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Does Disciplinary Convention Affect Rhetorical Organization? A Move Analysis of Scopus-Indexed Articles by Indonesian Authors

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ABSTRACT

Publication in high-reputation international journals is a necessity for contemporary academics. However, academics face considerable challenges in writing for international publication partly because of failing to meet acceptable rhetorical patterns in accordance with disciplinary conventions. This study tries to investigate rhetorical moves in eight Scopus-indexed research articles written by two Indonesian authors from hard science and soft science. The articles were selected based on the authors' status as first authors. To analyze the rhetorical moves, a framework from Maswana, et al. (2015) was adopted and modified. The findings revealed that the authors rhetorically organize their articles mostly in a similar way, particularly in the abstract and introduction sections. Similarities were also found in manifesting several steps such as "identifying data source" and analysis instruments in the methods section, stating and interpreting the results in the findings and discussion section, and highlighting overall results and significance in the conclusion section. However, differences were spotted in the step level particularly in recounting the experimental process in the methods section and explaining specific research outcomes in the conclusion section. Those discrepancies might be caused by disciplinary conventions. The results provide a framework and resources for academics striving to write articles for international publications.

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1. Introduction

Academic writing is a key aspect of success in an academic's career (Fang, 2021). The ability to perform well in academic writing may help academics in knowledge dissemination, building identity and positioning as a scholar, as well as advancing their career prospects

(Fang, 2021). As a genre of academic writing, research article is a well-known (Maswana et al., 2015) key aspect to achieving the positive effects that academic writing could have for academics, lecturers, and even students. This is shown by the exigency of writing research articles, especially in an international publication context, for academics due to the pressure that they face (Antoniou & Moriarty, 2008; Coleman, 2014; Curry & Lillis, 2014; Flowerdew, 2015; Salager-Meyer, 2013).

Indonesian academia gives a good example of this exigency. The release of the regulations of the Ministry of Research and Higher Education number 20 in 2017 gives an encouragement for Indonesian lecturers and academics to produce research articles that are published on both national and international scales. Published research articles are also one of the requirements for getting an allowance for lecturers according to the ministerial regulation. This urgent need for publication is also coupled with the fact that international publication is a standard of assessment for academics in many countries (Flowerdew, 2015; Hyland, 2015; Suherdi et al., 2020). Hence, research articles for international publication are a necessity for individual academics and institutions to produce for many reasons.

Despite all of the exigencies to write research articles for international publications, writing them is not an easy task, particularly for non-native speakers of English (Chang & Kuo, 2011; Coleman, 2014; Ren & Li, 2011;). One of the factors of this is the language itself since English has been accepted as the language for international publication (Bardi, 2015; Bocanegra-Valle, 2013; Curry & Lillis, 2014; Flowerdew, 2015). It is known that non-native speakers of English often get difficulties and extra burdens when writing in English. This is shown by more labor put into the process of writing, difficulty in using Standard English grammar conventions, and a commonly perceived injustice compared to native speakers of English (Bardi, 2015; Ferguson et al., 2011; Hyland, 2016). However, there is more nuance on this issue. One of them is the fact that writing research articles, and academic writing in general, is not easy for native speakers of English as well (Hyland, 2016).

Writing research articles is a learned process that both native speakers and non-native speakers must undergo as they need to become familiar with the linguistic and rhetorical conventions of research articles (Ferguson et al., 2011; Hyland, 2016). It is also shown that research articles from non-native speakers are rejected because of the failure to meet the standard of academic conventions set by the reviewers, not grammatical mistakes/simplicity (Hyland, 2016; Pho, 2008). Therefore, it is important to solve the issue of writing difficulties by raising awareness of the importance of writing research articles with accepted rhetorical conventions.

A way to solve writing difficulties in an international publication setting is by using genre analysis, which makes various knowledge about the genre explicit and understandable (Bardi, 2015; Driscoll et al, 2020; Ren & Li, 2011). "Genre" here is defined as a class of communicative events whose members share some set of communicative purposes (Swales, 1990). These purposes are related to the rationale of the genre which is acknowledged by expert members of the discourse community. It then shapes the structure of the discourse where the genre is situated (Swales, 1990). In other words, the rationale of the genre develops the conventions which influence the writing of the genre itself, specifically in this context, the research article (Kanoksilapatham, 2007). Making convention explicit through genre analysis is a suitable way to make writing research articles easier, where conventions become a tool to write clearer

and better instead of an extra burden (Bardi, 2015). Swales (1990) has developed a framework to make this possible by analyzing what is termed rhetorical moves. "Move" here means "a discoursal or rhetorical unit that performs a coherent communicative function" (Swales, 2004, p. 228). These moves have smaller elements which are called "step" which functions to actualize the move (Kanoksilapatham, 2007). Understanding the interplay of moves and steps can assist in comprehending the rhetorical function of each section of research articles as well as the communicative purpose of the research article as a whole. Awareness of moves can lead to success in international publication (Fazilatfar & Naseri, 2014) by helping academics to meet the expectation of research article conventions set by the reviewers as noted in Hyland (2016).

