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Move Analysis of Research Article Abstracts: A Cross-Disciplinary Study

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Abstract

The present paper aims at investigating the formation of research article abstracts in terms of their rhetorical structure. To this end, three Applied Linguistics, Applied Mathematics, and Applied Chemistry journals have been selected. The main focus of the analysis was put on the rhetorical structure – the moves and steps employed in each specific abstract. The authors' self-mention, voice, and tense of the verbs included in each move were also inspected. Therefore, a total of 63 abstract (21 published abstracts from each field) from credited international journals were randomly selected and assigned for analysis. The Five-Move Model by Hyland (2000) was chosen as a basic model for the analysis. Accordingly, the constituent moves and steps were examined and recognized in the categories of selected abstracts. The obtained results were scrutinized and consequently the leading move patterns of each discipline, specific moves and steps, voice and tense of verbs hired in each move, and the authors' self-mention alternations were identified. Finally, the pedagogical implications for the expert teachers working in the fields of Discourse analysis (DA), English for Academic Purposes (EAP), and English for Specific Purposes (ESP) are presented.

Keywords: Genre, Cross-discipline, Research article, Abstract, Move analysis, Move pattern

1. Introduction

In every academic community research article (RA) is considered as an important genre. As Hyland (2000) has noted, RA follows binary purposes simultaneously: the first goal deals with new knowledge dissemination to the followers of their discourse community and at the same time the second goal is persuasion of the discourse members to admit the statements.

Research article abstract, as an important piece for knowledge communicating tool, has gained growing considerations in recent years following the information explosion era in the academic world. According to Lorés (2004), RA abstract is considered as the doorway that persuades the readers of specific discourse community to select an article or to choose a specific journal, or even the coordinators of seminars and conferences to admit or discard the submitted papers.

The organizational pattern analyses of the moves, grammatical structures, and literary features that formulate these moves and steps were the subject of studies in research article abstracts (e.g., Lim, 2006; Pho, 2008). A wide range of these studies investigate the linguistic features in a specific discipline, examining the existing structural differences across different languages. Another sort of investigation contributing to the students' research article writings in Discourse Analysis, ESP and EAP classroom settings is believed to be cross-disciplinary study of research article.

Therefore, in the present study an attempt has been made to explore research article abstracts and examine their constituent rhetorical structures and grammatical features across three disciplines (Applied Linguistics, Applied Mathematics, and Applied Chemistry). Along with such comparison, the existing similarities and differences across the selected research article abstracts have also been discussed.

2. Literature Review

In the subsequent sections, a brief review of the concept of genre analysis, research article as a genre, and research article abstract as a part of genre are introduced. Following this introduction the common models for the rhetorical analysis of RA abstracts are presented. Swales (1981), Bhatia (1994), and Hyland (2000) are among the pioneers studying research article abstracts. Their proposed models are discussed further. Finally, some related studies analyzing research article abstracts are presented.

2.1 Genre Analysis

Bhatia (1997) defines genre analysis as the "study of situated linguistic behavior in institutionalized academic or professional settings" (p. 181). It is considered as one of the important approaches to research article analysis in the text level, particularly in applied linguistics. Brett (1994) argues that the popularity of genre analysis in applied linguistics is due to its considerable implications for those working in the communicative ESP and EAP classrooms. An example of such implications is raising the learners or beginner investigators' awareness of the appropriate formats special for individual disciplines. The proper linguistic aspects of communicative functions are among these appropriate conventions.

Swales and Feak (2009) explain genre as a kind of discourse or text that is designed to obtain a series of communicative purposes. By these communicative purposes they mean the distinctive structural patterns which are the most important common features shared by the text as a constituent of the same genre. As Holmes (1997) has noted, these features also differentiate one genre from another.

