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Didactic Oriented Study: Move and Transitivity Analysis of Method, Result, and Discussion Sections in Research Articles

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Abstract: This study expounds how the analysis of move and transitivity in the method, result, and discussion sections contributes to the advancement of novice writers' writing skills by providing a writing pattern applied when composing research articles. To this aim, a qualitative approach with descriptive technique is employed to encapsulate and explain the phenomena being studied. The data are the method, result, and discussion sections of research articles (RAs) drawn from top tier journals categorized as language and linguistics and analyzed based on macro structure (move and steps) and micro structure (transitivity). The results indicate that 11 moves and 38 steps discovered, in detail, these consist of three moves and 15 steps in method, four moves and 10 steps in result, and four moves and 13 steps in discussion. As for the successions of the move steps, few inter-move step shifts observed. This is in contrast with the outer-move step shifts that commonly occurred. Meanwhile, the outcomes of the transitivity analysis suggest that there are six processes revealed including material, relational, verbal, mental, existential, and behavioral consecutively with material dominating and behavioral the fewest. The results of the present study may supplement the teaching materials reside in English for a research purpose.

Keywords: *Didactic oriented study, method, result and discussion sections, move, research article, transitivity.*

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Introduction

The contribution of studies related to dissecting RAs for the upsurge of students' writing abilities is undoubtedly enormous (e. g., Kim et al., 2016; Lim, 2006; Peacock, 2002; Pho, 2008). They have given numerous writing examples and patterns to follow (e. g., Lin & Evans, 2012; Stoller & Robinson, 2013; Tessuto, 2015). By this, generally, they have shaped and reshaped the process of learning and teaching RAs and particularly every section constitutes it. Most of the efforts to teach how to learn RAs are realized by investigating their sections. This has the purpose to help learners or novice writers recognize the rhetorical patterns and other features prevailed in the studied sections that eventually will enable them to master the sections effortlessly and efficiently (Behnam & Zamanian, 2013; Lim, 2006; Martínez, 2001; Peacock, 2002; Pho, 2008; Pramoolsook et al., 2015).

RAs commonly composed of, although not obligatory, several sections like introduction, method, result, and discussion (IMRD). Regardless of their similar patterns, proven by the many adoptions of the IMRD forms in RAs, still the rhetorical purposes of those sections, actualized by the macro and micro structures, are not always identical. The discrepancy occurred and triggered to some extent by the undertone of discipline (Holmes, 1997) and the authors' point of views manifested in the lexico-gramamatical features employed (Zheng et al., 2014). Taking this into account, therefore, there are many investigations related to studying RAs viewed from their macro structures (move and steps) in the overall sections (e. g., Cotos et al., 2015; Kanoksilapatham, 2005; Maswana et al., 2015; Nwogu, 1997; Pho, 2008; Stoller & Robinson, 2013; Tessuto, 2015) and in particular sections such as in method (e. g., Cotos et al., 2017; Lim, 2006; Pramoolsook et al., 2015), in result (e.g., Basturkmen, 2009; Lim, 2010), in discussion (e. g., Dobakhti, 2016; Kim et al., 2016; Liu & Buckingham, 2018; Peacock, 2002; Soodmand Afshar et al., 2018), as well as in result and discussion (e. g., Nguyen & Pramoolsook, 2015). Correspondingly, it happened to authors' points of views articulated by the micro structure materialized in the lexicogrammatical features in the overall sections (e. g., Martínez, 2001; Pang & Chen,

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2007; Zheng et al., 2014) or particular sections in RAs like abstract (e. g., Huang, 2009; Vathanalaoha, 2017; Vathanalaoha & Tangkiengsirisin, 2018).

Nwogu (1997) examined the schematic structure of RAs in the field of medicine, he found that 11 moves prevailed in the data analyzed. Kanoksilapatham (2005) investigated the structure of moves in RAs of biochemistry. The findings evinced that there were 15 moves identified with three moves in introduction, four moves in method, four moves in result, and four moves in discussion. Pho (2008) explored the rhetorical structure of moves from abstract to conclusion sections in applied linguistics and educational technology. The findings suggested that there were differences in the move steps existing in each section of the journals analyzed. Stoller and Robinson (2013) investigated RAs in chemistry subject. They uncovered that the features of abstract-introduction-method-result-[discussion-conclusion] (A-IMR[DC]) and abstract-introduction-method-[result-(discussion-conclusion)] (A-IM[R(DC)]) dominated, brackets signified that these sections were joined in one section. Cotos et al. (2015) applied and extended the Swales' framework (1990, 2004) to design article writing evaluation software. The findings showed that the first move dominated in the introduction and discussion sections. Meanwhile, in the method and result sections, the second move led. All in all, their study contributed to the realm of natural language processing (NLP) and computational operationalization for pedagogical use.

Maswana et al. (2015) reviewed the rhetorical structure of moves from 67 RAs in engineering field. They identified that the abstract, introduction, and conclusion sections along with their steps' realizations were conventional in that they were always present in the RAs studied. Meanwhile, other parts such as method, result, and discussion sections varied in line with their disciplines. Tessuto (2015) scrutinized the generic structures and rhetorical moves in English-language empirical law RAs. The results revealed that IMRD feature was a general pattern in the RAs investigated. Moreover, the rhetorical realizations of moves in IMRD sections were found to be different among RAs. This variability contributed to determining the organization of the discourse structure by giving a common identity to the way the RAs written.