Numerous previous studies have used Swales' move analysis as a framework for analyzing research articles. These studies often focused on abstracts as shown by Lubis & Kurniawan (2020). Among these are Amnuai (2019), Darabad (2016), Kaya & Yağız (2020), Kurniawan et al. (2019), and Rashidi & Meihami (2018) to name a few recent studies. Other individual research article sections, especially in their IMRD form, have also been studied (Farnia & Barati, (2017); La-o-vorakiat & Singhasiri, (2021); Luthfianda et al, (2021) for introduction. Cotos et al., (2017); Musa et al., (2015); Zhang & Wannaruk, (2016) for methods. Amnuai & Wannaruk, (2013); Hashemi & Moghaddam, (2019); Suherdi et al., (2020); Zekrati, (2015) for results & discussion). Furthermore, some studies have analyzed the full structure of research articles, but the studies on full research articles are fewer compared to those on individual sections. The older studies like Kanoksilapatham (2005), Nwogu (1997), and Posteguillo (1999) which analyzed biochemistry, medical science, and computer science research articles respectively have generated useful frameworks; some of which have been used by more recent studies. For example, Shi & Wannaruk (2014) used and modify the framework of Kanoksilapatham (2005) and applied it to agricultural science research articles. Another example is Maswana et al. (2015) which used Nwogu's framework and adapted it as a framework to analyze research articles in five subdisciplines of engineering. Other studies have combined frameworks from previous studies on isolated research article sections and combined them with their analyses such as Stoller & Robinson (2013) on chemistry research articles and Pho (2008) on applied linguistics and educational technology research articles.

Earlier studies on full research articles so far have focused more on analyzing research articles from 1 field or discipline, particularly in the hard sciences. Analyzing the rhetorical structure of research articles from different fields is still less common in the literature (Pho, 2008). Maswana et al. (2015) have given a detailed analysis of differences due to different knowledge disciplines and also modified Nwogu (1997)'s framework based on the results. However, Maswana et al. (2015)'s study is only focused on differences from the hard sciences.

Analyzing the rhetorical structure of published research articles from the hard sciences and soft sciences can reveal new insight regarding the accepted convention for publications since published texts are "the most concrete, public and accessible realization" of social disciplinary practices (Hyland, 2004, p.1). It's especially important since there is a perceived difference in the knowledge-constructing process in the continuum of hard and soft sciences. This can help to raise academics' and researchers' awareness of what is considered an acceptable practice of writing in their discipline (Hyland, 2004), which in turn can increase the chance of fulfilling the reviewer's expectation.

The importance of disciplinary convention in academic writing, particularly for publication, has been widely accepted in previous studies (Kaufhold & McGrath, 2019). Recent studies on writing research articles and the rhetorical move structure of research articles mentioned the importance of disciplinary convention. It is shown that expert writers' rhetorical moves in their research articles adhere closely to disciplinary conventions (Ye, 2019; Yin et al., 2023). It could be explained by the expert writer's consciousness of their scientific community's expectations and the knowledge-constructing process (Hyland, 2004 & 2016). Making disciplinary conventions explicit, particularly through corpus data, has been shown by recent studies to facilitate students' literacy regarding research articles (Blazer & DeCapua, 2020) and also students' writing skills (Dong & lu, 2022). Therefore, analyzing expert writers' prestigious research articles from different disciplines in terms of their rhetorical strategies could be useful as educational material for research publication writing. In light of several recent move analysis studies that highlighted the appearance of unique rhetorical structures in certain disciplines (Azizi et al., 2022; Sawaki, 2023), it becomes clearer that further identifying rhetorical moves in prestigious articles from two different disciplines could be beneficial.

This study is concerned with identifying rhetorical moves in Scopus-indexed articles written by two Indonesian authors from the field of Education and Chemistry. The identification of rhetorical moves and steps from the articles was done to develop a framework of moves and steps from the disciplines of soft science and hard science. To reveal the rhetorical moves and make disciplinary conventions from the articles more explicit two research questions were formulated.

(1) How do the authors rhetorically organize their Scopus-indexed articles in terms of moves and steps?

(2) What are the differences in the organization of rhetorical moves and steps employed by the authors in their research articles?