According to Swales (1990), the community in which a genre arises provides a label for it. In this vein, the medical community has a genre labeled 'case history' and the teaching community has the end-of-year report. Dudley-Evans (1993) states that the communicative purpose of a genre is seen as its defining feature - the feature that sets it apart from other genres, and that explains its form and features of language use. As Basturkmen (2006) states, genre theory seeks to explain the texts used by groups or communities by reference to the functions of those groups or communities and their outlook on the world. For example, typical functions of academic communities include dissemination of research findings, provision of descriptions, and explanations of phenomena. These functions lead to certain forms of communication including the conference presentation and the research report.

On the other hand, a genre is mainly described in terms of its rhetorical structure. Swales (1981, 1990) was a forerunner in the application of this framework in genre analysis. He examined research articles in academic discourse based on rhetorical movement analysis. According to Swales (2004), a move is a "discoursal or rhetorical unit that performs a coherent communicative function in a written or spoken discourse" (p. 228-9). Santos (1996) asserts that in addition to its own purpose, each move in a research article abstract contributes to the ultimate communicative purpose of genre. Each rhetorical move is composed of a number of smaller rhetorical elements. Swales (1990) calls these small elements as *steps*. Samraj (2009) noted that both moves and steps are considered as functional units and can be optional or obligatory in a genre.

2.2 Research Article Abstracts

As noted by Yearley (1981), research article is considered as one of the most applicable genres in academic research writing which has been broadly surveyed and generated abundant pedagogical implications. Genre and register were often used interchangeably in early studies, but Crookes (1986) labeled it as a *genre* and differentiated it from register.

Abstract is the summary of a research article that is written in the beginning of an academic paper. Its main purpose is to help other researchers and readers make a decision in selecting the readings. The American National Standards Institute has defined abstract as "an abbreviated, accurate representation of the contents of a document, preferably prepared by its author(s) for publication with it" (Lorés, 2004, p. 281). Research article abstract has received noticeable amount of attention as a result of the acceleration of the exchange of information in recent years. Such attention stems from the crucial role abstracts play in today's research world in which millions of research articles are being published every year.

2.3 Models for RA Abstracts

As it was mentioned earlier, Swales (1981) was a pioneer in studying research articles,

especially move-analysis. He proposed a four-move model for research article introductions. This model consists of four components. The first move deals with the creation of the field. In the second move making the report of previous research studies is addressed. The third move encapsulates the preparation for the present research. Finally, presenting the ongoing research study is concerned. Swales (1990) postulated a revised version of this structure called "*Create a Research Space (CARS)*" (Paltridge & Starfield, 2013, p. 287), as a pattern consisting of three moves.

Table 1. Swale's CARS model

Moves	Steps
1) Establishing a territory	1) Claiming centrality 2) Making topic generalization(s) 3) Reviewing items of previous research
2) Establishing a niche	1A) Counter-claiming 1B) Indicating a gap 1C) Question-raising 1D) Continuing a tradition
3) Occupying the niche	1A) Outlining purposes 1B) Announcing present research 2) Announcing principal findings 3) Indicating article structure

(Adapted from H. Basturkmen, 2006, p. 57)

The CARS model has been adopted as a guideline in various later studies investigating the structure of the research *introduction* section as well as *abstracts* (Bhatia, 1997; Samraj, 2002, 2005). Swales' revised model consists of three rhetorical moves. Each of these moves is divided into several steps. The components of CARS' model are outlined in Table 1.

On the other hand, another model was proposed by Bhatia (1994). His model was also acknowledged by many scholars (e.g., Phantama, 2000; Promsin, 2006; Salager-Meyer, 1992; Santos, 1996; Swales, 1990). It is believed that every abstracts should provide information on four features of the research article that they intend to describe. These features include the actions *(what)* that the author(s) has done, the ways of (*how) of doing* those actions, the findings of the study, and the conclusion. Accordingly, his model consists of the four following moves:

"Move 1: Introducing the purpose;

Move 2: Describing the methodology;

Move 3: Summarizing the results;

Move 4: Presenting the conclusions." (Helder, 2011, p. 89)

Finally, a more elaborate model which has been influential for lots of studies is Hyland’s