The studies regarding the analysis of moves and their steps in method sections indicated the same trends that is variabilities are observed. Pramoolsook et al. (2015) found that the comparison of method sections in two subdisciplines of marketing and management demonstrated differences in their rhetorical realizations. In the same line, Cotos et al. (2017) conducted an analysis of 900 method sections in 30 disciplines and found that there were three moves and 16 steps in the analyzed data. Moreover, the findings revealed that there were differences and similarities in the structures of moves and their steps. As for Lim (2006), he proposed that the dissections of structure and lexical elements of move steps resided in the method sections of management RAs, in general, might help students to recognize and realize the communicative functions in them.

In the result section, Basturkmen (2009) argued that the principal moves in language teaching research journals and master dissertations were usually observed in constructions of claim or assertion containing the evaluation or interpretation of research results. Lim (2010) surveyed and compared the result sections in two journals categorized as education and applied linguistics. The outcomes of the analysis showed that there were differences in the methodology and discipline of the data being compared.

In discussion section, Peacock (2002) reported that there were obvious differences among move steps and their sequences analyzed across seven different disciplines namely physics, biology, environmental science, business, language and linguistics, public and social administration, and law. Dobakhti (2016) investigated 15 RAs in applied linguistic disciplines and found that there were differences and similarities in the moves and their steps in qualitative and empirical RAs. Kim et al. (2016) contrasted discussion sections of Malay and English RAs in terms of moves and their steps. The findings demonstrated that three moves, introductory, evaluation and conclusion, were recognized with the second move (evaluating the findings) dominating. Liu and Buckingham (2018), in their study regarding the analysis of moves and their steps in 20 discussion sections of applied linguistics, discovered that the Yang and Allison's framework fitted well in dissimilar corpuses existing in the same disciplines without adding or reducing the moves. Soodmand Afshar et al. (2018) collated the discussion sections of 104 RAs in chemistry and applied linguistic journals. The findings revealed that there were variations in how the authors deployed moves, steps, and sub-steps in their discussion sections.

In result and discussion sections, regarded as a unified segment, Nguyen and Pramoolsook (2015) analyzed 24 Master's theses written by Vietnamese postgraduates. They noted that postgraduates utilized the communicative purpose of the thesis chapters, grasped naturally, as the guidance to write the result and discussion sections. Departing from this finding, therefore, they proffered that the enrichment to compose those sections should be imparted to postgraduates.

The difference between studies exploring moves and their steps in overall and particular sections of RAs is the depth of analysis carried out. If the comparison is made on many articles and journals, whether cross or intertwine disciplines, the findings and their discussions will be focused on their big pictures and the result is a generalization of the move step patterns. In reverse, if the analysis performed in a particular section, the findings and their discussions are deeper and involved comprehensive analysis of the move step patterns observed in the data. Although, there are differences in

utilizing moves and their steps identified in the overall and particular sections as demonstrated in the previous studies alluded to earlier, these are less significant compared to their similarities.

In short, most studies involving moves, steps and even sub-steps reside in the method, result, and discussion sections, again, are aimed at learning these sections. To this aim, the move step incidences are usually operated to determine whether they are included into obligatory or optional pattern. Moreover, the shifts of move steps are employed to give more clues for seeing the plot of narration informed. This may be exploited fully, to some degree, to define and characterize the sections in the journals and disciplines being scrutinized (Tessuto, 2015). The results expected are to make information inherent in the RAs composed by learners simply understood and adjusted to the rhetorical functions (Zheng et al., 2014) of the sections written. This is parallel to Cotos's et al. (2015) perspective arguing that move analysis is a potent and auspicious theoretical, analytical, and teaching construction in relation to the process of learning how to write a RA.

Equivalent of move steps' inquiries, the contribution of transitivity examination, in overall and particular sections of RAs, for the betterment of writing RAs is also beyond question (e. g., Martínez, 2001; Vathanalaoha & Tangkiengsirisin, 2018). The application of transitivity analysis is especially useful for understanding the position of the writers towards the topic written (Vathanalaoha, 2017), the sections utilized, and their readers. Furthermore, it will be very useful for those who do not use English as their first language since it may provide hints on how to write good academic writing (Vathanalaoha, 2017).

Martínez (2001) analyzed overall sections of 21 experimental RAs in the fields of physical, biological and social sciences. The results showed that there were high percentage of material process in method, relational process in result and discussion sections as well as mental process in discussion sections. Pang and Chen (2007) conducted transitivity analysis in sections of material and psychology science RAs. The outcomes indicated divergent numbers of processes found. Zheng et al. (2014) performed transitivity analysis to RAs in medical field. They discovered that material process overruled followed by relational, mental, verbal, and existential consecutively. Further, they claimed that the pervasiveness of material process in the sections investigated characterized the medical discourse.

Huang (2009) and Behnam and Zamanian (2013) contrasted the research article abstracts (RAAs) taken from local and international journals. Both used the same frameworks, the move structure drawn from Swales (1981, 1990) and the transitivity analysis taken from Halliday (1994). The results suggested that the Swale's move models evinced in the data analyzed and the processes resulted from the transitivity analysis were circulated variously. In a similar fashion, Vathanalaoha and Tangkiengsirisin (2018) compared the results of the transitivity analysis in abstracts resided in local and international dental journals. The outcomes demonstrated that there were more resemblances found in the two journal abstracts, only slight difference occurred in the methodology and discussion excerpts. Based on the results of the analysis, they asserted that foreign learners were profited by the transitivity related discussion when studying academic writing.