2. Research Methodology

2.1 Research Design

To unpack the rhetorical structure of research articles of two different authors from different disciplines, a descriptive-comparative qualitative design is employed. The research articles were analyzed individually to manifest their rhetorical structure, then the findings of rhetorical structure from the author's article were compared. The findings were compared at the level of moves, steps, and how they are realized (Kurniawan, et al., 2019). The result of the findings and comparison were then presented in the form of tables which indicate the frequency of moves and steps in each research article's section. All of the moves and steps which are used by the authors in each discipline were then compared side by side in one table to give a general idea of how the authors rhetorically organize their articles.

2.2 Data Source

Two Indonesian researchers from a state university in West Java, Indonesia took part in this study. The participants were chosen based on their *h*-Scopus index which is considered to be the foremost in their discipline (music education and chemistry). The education author has an *h*-Scopus index of 8 while the chemistry author has an *h*-Scopus index of 8. Another criterion is that they still have the status of being an active lecturer.

A process of correspondence was conducted by asking for the authors'/lecturers' consent for having their articles analyzed. After a series of correspondence was done, the authors consented to have their articles analyzed. In turn, the authors gave their list of Scopus-indexed articles so their articles could be analyzed. After obtaining their consent and their Scopus list, the corpus of this study was gathered.

Then, eight articles were selected to be analyzed in this study. The articles were taken from Scopus-indexed journals which were still indexed to the point when the authors submitted their articles. The articles were chosen based on the status of the authors as the first author, hence the range of publication is not a criterion for the selection of research articles.

All eight articles were taken from six journals; three education journals and three chemistry journals. The education author's articles were taken from journals which are Pegem Journal of Education and Instruction, International Journal of Education and Practice, and Universal Journal of Educational Research. While the chemistry author's articles were obtained from journals which are Royal Society of Chemistry, Journal of Environmental Chemical Engineering, and Carbon.

Table 1: The list of articles in the corpus and their codes

Code	Year of Publication	Journal Name	Journal Quartile
Education			
E1	2019	Universal Journal of Educational Research	Q4
E2	2022	Pegem Journal of Education and Instruction	Q4
E3	2020	Universal Journal of Educational Research	Q4
E4	2019	International Journal of Education and Practice	Q3
Chemistry			
C1	2021	RSC Advances	Q2
C2	2020	Journal of Environmental Chemical Engineering	Q1
C3	2019	Carbon	Q1
C4	2014	Faraday Discussions	Q1

2.3 Instruments

Maswana et al. (2015)'s coding of moves and steps was used as the theoretical framework for this study. Their framework provided twelve moves and thirty-eight steps categories, ranging from the abstract section to the conclusion section of the research article. However, Maswana et al. (2015)'s framework, outside of the abstract, is based on Nwogu (1997)'s coding of moves and steps which was done on medical research articles that are considered to be on the hard science continuum. Hence, discussions were carried out in order to determine whether to only adopt Maswana et al.'s (2015) framework or to modify it. After taking into account the articles used by Nwogu and Maswana et al. on their articles, which consisted of articles from the hard science continuum only it was decided that the framework should be modified. It was done to better represent the research articles from the soft science continuum, hence additional moves and steps in the introduction and method sections were added. This was done considering the well-known differences in methods between disciplines, especially the hard and soft sciences (Hyland, 2004; Swales, 1990 & 2004). The addition was based on Swales' (2004) revised CARS model in move 3 and Zhang & Wannaruk's (2016) categorization of education research articles methods section. This resulted in the addition of one move and seven steps, making a total of 13 moves and 45 steps. Other than additions, some moves and

steps categories from Maswana et al. (2015)' were renamed to make them fit more with the findings. The modified move category list is presented in the appendix.

2.4 Data Analysis Procedures

The coding of moves and steps was done based on the functional-semantic approach (Kwan, 2006). This approach is also in line with what was done by Maswana et al. (2015) where moves and steps are identified based on the content and meaning of text segments. However, during the analysis process, linguistic criteria provided by Nwogu (1990) are also employed as a way to further validate the identification of the moves and steps.

The data analysis process was done in different phases. The first phase involved reading all eight research articles to understand the ideas of the articles. The second phase was done by dividing the research articles into segments which were then coded according to the moves and steps categories from the theoretical framework. The third phase was conducted as the coded categories were moved into tables in Google Sheets to facilitate ease when counting the number of moves and steps identified. A reexamination of moves and steps coding was also done in the third phase. The fourth phase involved writing the total number of identified moves and steps in table form in Microsoft Word. In the final phase, the findings from research articles of the hard-science and soft-science authors were compared.

To validate the result of the study's findings, the assistance of inter-coders was employed. The inter-coders were two lecturers who specialized in linguistics and were well-versed in move analysis. The coders were involved in the data analysis phases, particularly the third phase where the identification of moves was reexamined. After the examination of move identification, discussions were conducted to reach an agreement on which move and/or step labels should be used and included. This was done considering many ways that rhetorical moves could be manifested and because the functional-semantic approach relied on the judgment of the researcher.

