highlighting the general research topic and indicating the research gap. On the other hand, the transitional words for "adding to what is known" are devised to link the intended research with the existing research in the niche area. The following excerpts illustrate how the link is established.

...the labor cost has not only increased substantially but farm laborers have become scarce as well. Therefore direct seedling is practiced extensively and most farmers in the areas are expected to eventually switch to direct seeding so as to reduce the cost of cultivation in some irrigated areas (De Datta and Nantasamsaran, 1991) (1P10)

In excerpt (1P10), the transitional word "therefore" links the general research topic of "labor... increase cost...scarce" to the possible solution of "direct seeding" which is cited from the existing study of "De Datta and Nantasamsaran, 1991". Here, the transitional word "therefore" acts as a linking word, rather than as a transitional word, linking the problem to the existing solution cited.

Since phase coding was very difficult to preserve in fiber, the technique of SAC with unipolar versions of the same bipolar code was proposed [4]. (F13UniMAP2)

Similarly, in the excerpt (F13UniMAP2), the transitional word "since" links the research space of "phase coding was very difficult to preserve in fiber" to the existing solution in the phrase of "SAC with unipolar version" which was cited from the previous study. In short, the transitional words for Move 2 Step 1B: Adding to what is known are used as a linking device that connects the general research problems and research gap to the existing studies. Likewise, the use of transitional words for Move 2 Step 2: Presenting positive justification is also different from the use in the other move and steps. The frequency of the transitional words used in realizing Move 2 Step 2 "Presenting positive justification" is presented in Table 4

Table 4: Frequency of the transitional words used in realizing Move 2 Step 2 "Presenting positive justification"

No	Transitional word	Frequency
1	Therefore	21
2	Hence	10
3	Thus	7
4	In order to	4
5	Because	3

Move 2 Step 2 "Presenting positive justification" is where the research gap that has been highlighted is retained and claimed. A statement on the intention to occupy the research space is made however, only 62% of the corpus attempted this step. Respectively, the frequency of the transitional words used for this Step is also the lowest at 74 with "therefore" being the highest followed by "hence", "thus", "In order to" and "because". Similar to the other move and Steps, "therefore" is also listed as the common transition word for this step. However, the transitional word "therefore" in this step is used to emphasize the justification on why the study is necessary. Often, after the research gap is reasserted, the transitional word "therefore" is used in the claim on the research space by highlighting the benefit of the study or by giving the drawbacks of not having the study. The following excerpt illustrates the use of the transitional word "therefore" in accomplishing the strategy of "presenting positive justification".

The conventional load shedding techniques may not work as desired in emergency conditions due to the complexity and size of modern power systems. Therefore, alternative methods are required for solving certain difficult power problems where conventional techniques have not achieved the desired speed and accuracy. (F7UMP1)

In the excerpt (F7UMP1) the transitional word "therefore" links the research problem to the justification for the study. The research problem of "conventional load shedding techniques may not work" is highlighted and then, the claim on the research space is made in "solving certain difficult power problems". The transitional word "therefore" creates a link between the research problems by justifying the need for the intended study. The usage may seem similar that is as a linking device but then again the rhetorical purpose differentiates the usage.

In short, the transitional word is a device that bridges the development of the ideas. The transitional words are also cues that help the readers to interpret the research better. Because transitional words device link within sentences and paragraphs, it is important to understand how the transitional words form the relationship as they are used in each Move and Step.

CONCLUSION

There many challenges in writing research articles including linguistic and cultural challenges [28, 29]. Teaching research writing is even more arduous if the teachers aimed to teach writing research that captures an audience beyond academia [30]. The description of how the writers write the research articles specifically on the language use ease teaching preparations and provide teachers with more authentic and relevant examples [31]. It is hoped that the findings of this study provide some reference for technical writing teachers to fall back to in establishing an understanding of how the writers actually write. Such understanding is important as it enables the teachers to gauge on the learners' writing needs.

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