Generally speaking, the upshots of the studies related to transitivity analysis depict the sums and frequencies of processes discovered in the analyzed data. Calculation of the results from the processes found may be utilized as clues as to whether the authors of RAs have written their topics congruently with the characteristics of the sections and disciplines. Following this, as mentioned earlier, some studies have suggested supportive and contradictory results. When compared, it turns out that there are more supportive results, for example the findings of Martínez's (2001) study are supported by the findings of Zheng et al. (2014). On the contrary, the difference in transitivity analysis study exists only in the distributional numbers of the processes disclosed in the sections which to some extent is influenced by the characteristics of the sections and disciplines where the RAs originated.

As indicated, the entire IMRD or particular sections in RAs have been extensively reviewed by the researchers. In common, the studies focused on only move step analysis or transitivity analysis as separated entities, few were combining both frameworks. If available, it was taken place in the abstract sections of RAs as alluded previously. Rarely have there been studies examining some or all sections in RAs. Furthermore, the analysis performed is not intended to compare the move steps and transitivity analysis found in these sections. When the transitivity analysis was applied to all sections (IMRD), the purpose was solely to uncover the processes inherent in the sentences at the sections analyzed. This means that the process of transitivity analysis is not based on the evaluation of move steps existing in the IMRD sections. The rarity of study combining two approaches simultaneously, move and transitivity analysis, involving several parts of RAs such as methods, results, and discussions has motivated the implementation of this study. In addition, this study is expected to enrich the literature on research related to dissecting RAs, especially the method, result, and discussion sections, using two frameworks concurrently.

Following the above rationales, this study aims to obtain some lessons from the analysis and comparison of move steps along with their consecutive orders or shifts in the method, result, and discussion sections and find out the results of transitivity analysis in each of these sections. The purpose of conducting transitivity analysis, in this context, is to know the types of processes commonly exist in the method, result, and discussion sections. In addition, it is utilized as a means of actualizing the authors' experience and knowledge manifested in the lexicogrammar used (Zheng et al., 2014).

Eventually, the results acquired from move and transitivity analyses can be administered as instructional materials when teaching RA composition, especially the method, result, and discussion sections.

To focus the study, some research questions are employed such as:

1. What are the patterns of move steps along with their consecutive orders/ shifts found in method, result, and discussion sections?
2. What are the dominant processes derived from transitivity analysis of move steps existing in method, result, and discussion sections?

To answer the first research question, the present study adopts the framework from Cotos et al. (2015) related to move step analysis. This adoption is driven by the favorable outcomes demonstrated by this framework when applied to analyze 900 RAs from 30 disciplines comprising of applied, natural, and social sciences as well as humanities. Thus, this will facilitate the intra- and inter-data analysis and comparison carried out. As for the second research question, the framework from Halliday (1994) and Thompson (2014) along with other relevant sources are employed. To realize this aim and make this article easy to follow, it starts with the introduction succeeded by methodology, finding, discussion, conclusion, recommendation, and finally ended by the limitation.

Methodology

Research Design

The background of the present study was the fact that many postgraduate students and novice researchers experienced problems in writing RAs, especially related to the method, result, and discussion sections. To ease 'their burden', this study was carried out by dissecting them. Qualitative approach with simple descriptive statistics was employed to dissect and analyze those sections (Creswell, 2003). This was chosen since the primary purpose of the present study was to describe the phenomena existing in RAs.

Sample and Data Collection

The data were in the form of RAs adopted IMRD format and originated from the journals categorized as language and linguistics indexed by Scopus and included into the first quartile (Q1) in the Scimago Journal and Country Rank. From each journal, there was one RA employed as the data hence the total data were five RAs. Yet, not all sections in each RA were investigated since introduction section was excluded from the analysis. Therefore, in every RA only three sections were scrutinized namely method section (MS), result section (RS), and discussion section (DS). For more information regarding the data utilized, it can be viewed from Table 1 below.

Table 1. Research Data

Section	Author & Publication Year	Title	Journal	Quartile & SJR
MS 1 RS 1 DS 1	Robey (2019)	The benefits of testing: Individual differences based on student factors	Journal of Memory and Language	Q1 SJR: 3.01
MS 2 RS 2 DS 2	Bower (2019)	School leaders' perspectives on content and language integrated learning in England	Language, Culture and Curriculum	Q1 SJR: 1.85
MS 3 RS 3 DS 3	Bice & Kroll (2019)	English only? Monolinguals in linguistically diverse contexts have an edge in language learning	Brain and Language	Q1 SJR: 1.6
MS 4 RS 4 DS 4	Kaiser (2019)	Linguistic consequences of event segmentation in visual narratives: Implications for prominence	Language, Cognition and Neuroscience	Q1 SJR: 1.52
MS 5 RS 5 DS 5	Jones & Brandt (2019)	Do children really acquire dense neighbourhoods?	Journal of Child Language	Q1 SJR: 1.2

Source: Adapted from Scimago Journal & Country Rank (2019)

Table 1 above describes the criteria of the data studied. These components consist of sections, authors' names and publishing year, title, journal name, and the quartiles as well as their values. The above data was gathered starting from the 11th to 20th of September 2019.

Although the data in this study is classified into a small data in that it only encompasses 15 sections, this does not reduce the significance of the contribution of the study (Aston, 1997). This is due to the reason that what prioritized in

it is the functionality of the data to uncover the topics intended to review (Crombie & Rika-Heke, 1991; Tribble, 1997). Furthermore, this is supported by the principle underlying that this study does not aim to generalize the results commonly used as a 'claim'. Accordingly, it merely tries to photograph the phenomena happened in the analyzed data.