3. Findings and Discussion

This section describes the appearance of rhetorical moves and steps in the research article of the Scopus-indexed authors from education and chemistry. The differences in how the authors rhetorically organize their articles are also shown and discussed. The description is shown using tables to show the salience and occurrence of moves and steps. Salience means the number of articles containing moves and steps, while occurrence refers to the total number of moves and steps present in all articles.

Abstract

Table 2: The salience of moves and steps in the abstract section

Move/Step	Education (N=4)	Chemistry (N=4)
Move a: Abstract	Salience	Salience
a1 Background of research	100%	75%
a2 Purpose	100%	75%
a3 Methods	100%	100%
a4 Results	100%	100%
a5 Conclusion	100%	0%

As table 2 shows, there is a difference in how the authors from education and chemistry rhetorically organize the abstracts section. The abstracts of the education author contain all five steps in all four articles. The results from the education author confirm the tendency to write complete informative abstracts in soft science (Kim, 2014). It might also reveal a disciplinary convention in soft science, namely establishing that their research is important, hence an informative abstract is needed to establish the importance of the topic and a real-world advantage that could be gained from the conclusion (Hyland, 2004). The finding is also in line with Wahyuni et al.'s (2020) findings which revealed the high amount of salience of all the steps, or moves in their study, which was increased after the authors in the soft sciences attended a workshop.

The abstracts of the chemistry author, on the other hand, only contain four steps with step 5 missing and with steps 1 and 2 being more optional since they are absent in one article each, making up a total of two. The absence of step 5 in the chemistry research articles shows that the conclusion section is used least in the hard sciences (Maswana et al., 2015). This may reveal a disciplinary convention in the hard science, namely searching for novelty in results where results need to be more elaborated, hence longer step 4 needs to be written in the abstract. Moreover, the significance of the study is also highlighted by the absence of a conclusion as a good amount of background knowledge is assumed for the discourse community in the hard sciences (Hyland, 2004). The finding is similar to Ramadhini, et al.'s (2020) findings on how authors in the field of hard science rhetorically organize their research articles. Their findings showed that the authors do not always use introduction and conclusion for their abstract, which could reflect assumed background information for the reader (Ramadhini et al., 2020).

Cyclical steps also existed in some analyzed articles from both chemistry and education research articles. The cyclicity in the education research articles occurs between steps 4 and 5 while cyclicity in the chemistry research article occurs between steps 3 and 4, both occurring only in one article. The cyclicity is shown in the examples below.

> a4: The research found that the prospective elementary school teachers were not accustomed to reading the symbols in song notations. a5: Therefore, their musical literacy was low. a4: However, this research found that their song notation reading comprehension and skill could be improved by implementing several critical-reflective action steps. a5: Additionally, the reports from this research illustrated the results of collaborative teamwork in developing and finding solutions in each of the learning steps. (E1)

> a3: The chitosan composite membranes consisting of poly(ethylene glycol) (PEG), multiwalled carbon nanotubes (MWCNT), and BKC were synthesized by mixing the membrane precursors and the antibacterial solution, and casting via an inversed phase technique. The effects of the BKC content on the morphology and performance of the membranes are investigated by varying the BKC feed compositions. a4: The composite membranes demonstrate better antibacterial efficacy against Staphylococcus aureus than Escherichia coli. a3: The permeability and selectivity performances of the composites as filter membranes are examined by employing a dead-end filtration system. a4: Interestingly, enhanced toughness of the membranes is observed as a function of the BKC content. (C1)

This finding further shows the disciplinary conventions in hard science and soft science as mentioned in the literature and previous studies. In hard science, steps 3 and 4 are often recycled to highlight novelty (Hyland, 2004, 2016). In soft science, on the other hand, the recycling of steps 4 and 5 highlights the significance of the study by highlighting two different findings and conclusions which shows usefulness, hence making the method important (Hyland, 2004, 2016; Zhang & Wannaruk, 2016;). The findings here show how the authors write their abstracts in accordance with disciplinary conventions as highlighted in the literature, highlighting novelty in hard science and appealing to significance in soft science (Hyland, 2016).