(2000) model of RA abstracts. It includes five moves: Introduction, Purpose, Method, Product, and Conclusion. The functions of the moves and their constituent steps are indicated in the following:

Table 2. Hyland's model of research article abstracts

Moves	Functions
Introduction	Establishes context of the paper and motivates the research
Purpose	Indicates purpose, outlines the aim behind the paper
Method	Provides information on design, procedures, data analysis, etc.
Product	Indicates results and the argument
Conclusion	Points to applications or wider implications and Interpretation scope of paper

(Adapted from B. Behnam & F. Golpour, 2014, p. 175)

In contrast to Introduction, Methods, Results and Discussion (IMRD) pattern, in this framework the purpose of *abstract* is distinguished from that of the *introduction*. The introduction's purpose is supposed to be providing a rationalization for the research to be conducted while the purpose of abstract is different. In addition, the *result move* is replaced with *product move* in this pattern.

A number of genre analysis studies have been conducted on RA abstracts in English (Anderson & Maclean, 1997; Cross & Oppenheim, 2006; Duncan, 2008; Lores, 2004; Salager-Meyer, 1992; Stotesbury, 2003) and other languages such as German (Busch-Lauer, 1995) and Spanish (Martin, 2003). Most of these studies have addressed the research article abstracts' rhetorical structures in terms of its moves.

Loré s (2004) has noted that research article abstracts are different from research articles in the following three aspects: function, rhetorical structure and linguistic realizations. Because of the increasing interest in abstracts, quite a few analyses on the part-genre have been conducted (Bonn & Swales, 2007; Loré s, 2004; Pho, 2008; Samraj, 2005; Santos, 1996). Santos (1996) chose to explore the textual organization of research article abstracts at two levels: first, the features that constitute abstracts at the macro-level of textual organization, and second, the sentence level features at the micro-level of textual analysis. Ninety-four research article abstracts from the field of applied linguistics were formed the corpus of his analysis. Using his model of five main moves, he identified the RA abstracts as: situating the research (M1), presenting the research (M2), describing the methodology (M3), summarizing the results (M4), and discussing the research (M5). Santos reported that M2 and M3 were essentially obligatory moves in the genre, and different moves required different linguistic resources to realize their purposes in terms of thematization, tense choice, and voice choice.

Using the CARS model and the IMRD model, Loré s (2004) conducted a genre analysis on a corpus of 36 RA abstracts from the field of linguistics. She found that about 61% of RA abstracts followed the IMRD structure, about 31% of them followed the CARS structure, and 8% displayed the two structures. The three types fulfill three different functions: the informative, the indicative, and the informative-indicative function. Loré s indicated that the

results of the study might explain why previous studies did not agree on the rhetorical organizations of abstracts and described them in very flexible terms.

Chinese linguists also have conducted some studies on English abstracts to help postgraduates improve their English writing. Ge and Yang (2005) have investigated English abstracts for the discourse structures and linguistic features in three disciplines (engineering, finance and surgery) using a 5-move model. The results showed that most of the abstracts followed the same move sequence but there was a significant difference in the frequency of moves in relation to disciplinary characteristics. For example, 45% of the surgery abstracts had a method move, but only 14% of the finance abstracts had this move.

In a comparative study of research article abstracts from two *conversation biology* and *wildlife behavior* disciplines, Samraj (2005) found similar pattern for the research article abstracts: PMRC. While examining other features of the abstracts, differences emerged. The differences were observed in the rhetorical structure and moves attributed to research article introduction. The selected disciplines from which the abstracts examined were closely related to each other. The obtained differences in her study showed that even closely related disciplines may have different rhetorical structures.

In another study conducted by Pho (2008), the rhetorical organization, the linguistic realization of moves and authorial stance were investigated. Thirty research article abstracts from applied linguistics and educational technology formed the corpus of the study. Three moves of *presenting the research*, *summarizing the findings* and *describing the methodology* were identified in about all of the abstracts.