The data in this study, as portrayed in Table 1 above, was selected based on several criteria as follows:

1. RAs owned an IMRD format.
2. RAs were selected from journals possessing Scimago Journal Rank (SJR) value above one.
3. RAs contained empirical or experimental research.
4. The journals taken as data drawn from reputable publishers.

Analyzing of Data

Data analysis was carried out in several stages, first the data consisting of MSs, RSs, and DSs were read and analyzed based on their moves and steps using the framework derived from Cotos et al. (2015). Second, the findings of moves and their steps identified in those sections were tabulated highlighting their frequency and percentage. Third, the data were compared in line with their most or fewest sum of incidences. Fourth, after compared in terms of their frequency and percentage, the data containing inter- and outer move step shifts existing in the MSs, RSs, and DSs were presented referring to their consecutive orders. Finally, transitivity analysis using the framework proposed by Halliday (1994) and Thompson (2014) was conducted and the results found from this process were tabulated and contrasted.

The rationale behind the employment of two different frameworks, move and transitivity analysis, in analyzing the data is in accordance with the opinion of Liu and Buckingham (2018) arguing that the main analytical tools in the genre-based approach are rhetorical structure and linguistic features. Moreover, to make sure if the analysis was correctly accomplished, the authors requested some supports from other colleagues, one doctoral and four master's graduates, specializing in move and transitivity analysis. They were asked to examine whether the results of the data analysis performed were in alignment with the theoretical frameworks applied or not. This measure was taken to increase the validity and reliability of the analysis results. The reliability can be reached in this context by comparing the results of analysis done by all analysts. If, they demonstrate similar outcomes or near similar outcomes, then reliability to some extent is fulfilled.

Results

This section represents the results of analysis originated in MSs, RSs, and DSs. In so doing, the elucidation of the results follows the research questions corresponding to what patterns of move steps and their consecutive shifts and what dominant processes derived from transitivity analysis of move steps existing in MSs, RSs, and DSs. In keeping with these questions, this section starts with the description of move step patterns along with their shifts in MSs, RSs, and DSs followed by their transitivity analysis successively.

Table 2 Finding of Moves and Their Steps in the MSs

Section	Move	Step	*f/ %
Method (Cotos et al., 2015)	1. Contextualizing the study	1. Referencing previous works	6/1.89
		2. Providing general information	3/0.94
		3. Identifying the methodological approach	4/1.26
		4. Describing the setting	13/4.10
		5. Introducing the subjects/participants	14/4.41
		6. Rationalizing pre-experiment decisions	4/1.26
	2. Describing the study	1. Acquiring the data	8/2.52
		2. Describing the data	15/4.73
		3. Identifying variables	4/ 1.26
		4. Delineating experimental/ study procedures	100/31.54
		5. Describing tools/instruments/materials/equipment	58/18.29
		6. Rationalizing experiment decisions	4/1.26
		7. Reporting incremental	20/6.30
	3. Establishing credibility	1. Preparing the data	0/0
		2. Describing the data analysis	38/11.98
		3. Rationalizing data processing/analysis	26/8.20
N (total)			**317**

* frequency/percentage

There are 317 sentences that realize the moves and their steps in the MSs as illustrated by Table 2 above. The analysis outcomes indicate that there are three moves with 15 steps found in them. Moreover, to see how the move step patterns is materialized in the MSs, Table 3 maps the consecutive orders of them.

Table 3 Inter- and Outer Move Step Shifts in MSs

Move	Step	Data				
		*MS (1)	MS (2)	MS (3)	MS (4)	MS (5)
1	1. Referencing previous works	9			9	5/9/11/19
	2. Providing general information				2	1
	3. Identifying the methodological approach	29	2	29		12
	4. Describing the setting	24		2/8		13
	5. Introducing the subjects/participants	1	3	1/18/28	1	
	6. Rationalizing pre-experiment decisions	2	5			20/23
2	1. Acquiring the data	6/10/12				15/17/21
	2. Describing the data	3/19	8	4/6/9/33		6/10/14/18/35
	3. Identifying variables					4/25/34
	4. Delineating experimental/ study procedures	8/13/15/ 17/25	10	13/15/19/ 21/27/30/36	3/5/7	3
	5. Describing tools/instruments/ materials/equipment	5/7/14/ 16/21	1/4/7	3/12/14/ 16/20/22/ 24/26/ 31/34	4/6	2/33/36
	6. Rationalizing experiment decisions			23/35		27
	7. Reporting incremental			11/38	14	28/30/ 32/37
3	1. Preparing the data					
	2. Describing the data analysis	4/11/20/ 23/26/28	9	5/7/25/ 32/37	8/11/ 13	7/16/ 22/29
	3. Rationalizing data processing/analysis	18/22/27/ 30	6	10/17	10/12	8/24/ 26/31

*Method section (MS)

Table 3 shows the inter- and outer move step shifts in the MSs. In term of move step shifts written orderly as suggested by the framework (Cotos et al., 2015), not more than two move steps identified composed in this regard.

The investigation results from the five RSs demonstrate that there are 242 sentences realizing the move steps. Overall, as can be seen in Table 4 below, it is found that four moves with 10 steps present in them.