Introduction

Table 3: The salience of moves and steps in the introduction section

Move/Step	Education (N=4)	Chemistry (N=4)
Move 1: Presenting background information	Salience	Salience
11 Reference to established knowledge in the field	100%	100%
12 Reference to main research problems	100%	100%
Move 2: Reviewing related research	Salience	Salience
21 Reference to previous research	100%	100%
22 Reference to limitations of previous research	75%	50%
Move 3: Presenting new research conducted by the author(s)	Salience	Salience
31 Reference to research purpose	100%	100%
32 Reference to research questions/hypothesis	100%	0%
33 Reference to main research procedure and outcome.	100%	100%
34 Reference to the structure of the article	25%	0%

Table 3 shows that the authors from education and chemistry utilized all three moves for the introduction section. There also seems to be a similarity in how move 1 and move 2 are manifested, with both moves often being recycled as shown by occurrence being higher than salience. It shows how the authors try to appeal to the discourse community by showing how the research topic is important and that it also can be situated and connected to a wider research tradition (Nwogu, 1997; Swales, 1990). After the recycling of move 1 and move 2, the authors then end with move 3 to present their current research. Interestingly, the education author often recycles move 3 as well. The existence of cyclicity in move 3 could be caused by the existence of multiple headings for the introduction section. For example, after a heading called "introduction", there are headings named "literature review", "theoretical framework", and "research objectives". Authors of research articles are sometimes expected to write a separate theoretical framework and literature review section (Fang, 2021). This makes the author restate move 3 in different sections of the articles. The example of a recycled move 3 is shown below.

> **32: The research posed a number of questions** based on the aforementioned issues, including: (1) Why are prospective elementary school teachers unable to read song notations?; (2) Are prospective elementary school teachers aware of the importance of song notation reading comprehension and skill?; (3) Do prospective elementary school teachers know how they can improve their song notation reading comprehension and skill?; and (4) Can a set of steps to read song notations improve the prospective

> elementary school teachers' song notation reading comprehension and skill? **33:** Based on this set of research questions**, an action research was conducted**. **21**: **(Theoretical framework section)… 22&31: In contrast with previous studies, this research aims at** prospective elementary school teachers that have the obligation to teach songs to their students but are yet to have good comprehension regarding song notations, especially in reading the song notations. (E1)

From the example, it is shown how move 3 is recycled, with two elaborations presenting the author's new research separated by move 2 which comes under the heading of "theoretical framework" in the article. An interesting point could be made here regarding disciplinary conventions in hard and soft sciences. Previous theoretical works mentioned that authors in soft science need to situate and contextualize their research direction by connecting it to previous studies, and it is manifested in a longer and more cyclical introduction section (Hyland, 2004; Swales, 1990). This is contrasted with the introduction section of hard science articles which tend to be more brief and linear, which shows a lesser need to contextualize their research direction (Hyland, 2004; Swales, 1990). Citations and previous studies in hard science is instead used to establish theoretical framework rather than situating their research direction (Hyland, 2004).

The example also shows the existence of an embedded move 2 step 2 and move 3 step 1, as well as the existence of a new step for move 3 which was labeled as step 2: reference to research question/hypothesis. Presenting research questions seems to be common in soft science, similar to Pho (2008)'s findings which shows applied linguistics and education technology research articles using research question. This type of move manifestation does not exist in the chemistry research article, which shows more significant differences in the step level.

The step level in the introduction section also contains several differences. Table 3 shows that the education author uses more move 2 step 2 compared to the author from chemistry. The study by Luthfianda et al. (2021) also confirmed this tendency, where authors from soft science use this step more than authors from hard science. However, both authors do not use move 2 step 2 in all four of their articles which indicates an alternative way to show what could be called a gap statement. This shows a tendency of articles from non-Anglophone cultures to give justification for the study without providing criticism of previous studies (Kwan, 2006; Samraj, 2002). Hence, the authors sometimes use move 2 step 1 as a bridge to move 3. An example of how this is done in a chemistry article is shown below.

> **21: In our previous study,** a naphthalene-adsorbed SWCNT had an intercalation structure according to the X-ray diffraction pattern and the ultraviolet photoelectron spectroscopy **shows an explicit increase** of the density of state at the Fermi level which indicates a pseudo-metallic state. **31: In this study, we modify** SWCNT bundles with naphthalene and its derivatives of different electronic properties using liquid phase adsorption. (C4)

Furthermore, the education author also announces the structure of his article in one instance which is labeled as step 4 in move 3. This step does not appear in chemistry research article where only step 1 and 3 is used for move 3 (Stoller & Robinson, 2013). Therefore, it can be said that step 3 is optional in the field of education in line with Swales (2004, p.232) who said that the status of the step is "probable in some fields". An example of this step is shown below.