Similarly, as a cross-disciplinary move analysis, in this study an attempt is made to conduct a comparative study on research article abstracts focusing on the rhetorical structure and certain grammatical features. The abstracts have been selected from three applied linguistics, applied mathematics, and applied chemistry disciplines.

3. Methodology

3.1 The Disciplines and Their Research Article Abstracts

Sixty three research article abstracts from Applied Linguistics (AL), Applied Mathematics (AM), and Applied Chemistry (AC) formed the data for this study. This corpus consisted of three groups, each containing 21 abstracts selected from three credited international journals. The list of journals and the number of abstracts taken from each group are shown in Table 3. The research article abstracts were selected from the published articles from 2012 and 2015.

Table 3. The list of journals

Applied linguistic	No. of Abstracts	Applied Mathematics	No. of Abstracts	Applied Chemistry	No. of Abstracts
TESOL Quarterly	7	Applied Mathematics and Computing	7	Russian Journal of Applied Chemistry	7
The Modern	7	Applied	7	Journal of	7

Language Journal		Mathematical Modelling		Chemical Technology and Biotechnology	
Applied Linguistics	7	IMA Journal of Applied Mathematics	7	American Journal of Applied Chemistry	7

3.2 The Pilot Study

To adopt an appropriate model for move analysis, nine research article abstracts were piloted. The obtained results suggested Hyland's (2000) five-move model as a leading model for further analyses of research article abstracts. These five moves are as follows: Introduction, Purpose, Method, Product, and Conclusion. Therefore, a *move unit* was defined for each abstract. Move units may consist of one or more sentences or at least clauses. An example of the identification of moves is illustrated below. The abstract is taken from applied linguistics.

> *This study explored the relationship between two dimensions of vocabulary knowledge, that is, breadth of vocabulary (the number of words known) and depth of vocabulary (the richness of word knowledge), and their effects on different aspects of English reading in Chinese high school students learning English as a second language* **(Move 2: Purpose)**. *Two hundred and forty-six Grade 8 students in China were administered measures of word reading, vocabulary breadth, vocabulary depth, and reading comprehension* **(Move 3: Method)**. *Results showed that breadth and depth of vocabulary were moderately correlated. They both contributed to word reading, but breadth of vocabulary had a stronger effect than depth of vocabulary* **(Move 4: Product)**. *When reading comprehension was the outcome measure, vocabulary breadth significantly predicted a multiple-choice reading comprehension measure, which requires general understanding of the text, while vocabulary depth contributed to summary writing, a measure of deeper text processing. Discussion focuses on the important roles of different dimensions of vocabulary knowledge for different types of second language reading* **(Move 5: Conclusion)**.
>
> (Adapted from M. Li, & J. R. Kirby, 2014).

This framework is applied to the analysis of the selected abstracts. According to Ackland (2009), two 'bottom-up' and 'top-down' approaches are used for the recognition of moves and therefore the setting of move boundaries in abstracts. Top-down approach is based on the content of the abstract and bottom-up approach is based on linguistic signals. In this study, the top-down approach, semantic criteria, was employed in setting the textual boundaries of these units.

After recognizing the moves, steps, and the move pattern in each abstract, the grammatical analysis was conducted. In this phase, the tense (present/past) and the

voice (active/passive) of the verbs characterizing each move were identified. Finally, the authors' self-mention (use of personal pronouns) was spotted in the abstracts.

4. Data Analyses and Results

In spite of their distinct features corresponding to the different disciplines they belong to, the three groups of abstracts interestingly showed a considerable degree of conformity. This section begins with discussing these commonalities. Taking a micro view, it then goes on to compare the three groups regarding each move and step in Hyland's (2000) model. Finally, it is wrapped up by pointing out the overall differences between them.

4.1 Descriptive Statistics

Table 4. Frequency of moves across the disciplines

Moves	Applied Linguistics	Applied Mathematics	Applied Chemistry
Introduction (I)	6	10	8
Purpose (P)	21	20	21
Method (M)	17	14	17
Product (P)	21	20	19
Conclusion (C)	16	17	13

As it is shown in Table 4, some significant and shared features were found in the abstracts of the three disciplines. One of these shared features was the least frequent move, *introduction*, in all the disciplines. The *introduction move* was included in only 6 AL, 10 AM, and 8 AC abstracts.