Table 4 Finding of Moves and Their Steps in RSs

Section	Move	Step	*f/ %
Result (Cotos et al., 2015)	1. Approaching the niche	1. Providing general orientation	25/10.33
		2. Restating study specifics	2/0.82
		3. Justifying study specifics	1/0.41
	2. Occupying the niche	1. Reporting specific results	
		2. Indicating alternative presentation of results	68/28.09
	3. Construing the niche	1. Comparing results	0/0
		2. Accounting for results	
		3. Explicating results	37/15.28
		4. Clarifying expectations	21/8.67
		5. Acknowledging limitations	85/35.12
	4. Expanding the niche	1. Generalizing results	1/0.41
		2. Claiming the value	1/0.41
		3. Noting implications	
		4. Proposing directions	1/0.41
			0/0
			0/0
			0/0
N (total)			**242**

* frequency/percentage

Table 5 above describes the move steps found in the RSs. To see how these move steps are mapped in the RSs, Table 8 below sketchs out the sequence of move steps exploited by the authors.

Table 5 Inter- and Outer Move Step Shifts in RSs

Move	Step	Data				
		*RS (1)	RS (2)	RS (3)	RS (4)	RS (5)
1	1. Providing general orientation	3/10/16/24	1/5/12/20/24			
	2. Restating study specifics	9	15/18			
	3. Justifying study specifics	13				
2	1. Reporting specific results	1/4/6/12/14/17/21/25	2/4/7/9/11/13/16/21/23	7/9/11/13/17	1/3	1/7
	2. Indicating alternative presentation of results					
3	1. Comparing results	2/8/11/19/23	3	2/4/18	2	3
	2. Accounting for results	20/22	17	1/3/10/14/16		
	3. Explicating results	5/7/15/18	6/8/10/14/19/22	5/8/12/15/19	4	2/4/6/8
	4. Clarifying expectations			6		
	5. Acknowledging limitations			20		
4	1. Generalizing results					5
	2. Claiming the value					
	3. Noting implications					
	4. Proposing directions					

*Result section (RS)

Table 5 above illustrates the inter- and outer move step shifts in the RSs.

The outcomes of analysis from the five DSs suggested that there are 207 sentences materializing the move steps in these sections. Moreover, totally, it is revealed that four moves with 13 steps taken place in them. To comprehensively analyze the results, Table 6 portrays the findings drawn from the DSs.

Table 6 Finding of Moves and Their Steps in DSs

Section	Move	Step	*f/ %
Discussion (Cotos et al., 2015)	1. Re-establishing the territory	1. Drawing on a/theoretical general background	0/0
		2. Drawing on study specific background	27/13.04
		3. Highlighting principal findings	26/12.56
		4. Previewing the discussion 'road map'	1/0.48
	2. Framing the new knowledge	1. Explicating results	74/35.74
		2. Accounting for results	6/2.89
		3. Clarifying expectations	2/0.96
		4. Addressing limitations	15/7.24
	3. Reshaping the territory	1. Supporting with evidence	15/7.24
		2. Countering with evidence	10/4.83
	4. Establishing additional territory	1. Generalizing results	7/3.38
		2. Claiming the value	9/4.34
		3. Noting implications	6/2.89
		4. Proposing directions	9/4.34
N (total)			**207**

*frequency/percentage

Table 6 above describes the moves and their steps found in the DSs. To analyze how the move steps is presented in DSs, Table 7 below maps the inter- and outer move step shifts.

Table 7 Inter- and Outer Move Step Shifts in DSs

Move	Step	Data				
		*DS (1)	DS (2)	DS (3)	DS (4)	DS (5)
1	1. Drawing on a theoretical/ general background					
	2. Drawing on study specific background	2/7/19/21	1	1/4/10/17	1	1
	3. Highlighting principal findings	3/5/12/14	14	2/13/15/24	2/5	3/5/10
	4. Previewing the discussion 'road map'		5			
2	1. Explicating results	4/13/16/18	2/4/8/ 11/13	8	4	4/7
	2. Accounting for results	6		5/11		
	3. Clarifying expectations		18	7		
	4. Addressing limitations		10/12	12/18/20		8
3	1. Supporting with evidence	10/17/23	3/7	6/23	3	2/6
	2. Countering with evidence	8	9/15			
4	1. Generalizing results	15/20/25	6/19	16		
	2. Claiming the value	1/22	17/20	14/21		
	3. Noting implications	24		3/9/25		
	4. Proposing directions	9/11/26	16	19/22		9

*Discussion section (DS)

Table 7 describes the inter- and outer move step shifts in DSs.

Equal to move step analysis, transitivity analysis evinces the variability of the results obtained as seen in the Table 8 below. This table detailly describes the magnitude of comparison of the number of processes acquired from the results of the transitivity analysis on method, result, and discussion sections.

Table 8 Incidences of Processes Found in the Data

Process	Section		
	Method *F/P	Result F/P	Discussion F/P
Material	196/61,82%	110/45,45%	80/38,64%
Relational	88/27,76%	72/29,75%	72/34,78%
Verbal	20/6,30%	36/14,87%	33/15,94%
Mental	9/2,83%	14/5,78%	15/7,24%
Existential	3/0,94%	10/4,13%	7/3,38%
Behavioral	1/0,31%	0	0
Total	317	242	207

*frequency/percentage

All in all, as illustrated in Table 8 above, the findings of material process predominate. Conversely, the behavioral process is the minority found in all sections.

Discussion

The Patterns of Move Steps and their Consecutive Orders

As observed in the Table 2, the first move "Contextualizing the study" contains six steps and the fifth step "Introducing participant/ subject" dominated. In contrast, the second step "Providing general information" is the scarce step existing in this move. In the second move "Describing the study", the most move step found is "Delineating experimental/ study procedures", whereas the fewest is held by the third and sixth move steps. Interestingly, the third step "Identifying variables" and the sixth step "Rationalizing experiment decisions" occurred equally. As for the third move "Establishing credibility", it comprises of three steps with the second and third noticed in the data and none for the first.