> **34:** The remainder of this paper **includes a literature review, research methodology, results, discussion** to answer the proposed research questions**, and a conclusion.** (E4)

Method

Table 4: The salience of moves and steps in the method section

Move/Step	Education (N=4)	Chemistry (N=4)
Move 4: Describing Research Design	Salience	Salience
41 Identifying research design	100%	0%
Move 5: Identifying source of data and method adopted in collecting them	Salience	Salience
51 Indicating source of data.	100%	100%
52 Indicating data size.	100%	50%
53 Indicating criteria for data collection.	0	0
54 Indicating data collection procedure	100%	0
55 Justifying data collection procedure	50%	0
56 Providing background details of data	100%	0
57 Indicating compliance of data collection with ethical standard	25%	0
Move 6: Describing experimental procedures	Salience	Salience
61 Identifying main research apparatus	0	100%
62 Recounting experimental process	0	100%
63 Indicating criteria for success	0	0
Move 7: Describing data analysis procedures	Salience	Salience
71 Defining terminologies	0	50%
72 Indicating process of data classification	0	0
73 Identifying analytical instrument/procedure	100%	100%
74 Indicating modification to instrument/procedure	0	0

As table 4 shows, there is a difference in the use of move by the education and chemistry authors. The education author uses move 4, 5, and 7 while the chemistry author uses move 5, 6, and 7. This shows that the methods section is the most different part of research articles across disciplines, hence extra attention needs to be taken in writing this section. (Cotos et al., 2017; Swales, 1990; 2004).

The existence of move 4 (describing research design) in soft science is consistent with the findings of Fazilatfar & Naseri (2014), Lim (2006), and Zhang & Wannaruk (2016). The example of move 4 is given in the example below.

> **41: This study employs a participatory action research design. Studies with action research design** are conducted by collecting information and then improving the ability of research subjects (Creswell, 2002). **This design was used** because in this study, data were collected in the form of self-reflection questions that served to improve the subjects' understanding of the practice (McTaggart, 1994)…(E2)

The example shows how the author uses move 4, describing his research design, justifying it, and explaining how it would be relevant to the study along with several citations. The theoretical works on the methods section mentioned that the methods in soft science is more elaborated and more important (Swales, 1990 & 2004; Hyland, 2004; Lim, 2006; Pho, 2008). This is because of the highly-contested nature of methodology in soft science (Hyland, 2016). The education author's use of move 4 in the example, combined with move 5 for describing data, steps 1 and 2, as well as other aspects of data collection, steps 5, 6, and 7, indicated that

his writing follows the aforementioned disciplinary convention. The use of a connected research design along with different steps in the data collection shows how it is highly elaborated. However, the existence of only one step in move 7 could be because the other moves are more prominent for the hard sciences.

The chemistry author, on the other hand, does not use move 4 but instead uses move 6, which is about the experimental procedure. This is also shown by the subheadings which are called "Experimental" instead of "Method", which was similar to previous studies on this issue (Kanoksilapatham, 2005; Maswana et al., 2015; Stoller & Robinson, 2013). Despite using move 5, only 1 step is used by the chemistry author which is about the data source, or specifically, the materials used for the study. Move 7 on the other hand, is sometimes realized with 2 steps by including words definition. This is in line with Kanoksilapatham's (2005) and Stoller & Robinson's (2013) description of the methods section of chemistry research articles containing a description of materials, experimental procedure, and apparatus, along with the statistical procedure. Furthermore, the way the methods section is written also reveals the characteristic of methods in hard science as mentioned in theoretical works. In Swales' words, the method section tends to be more "clipped", assuming more background information and less elaborated because more established procedures are known in the hard sciences (Hyland, 2004 & 2015; Lim, 2006; Swales, 1990 & 2004). The example is given below, shown by a quick jump in move and step in one subheading.

> 61:...The functional groups of the samples were identified using a Thermo Scientific Nicolet 6700 infrared spectrometer (ATR mode, 4 cm−1 resolution, 50 scans). 73: The hydrophilic behavior of membranes was studied using the water contact angle measurement. 62: Typically, a water droplet (4 μL) was carefully placed on a clean and dry membrane surface with the help of a micro-syringe. The side view image of the water droplet was captured, and the droplet contact angle against membrane surface was measured using the ImageJ software. 61: The mechanical properties of composite membranes (tensile strength, strain and elasticity) were investigated with a Shimadzu EZLX-500 M instrument following ASTM D882 standard...(C2)

Findings & Discussion

Table 5: The salience of moves and steps in the findings section

Move/Step	Education (N=4)	Chemistry (N=4)
Move 8: Reporting results	Salience	Salience
81 Restating methodology	75%	100%
82 Restating research questions	0	0
83 Stating background information	25%	75%
84 Stating general findings	100%	50%
85 Stating specific findings	100%	100%
Move 9: Commenting on results	Salience	Salience
91 Interpreting results	100%	100%
92 Comparing & contrasting results with previous studies	25%	75%
93 Evaluating results (or research)	50%	75%

As table 5 shows, there is no difference in the salience of moves in how the two authors rhetorically organize the results section. The way they organize this section is similar, with the recycling of moves 8 and 9, though this is more commonly done by the chemistry author.