Table 5. The dominant move pattern

Dominant Move Pattern	Applied Linguistics	Applied Mathematics	Applied Chemistry
PMRC	10	6	5

In examining the move pattern, the most frequent move pattern turned out to be PMRC in all the three groups with 10 times of occurrence in Applied Linguistics, 6 in Applied Mathematics, and 5 times in Applied Chemistry abstracts. Another common feature was that the *introduction move* was mainly embodied through its second step– making topic generalizations. In the same vein, the *conclusion move* was most often realized through its first step, deducing conclusions from results.

Table 6. Proportion of tense and voice of the verbs across the disciplines

Journals	The voice of the verbs		The tense of the verbs	
	Active (%)	Passive (%)	Present (%)	Past (%)
Applied Linguistics	77	23	67	33

Applied Mathematics	71	29	83	17
Applied Chemistry	52	48	75	25

Finally, as it is shown in Table 6, regarding the tense and voice of the verbs, present tense verbs in active voice constituted the dominant type of verbs in all the three sets of abstracts.

4.2 Move Analysis

4.2.1 Introduction

According to the findings of abstracts analyses, the frequency of occurrence of *introduction move* in Applied Linguistics, Applied Mathematics, and Applied chemistry were 6, 10, and 8, respectively, showing the least frequency for Applied Linguistics. A crucial point here is that this move was commonly realized through one step. However, concurrent use of more than two steps in the same abstract was not much evident. Among the four steps constituting *introduction move*, the *'making topic generalizations*' step was most often employed to represent this move. Despite the similarities that exist between the abstracts of Applied Linguistics and Applied Mathematics in the less-frequent application of other steps, the use of other steps in the abstracts of Applied Chemistry was more prominent. Finally, in terms of the tense and voice of the verbs, there was not any significant difference across these three disciplines representing the present active verbs dominating this move.

4.2.2 Purpose

The analyses of the abstracts revealed that this move was employed through the direct statement of the purpose in all abstracts of Applied Linguistics and Applied Chemistry and in 20 abstracts of Applied Mathematics. A defining characteristic of this move was its integration with some other moves in some cases. Sometimes this integration was observed in a purpose-method mode and in other cases a purpose-result mode to formulate a single move.

4.2.3 Method

The same number of abstracts in Applied Linguistics and Applied Chemistry (17 abstracts in each discipline) enjoyed the *method move* while 14 abstracts in Applied Mathematics made use of this move. As mentioned in previous sections, in a few abstracts of Applied Linguistics and Applied Chemistry the *method move* was integrated with *purpose move* to create a single move but such integration was not observed in any of the abstracts in Applied Mathematics.

Moreover, three steps of *method move* – describing the participants, describing the instruments or equipment, describing the procedure and conditions – were almost equally employed in Applied Linguistics abstracts. In the abstracts of Applied Mathematics and Applied Chemistry, however, the use of the last step – description of the procedure – was much more prominent. In terms of tense of the verbs in Applied Linguistics, the frequency of occurrence of the past tense verbs was twice higher than present tense. In Applied Mathematics and Applied Chemistry corpus the case was quite different. The frequency of occurrence of the present tense verbs was more than the past ones in the two disciplines. The same is true for the voice of the verbs. Active verbs were seen to be more than passive ones in

Applied Linguistics and Applied Mathematics. Conversely, the Applied Chemistry abstracts contained more passive verbs than active ones in this move.

4.2.4 Product

The analyses of the abstracts showed that the *product move* was almost equally employed in the abstracts of all the examined disciplines in this study. As it was mentioned earlier, this move was integrated with the purpose move in a number of abstracts in Applied Mathematics and Applied Chemistry to form a single move; however, there was not such integration in Applied Linguistics corpus. Moreover, the present active verbs were more prominent than passive ones across these three disciplines. Nonetheless, some degree of diversity was witnessed involving the intensity of the use of this tense and voice. The proportion of present to past tense was much higher in the abstracts of Applied Mathematics corpus and that of active to passive voice was much greater in Applied Linguistics as compared to the other two disciplines.