If compared in terms of move step's frequency, the fourth step of the second move "Delineating experimental/ study procedures" is the primary move step in this section. This finding supports the results of research conducted by Cotos et al. (2015). On the other hand, the description of "Providing general information", the second step of the first move, is the topic least reviewed. This finding indicates that the authors of the article incline to assert what they do in the research process and indeed if further investigated, one of the essences of the MSs is related to the explanation of the research procedures carried out. This implies, in addition, that the writers have adjusted their writing techniques in line with the rhetorical purpose of the addressed section (Zheng et al., 2014).

Regarding the move step patterns materialized in the MSs, as illustrated in Table 3, if compared, MS 5 utilizes the most move step written orderly with five occurrences and MS 3 applies the fewest. As for the rest, the shifts of move steps do not occur sequentially, linearly composed, in accordance with the framework used, this supports the findings from a study conducted by Pramoolsook et al. (2015) in marketing and management journals. Furthermore, it is found that there are differences in the actualization of the move steps among MSs. They can be commenced by any move step, meaning that the initial sentence of the MS can be realized by any move step. As an illustration MS 1 starts with "Introducing the subjects/ participants", MS 2 begins with "Describing tools/ instruments/ materials/ equipment", MS 3 commenced by "Introducing the subjects/ participants", MS 4 initiated by "Introducing the subjects/ participants", and MS 5 instigated by "Providing general information". When examined carefully, there are similarities in the move steps employed in the MSs. This happened in MS 1, MS 3, and MS 4. Their opening sentences are "Introducing the subjects/ participants".

Related to the obligatory and optional move steps, the fourth step of the second move "Delineating experimental/ study procedures" and the fifth step "Describing tools/ instruments/ materials/ equipment" and the second step of the third move "Describing the data analysis", and the third step "Rationalizing data processing/analysis" are the move steps that always appear in the MSs. Moreover, viewed from move step variability, MS 5 utilizes the most move step variants. It means that almost all move steps drawn from the framework of Cotos et al. (2015) are applied.

The outcomes of analysis from the five RSs, as expounded in Table 4, indicated that the first step of the first move "Providing general orientation" is the principal move step while the third step "Justifying study specifics" is underrepresented. In the second move, the first step "Reporting specific results" is the most step discovered compared to its counterpart that is absent. In the third move, particularly the third step "Explicating results" is the prominent step, while the fourth step "Clarifying expectations" and the fifth step "Acknowledging limitations" are infrequent steps equally detected. In the fourth move, the first step "Generalizing results" is the most move recognized compared to the others that are unattended.

Again, if compared in terms of move step's frequency, the third step of the second move "Explicating results" is the predominant move step in RSs. This contrasts with the findings from the study conducted by Cotos et al. (2015). Moreover, there are some move steps that are absent for instance the fourth step of the fourth move "Proposing directions" and there are some move steps exploited minimally for instance the fourth step of the third move "Clarifying expectations". This may reflect that the authors of the articles focus more on presenting topics related to "Explicating results" followed by "Reporting specific results" in their RSs. Of course, this finding is not too surprising in that the essence of the RSs in RAs is to describe the results obtained. To some extent, this is consistent with the study done by Basturkmen (2009) in language teaching research journals and master dissertations.

In term of the inter- and outer-move step shifts in the RSs, as explicated in Table 5, the inter-move step shift occurred, for example, in RS 1 the first and second steps of the third move, 19th and 20th order and in RS 3 the second and third steps of the third move, 14th and 15th order. If contrasted, RS 3 applies the most move step written orderly with two incidences and RS 1 deploys the fewest and none in the others. As for the outer-move step shift, it is taken place passim, hence, it outnumbers the first.

Similar to Table 3, Table 5 shows that there are discrepancies in the actualization of move steps among the RSs. They can be initiated by any move step, meaning that their initial sentences can be materialized by any move step. Surprisingly, referring to the presentation of Table 5 as alluded, there are similarities in the beginning of the move steps deployed in RS 1, RS 4, and RS 5. They are commenced by the first step of the second move "Reporting specific results". This finding suggests that it is the seminal move step applied as the starting point of the RSs.

Regarding the obligatory and optional move steps, the first step of the second move "Reporting specific results" and the first step of the third move "Comparing results" as well as the third step of the third move "Explicating results" are the move steps that always emerge in the RSs. Moreover, surveyed from move step variability, RS 1 utilizes the most move step variants, whereas RS 4 is the fewest.

The outcomes of analysis from the five DSs, as portrayed in Table 6, suggest that the second step of the first move "Drawing on study specific background" is predominant, whereas the fourth step "Previewing the discussion 'road map'" is the rare move step. In the second move, the first step "Explicating results" is the primary move step, whereas the third step "Clarifying expectations" is the insignificant move step. In the third move, the first step "Supporting with evidence" is more employed than its counterpart. In the fourth move, the second step "Claiming the value" and the fourth step "Proposing directions" are the majority move steps and both share the same frequencies. In contrast, the third step of the fourth move "Noting implications" is the fewest move step.

If compared in terms of move step's frequency, the results of the analysis indicate that the first step of the second move "Explicating results" is a paramount move step. This finding extends the results of study conducted by Kim et al. (2016), albeit there is a difference in terms of moves found. Contrastively, the domination of the first step of the second move as evidenced is not consistent with Cotos's et al. (2015) finding explicating that the first move dominating in the discussion section.