The difference can be explained by how results & discussion are presented. The chemistry author combined results & discussion into one heading, separated by several sub-headings for key results. This confirms Stoller & Robinson's (2013) observation that chemistry journal articles use the combined results & discussion headings more often. The education author, on the author hand, uses separate results & discussion headings. The difference seems to be caused more by the difference in methods or journal preferences instead of disciplinary convention, as there are articles from the soft sciences that use combined results & discussion sections (Pho, 2008).

There seem to be fewer statements of general findings in the chemistry research articles compared to the education authors' articles which reflects the necessity of commenting on results instead of restating them. However, commenting on results is also common in education research articles even though the discussion section is put in a separate section. This is in line with the ideas presented in Swales (2004 pp. 224-226), that findings are sometimes accompanied by comments instead of just "speaking for themselves". Some of the step labels are renamed, with move 81 being "restating methodology" instead of "restating data analysis" since overall methods and procedures are often mentioned instead of merely being data analysis. The example is shown below.

> 81: The activity continued **with reflection through questions and statements directed to participants via Google Forms. These statements and questions also served as survey tools to collect** post-activity information in this study. (E2)
>
> 81: The mechanical properties of the composite membranes **were investigated by tensile experiments**. (C1)

Furthermore, a new step "stating background information" was added which also existed in earlier studies, sometimes as a move or step (Amnuai & Wannaruk, 2013; Kanoksilapatham, 2003; Pho, 2008). This step often gives contextualization or necessary information before starting a discussion, an example is shown below.

> 83: **According to the National Institute for Occupational Safety and Health**, the lowest oral toxic dose of BKC for a human is 266 mg kg1. (C1)

As stated earlier, there are similarities in the recycling of moves 8 and 9, which is more commonly done by the chemistry author. The pattern in the step level is 81-85-91 or 92. In the education research article, this occurred more in the discussion section as shown in table 6, with recycling of steps 2 and 3 or 5, in line with Amnuai & Wannaruk (2013). The findings in the education research article are more often discussed and presented with 81-84 or 81-85 and 81-85-84, with the general findings functioning to restate the findings in a more general way. The appearance of the pattern is dominant and recurrent, which could be explained by the authors' expertise and experience in writing. This is in contrast with Suherdi et al.'s (2020) findings of how undergraduate students rhetorically organize the findings and discussion section. The students in their study often use randomized patterns in their writing (Suherdi et al., 2020). However, one noteworthy finding is that move 8 step 1 does not exist in all the education research articles. This is because, in one article, some part of the methods section is mentioned in the findings section, hence it is grouped under move 7 instead. In education research articles, this is sometimes done by authors from that field (Zhang & Wannaruk, 2016).

Conclusion

Table 6: The salience and Occurrence of moves and steps in the conclusion section

Move/Step	Education (N=4)	Chemistry (N=4)
Move 10: Highlighting overall results and their significance	Salience	Salience
101 Stating the main results and significance.	100%	100%
Move b: Explaining specific research outcomes	Salience	Salience
b1 Giving background information	0	25%
b2 Stating a specific outcome	100%	0
b3 Interpreting the outcome	100%	0
b4 Indicating significance of the outcome	0	0
b5 Comparing and contrasting present and previous outcomes.	100%	0
b6 Indicating limitations of outcomes.	25%	0
Move c: Stating research conclusions	Salience	Salience
c1 Indicating research implications	25%	75%
c2 Promoting further research	50%	25%

Table 6 shows the moves and steps that the authors used in the discussion-conclusion section. Despite the differences in the integration of discussion into findings as the salience and occurrence in move b shows, the authors always use move 10 to conclude their articles. However, how the author uses move 10 differs. The education author, despite mentioning research questions in his articles, does not restate them in the findings as shown in table 6. This is because he highlights his overall results by restating research questions in the conclusion section. The example is shown below

> 101: ...**Do prospective elementary school teachers know the importance of song notation reading comprehension and skill? The survey results showed that** they knew that song notation can make it easier for teachers to learn and teach songs, but that knowledge was not balanced with efforts to improve their song notation reading skill...(E2)

Hence, the education author uses the conclusion section as a way to explicitly show that all the research questions posited in the introduction have been answered. The chemistry author, on the other hand, does not restate any research question since there are not any explicit research questions mentioned.