4.2.5 Conclusion

The analyses showed that 46 abstracts ended with conclusion move. Among them are 16 abstracts in Applied Linguistics, 17 abstracts in Applied Mathematics, and 13 abstracts in Applied Chemistry. The three steps representing the *conclusion move* are deducing conclusions from results, evaluating value of the research, and presenting recommendations.

Interestingly, this move was, in all the three groups, mainly realized through the first step, in some cases through the second one, and rarely through the last one. Finally, no significant difference was witnessed among the three disciplines in terms of the tense and voice of the verbs so that, in all the three, the present active verbs dominated this move.

4.2.6 Overall differences

A number of differences were identified while analyzing the research article abstracts across three disciplines. The differences were observed in move patterns, number of moves, repetition of moves in an abstract, the application of the hybrid moves, proportion of the passive verbs to the total number of verbs, and the self-mention of the authors. The results are shown in Table 7.

Table 7. The move patterns recognized in each discipline

	Applied Linguistics	Applied Mathematics	Applied Chemistry
1	PMRC (10)	PMRC (6)	PMRC (5)
2	IPMRC (3)	IPMRC (2)	IPMRC (3)
3	IPR	IPR (2)	IPR (2)
4	PRC (2)	PRC	PMRCPRC
5	PMR (3)	PRMC	PMR
6	IPMR	PMRCMRC	PMRCMRC
7	IPRC	IPRC (3)	IPMRPMRC

8		IPMR	IPMR
9		PRCM	PRCPR
10		IPMC	PRMR
11		PMRMR	PM
12		IRC	IP
13			PRC
14			PMRMR

As a first important difference, various move patterns were recognized in the examined abstracts. Accordingly, abstracts in Applied Linguistics, Applied Mathematics, and Applied Chemistry employed 7, 12, and 14 move patterns, respectively. Hence, while Applied Linguistics was relatively homogenous in terms of the employed move patterns, Applied Mathematics and Applied Chemistry were more heterogeneous.

The second difference was about the number of moves forming each abstract, regardless of the repeated moves. Most of the abstracts in Applied Linguistics and Applied Mathematics disciplines were composed of 4 moves. In Applied Chemistry corpus, however, the majority of abstracts included only three moves.

In some cases repetition of a specific move was identified. Hence, the third difference in this analysis deals with such repetition of a move in the same abstract. This case was manifested in such patterns as PMRCMRC. One possible explanation for such repetition could be a stage-wise report of different phases of a study. This feature was observed in 6 Applied Chemistry, 2 Applied Mathematics, and no Applied Linguistics abstracts.

As it was discussed earlier, some of the abstracts were composed of mixed moves. Therefore, the next important difference addresses the employment of integrated moves. There were instances of Purpose-Method moves in Applied Linguistics abstracts with no occurrence of Purpose-Result move. In contrast, instances of Purpose-Result moves were observed in Applied Mathematics with no Purpose-Method move. And in the abstracts of Applied Chemistry, both of these integrated moves were identified.

Aside from *introduction move*, which is the least frequent move, method move appeared to have been less emphasized in Applied Mathematics and *conclusion move* has gained this position in Applied Chemistry.

Another difference involves the proportion of the passive verbs to the total number of verbs. The proportion of passive verbs was higher than active verbs across these three disciplines. The analysis indicated that passive verbs had a relatively much more remarkable percentage in Applied Chemistry as compared to the other two groups. As indicated in Table 6, in Applied Chemistry the passive verbs were almost twice higher the ones in Applied Linguistics and Applied Mathematics.

The last examined difference concerns the self-mention of the authors. In both Applied Linguistics and Applied Mathematics, more than half of the abstracts (11) included personal and possessive pronouns such as I, we, our, etc. referring to the authors; whereas in Applied

Chemistry, a few number of abstracts were marked by such self-mention.