The many utilizations of move step corresponding to "Explicating results" demonstrate that, in the DSs, this topic is very prominent and indeed if related to the rhetorical purpose of the section, this is very congruent since in the DSs the emphasis is on how to interpret the research results.

As outlined in Table 7, if juxtaposed, DS 1, DS 2, DS 3, and DS 4 utilize the same sum of move step shifts written in an orderly manner. It means that they equally practice the move step shift composed orderly. Moreover, comparable to the contents of Tables 3 and Table 5, Table 7 illustrates that there are differences in the actualization of move steps utilized as the opening of DSs. They can be started with any move step, meaning that the initial sentence of this section can realize any move step. In reverse, there are similarities discovered in initial move steps originating from DS 2, DS 3, DS 4, and DS 5. These are commenced by the move step "Drawing on study specific background". This suggests, to some degree, that the authors want to foreground the rationality of the interpretation given to the results. In so doing, the readers of the article will find it easier to grasp the reasons behind the explanations provided.

Analogous to what found in the MSs and RSs, the majority of move step shifts in the DSs are not occurred linearly or sequentially. This is indicated by few consecutive move step shifts identified, for instance in DS 1, the second and third steps of the first move have consecutive inter-move step shift order. As for the obligatory and optional move steps, the second step of the first move "Drawing on study specific background", the third step of the first move "Highlighting principal findings", the first step of the second move "Explicating results", and the first step of the third move "Supporting with evidence" are the move steps that always exist in the DSs. In addition, scrutinized from move step variability, DS 2 and DS 3 deploy the most move step variants, whereas, DS 4 is the fewest. The findings of variability in move steps found in DSs, to some degree, are in line with studies conducted by Liu and Buckingham (2018) and Soodmand Afshar et al. (2018).

Overall, the results of comparing the MSs, RSs, and DSs evince that the number of moves in the MSs is different from RSs and DSs. If juxtaposed in terms of move step variability and frequency existing in the MSs, the RSs and DSs' are fewer, it means that the MSs' exceed them. This diversity caused by the number of sentences in the MSs is more than the others.

In term of homogenous move sum, the RSs have the same numbers as the DSs that is four moves, they just differ in the number of steps, 10 steps in the RSs and 13 steps in DSs. Another interesting finding from comparing the frequencies of the fourth move in RSs and DSs is in RSs the second, third, and fourth steps of the fourth move are not observed whereas in DSs they are present. Of course, in the RSs, it will hardly be found the rhetorical steps related to claiming the value, noting implications, and proposing directions in that these topics are one of the focal points signifying the DSs (Liu & Buckingham, 2018). In relation to domination of certain move step topic, the RSs and DSs share similarity. For instance, RSs are predominated by the third step of the third move "Explicating results" and the same goes with DSs that dominated by the first step of the second move "Explicating results".

Regarding the move step shifts written orderly, if compared, MSs have the most followed by RSs and DSs consecutively. Moreover, in them, the preponderance of move step shifts does not occur linearly or sequentially. This may be caused by the authors' motives to highlight the flows of logical arguments and this realized by, to some degree, intertwining outer-move shifts (Cotos et al., 2015). The pattern of outer and inter-move sequences found is in line with the result of study conducted by Peacock (2002). Finally, regarding mandatory and optional move steps, MSs and DSs utilize the same number of mandatory move steps that is four. Whereas, RSs applies three mandatory move steps. If collated, the optional move steps outnumber the mandatory move steps in the three sections investigated.

In relation to the educational context, particularly to the teaching of how to create a paper or research article in higher education levels, the patterns of move steps and their consecutive orders as well as obligatory and optional move steps found in method, result, and discussion sections are the powerful 'assistance' for students. In this context, they may employ similar patterns applied by the writers whose works analyzed. Of course, it is only the pattern that is imitated not the same wording. By this, it is expected that they will find easiness when composing a research article. This is in line with the results of the study performed by Lim (2006).

Processes Existing in Method, Result, and Discussion Sections

As illustrated in Table 8 alluded to earlier, by and large, the findings of material process predominate, contrarily the behavioral process is the minority found in all sections. Seen in a particular section for instance in method, the high incidences of material processes support and extend the study conducted by Martínez (2001) in physical, biological, and social sciences. Nevertheless, there are differences of findings in the result and discussion sections if contrasted to the study of Martínez (2001). In her study, the relational process prevailed in only result and discussion sections and mental process in discussion sections whereas in the present study material process is very focal in the overall sections. At this point, the present study is consistent with the research carried out by Zheng et al. (2014) in medical sciences. Moreover, the domination of material process implies the high degree of objectivity communicated by the authors in the sections analyzed (Zheng et al., 2014) in that it demonstrates that the events or the occurrence of them are not subjectively designed by the authors. Instead, their positions, in this context, solely materialize the phenomena happened in the study being performed.

Following the material process, the finding of high relational process in the data is coincidental with the results of study carried out by Martínez (2001) indicating that relational process predominates in the result and discussion sections. This also stretches the results of study performed by Zheng et al. (2014) evincing that the relational process is immensely discovered after mental process. In this study, relational process is discovered second after material process and its discovery implicates that the contents of the method, result, and discussion sections are filled with the explanations to assist the readers' comprehension towards the topics being presented. Moreover, the abundant realization of relational process indicates that the writing pattern of the sections has fulfilled the features of science language (Halliday & Martin, 1993).

Regarding the verbal process, it is depicted as the third order in the Table 8. Its existence, if compared in the overall sections analyzed, predominates in the result sections. This finding suggests that in the result sections the authors utilize more verbs characterized as verbal process for instance reporting and arguing. This applies, to some extent, to show that the result of the analysis in the study performed is in line with the studies done previously.

Related to the mental process, its position is the fourth in the Table 8 above. The finding of the mental process in the present study contradicts the findings of Martínez's (2001) study indicating that mental process overrules in the discussion sections. Moreover, the discrepancy also observed if compared to the findings of Zheng et al. (2014) suggesting that mental outrun the verbal processes. Few findings regarding mental process propose that the authors are not in favor of accentuating their mental perceptions in the sections composed.

Compared to material, relational, verbal, and mental processes, the existential process is fewer in frequency. Moreover, if juxtaposed in the overall sections, for instance in method, result, and discussion, its incidence is dominant in the result sections and minority in the method sections. This outcome is in line with the finding of the study done by Zheng et al. (2014) showing that existential process is the rarest discovered in their corpuses. Even so, the finding of existential process, as claimed by Zheng et al. (2014), implies that the authors limit their personal involvement towards the phenomena being presented.

Lastly, the behavioral process only occurred once in the data and this happened in the method section. The infrequent finding of this process demonstrates that it is not considered as the traits of scientific language (Halliday & Martin, 1993), hence it is not generally exploited. Moreover, referring to Zheng et al. (2014), they exclude the transitivity analysis regarding the behavioral process in that, again, it is not commonly applied in research articles.

Taken together, the results of transitivity analysis indicated differences in the processes found. This to some extent is comparable to the outcomes of the studies performed by Pang and Chen (2007) in material and psychology sciences and Huang (2009) and Behnam and Zamanian (2013) in abstract sections. Moreover, viewed from the educational settings, the processes resulted from the transitivity analysis in the sections analyzed such as methods, results, and discussions can be utilized as the alternative of learning topic when discussing how to compose a RA. In this situation, the teachers or lecturers may select any parts that suit with their teaching purposes. Any of them is eligibly chosen in that they have been written in accordance with their rhetorical functions.

Conclusion

From the process of data analysis and its interpretation, there are several conclusions that can be drawn. First, overall, there are 38 move steps discovered in the three sections analyzed. More specifically, these results consist of 15 move steps in the method, 10 move steps in the result, and 13 move steps in the discussion sections. Second, the realization of move steps varied among sections. It means that not all the move steps in the framework used are found in every data analyzed. Third, the exploitation of the move steps is indicated to have been adapted to the rhetorical purpose of the section encompassing it. This is proven by the domination of move steps which corresponds closely to the characteristics of the sections where they are found. Fourth, there are inter- and outer-move step shifts detected in all data analyzed yet if compared the second outnumbers the first. This suggests that the swerves of the move steps are not occurred linearly or sequentially as presented in the framework. Fifth, there are six processes found based on the transitivity analysis of the data. These comprise of material, relational, verbal, mental, existential, and behavioral with material processes dominating and behavioral the fewest. Sixth, the results of the transitivity analysis may be utilized to disclose the primary characteristics of the sections as well as the discipline where the RAs originated. Seventh, frameworks taken from Cotos et al. (2015) regarding the move steps and Halliday (1994) and Thompson (2014) related to transitivity analysis have been successfully explicated the phenomena being investigated. Finally, based on the analysis conducted both on literature and research data, the variation and dynamism of move step constructs and their linguistic features are, to certain degree, influenced by the characteristics of the sections, journal writing guidelines, disciplines, and the authors' perspectives towards the topics written.

Recommendation

This study has several implications particularly for learners learning in higher educations, as well as, generally, for neophytes in other stages of learning whether done formally and informally. The implications laid in terms of reading and writing RAs especially in the method, result, and discussion sections. Related to reading the RAs, the results of the

present study will provide a map to guide the students or novice researchers when perusing those sections. This pattern, moreover, may facilitate them in selecting which information should be highlighted and what is not. By this, they will spend less time and energy to read those sections. As for the writing RAs, the frequencies showing mandatory and noncompulsory move steps as well as the shifts of move steps orderly or not discovered in the data analyzed may be utilized as examples of learning materials that can be taught to the students or novice researchers elsewhere when composing the method, result, and discussion sections. This, in the end, may contribute to their advancement if they write their own RAs in accordance to the discipline and subjects studied.

Following the implications as stated, it is suggested that future researchers operate more data to accurately picture the phenomena being investigated. This can be taken by putting more RAs in terms of numbers and cross, similar or subdisciplines, and covering the overall sections such as abstract, introduction, method, result, and discussion. By this, it is expected that the research outcomes will yield more comprehensive understanding towards the contents of all sections reside in the addressed RAs, hence the contribution will be more extensive for learners learning RAs.

Limitation

As generally happened in a research, the present study has limitation related to the data employed. The data exploited is not sufficient to use as a point of the departure where a 'generalization' of the study outcomes can be drawn. Therefore, this study is not intended to assert a generalization. Instead, it tries to find some lessons from the cases found in the data that eventually can be deployed as materials to learn for students whether in reading or writing.

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Authorship Contribution Statement

Hendrawan: Conceptualization, design, analysis/ interpretation, and writing. Sujatna: Conceptualization, editing/ reviewing, supervision, and securing funding. Krisnawati: Conceptualization and supervision. Darmayanti: Conceptualization and supervision.

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