5. Conclusion

The cross-disciplinary analysis of research article abstracts in Applied Linguistics, Applied Mathematics, and Applied Chemistry revealed some similarities and differences in rhetorical structures and also grammatical features among the three groups of research article abstracts.

The analysis of the rhetorical structures showed that the main similarities among the abstracts in the examined disciplines were found in the status of *introduction move*. The least frequent move was *introduction* and the most frequent move pattern was PMRC. Accordingly, most of the research article abstracts follow the pattern and the conventional structure assigned by the English academic discourse community. Moreover, the *purpose and product moves* were identified to be present in almost all abstracts in the examined samples of these disciplines. Therefore, these two moves can be considered as the mandatory constituents in these disciplines.

With regard to move patterns, the major rhetorical difference was that the least variety of move patterns was observed in Applied Linguistic corpus and no instances of repetition of a move within the same abstract. This finding resembles homogeneity among the research article abstracts in this field. The corpus of Applied Chemistry had the opposite status, being relatively heterogeneous in this respect. And the position of Applied Mathematics was between the other two disciplines near to that of Applied Chemistry. This finding appears to be somehow contrary to the common belief that expects Applied Chemistry as a *hard discipline* (Hyland, 2000) to follow more strict rules and conventions in writing research article reports.

Another important difference that was observed in the abstracts is the use of mixed moves. Some instances of this kind of hybrid move were elaborated in the results. The mixing process was in a way that the *method move* was embedded in the *purpose move* in some Applied Linguistic and Applied Chemistry abstracts to shape the mixed Purpose-Method move. This mixing process was in line with the findings of Santos (1996) and Pho (2008). In their studies the *method* move was partially or totally merged with *purpose* move in the research article abstracts of applied linguistics and educational technology. Another mixing process was the combination of *purpose* and *product* moves (Purpose-Result) in Applied Mathematics and Applied Chemistry corpus. Similarly, Li's (2011) findings indicated that *product move* was sometimes incorporated in the *purpose move*. Some researchers (e.g., Pho, 2008; Santos, 1996) asserted that two or more moves might be combined due to the condensed nature of abstract structure.

The last remarkable difference among the examined categories of abstracts in terms of the rhetorical structure was that, in addition to *introduction move*, the *method move* had relatively fewer frequency of occurrence in the research article abstracts of Applied Mathematics and the *conclusion move* had the same status in Applied Chemistry corpus. This can refer to the less noticeable role of these moves in the corresponding disciplines as these disciplines place less emphasis on them. This finding, also, confirms Ge and Yang's (2005) claim on the

existence of a significant difference in the frequency of moves in relation to disciplinary characteristics.

In terms of the analysis of linguistic features, the findings indicated that the frequency of present tense verbs with active voice was dominant in the examined disciplines. Despite this similarity, the percentage of passive verbs was much higher and the self-mention of the author was considerably lower in Applied Chemistry corpus as compared to the other two groups. One possible explanation for this variation could be attributed to scientific language which is predominantly employed in Applied Chemistry discipline.

In sum, the findings of the present study revealed that the textual structure and organization of an abstracted could be influenced due to the variations in disciplines. As such, as Melander, Swales, and Fredrick (1997) noted, the criteria of a specific discipline may urge the authors to employ certain rhetorical and linguistic features and consequently determined moves and steps.

Finally, the results suggest some key implications for teachers, learners, and all practitioners working in the field of Discourse Analysis (DA), English for Specific Purposes (ESP), and English for Occupational Purposes (EOP). Through genre analysis, specially investigating the rhetorical structure of research article abstracts, students would gain the necessary explicit knowledge of abstract writing norms and standards in different disciplines. Once equipped with the knowledge, they might be able to produce more complex genres. On the other hand, knowledge of genre, rhetorical structure, and other constituent of research article abstracts help the students and readers both to have a comprehensive understanding of specific texts and to produce appropriate texts based on the discipline norms.

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