Table 6 also shows the difference between the authors in using move c. The chemistry author seems to use move c step 1 more often, which could indicate an appeal to real-world benefit which hard-science authors often use (Hyland, 2004). This is also confirmed by Stoller & Robinson (2013), who suggests that overall implication is part of the concluding step in chemistry research articles. Zamani & Ebadi's (2016) findings also confirm this where civil engineering research articles state their research implications more compared to applied linguistics research articles, which highlight disciplinary convention. The education author, on the other hand, uses move c step 2 more often. This shows a possible disciplinary convention in soft science, where they would be more likely to recommend future research compared to hard science (Pho, 2008; Zamani & Ebadi, 2016).

4. Conclusion

This study investigates how two Indonesian authors from chemistry and education rhetorically organize their Scopus-indexed articles as well as possible differences in their

organization of research articles. The findings revealed that the way the authors rhetorically organize their articles is in line with previous studies on research article structures as shown by the move and step patterns. This may show that their writing is in accordance with the journal reviewer's expectation, which could also explain the fact that their articles have been published in Scopus-indexed journals. Furthermore, there are notable differences between the authors' articles, particularly in the methods section. Most of the time these differences could be traced to the disciplinary conventions of soft and hard science. This provides a case for the necessity of awareness of disciplinary conventions in writing research articles for international publication, as it could also manifest in the research articles' rhetorical organization. These differences also lead to some modifications to the framework used in this study. The findings from this study can be used as a source to develop pedagogical materials for English academic writing programs and courses, possibly as a guideline for international publication. The modified framework that this study provided can also be used for writing tasks that involve analyzing research articles to raise awareness about the role of disciplinary conventions and their manifestation in rhetorical moves and steps of research articles.

Due to the small amount of data in the corpus, this study has only presented a case instead of a generalized account of how authors of Scopus-indexed articles rhetorically organize their articles in terms of moves and steps. Future research with higher amounts of data is suggested to overcome the limitations of this study's findings. Other than including higher amounts of data in the corpus, this could also be done by including more disciplines for the soft sciences and the hard sciences. More insight into the disciplinary convention in writing research articles and a more generalized account of how Scopus-indexed articles are written could be gained using higher and more comprehensive data.

References

Amnuai, W. (2019). Analyses of rhetorical moves and linguistic realizations in accounting research article abstracts published in international and Thai-based journals. *Sage Open*, 1-9. https://doi.org/10.1177/2158244018822384

Amnuai, W., & Wannaruk, A. (2013) Investigating move structure of English applied linguistics research article discussions published in international and Thai journals. *English Language Teaching, 6*(2), 1-13. http://dx.doi.org/10.5539/elt.v6n2p1

Antoniou, M., & Moriarty, J. (2008). What can academic writers learn from creative writers? Developing guidance and support for lecturers in Higher Education. *Teaching in Higher Education*, *13*(2), 157-167. http://dx.doi.org/10.1080/13562510801923229

Azizi, M., Abdi, J., & Gholami, J. (2022). Exploration of value arguments in applied linguistics research articles. *Journal of English for Academic Purposes*, *59*, 101161. https://doi.org/10.1016/j.jeap.2022.101161

Bardi, M. (2015). Learning the practice of scholarly publication in English: A Romanian perspective. *English for Specific Purposes, 37*, 98-111. http://dx.doi.org/10.1016/j.esp.2014.08.002

Blazer, S., & DeCapua, S. E. (2020). Disciplinary corpus research for situated literacy instruction. In M. Brooks-Gillies, E. G. Garcia, S. H. Kim, K. Manthey, T. G. Smith (Eds.), *Graduate writing across the disciplines: Identifying, teaching, and supporting* (pp. 315-335). University Press of Colorado.

Bocanegra-Valle, A. (2014). 'English is my default academic language': Voices from LSP scholars publishing in a multilingual journal. *Journal of English for Academic Purposes, 13*, 65-77. https://doi.org/10.1016/j.jeap.2013.10.010

Chang, C-F., & Kuo, C-H. (2011). A corpus-based approach to online materials development for writing research articles. English for Specific Purposes, 30, 222-234. http://dx.doi.org/10.1016/j.esp.2011.04.001

Coleman, J. A. (2014). How to get published in English: Advice from the outgoing Editor-in-Chief. *System, 42,* 404-411. http://dx.doi.org/10.1016/j.system.2014.01.004

Cotos, E., Huffman, S., & Link, S. (2017). A move/step model for methods sections: Demonstrating Rigour and Credibility. *English for Specific Purposes, 46*, 90-106. https://doi.org/10.1016/j.esp.2017.01.001

Curry, M.J., & Lillis, T.M. (2014). Strategies and tactics in academic knowledge production by multilingual scholars. *Education Policy Analysis Archives, 22*, 32. https://doi.org/10.14507/EPAA.V22N32.2014

Darabad, A. M. (2016). Move analysis of research article abstracts: A cross-disciplinary study. *International Journal of Linguistics, 8*(2), 125-140. https://doi.org/10.5296/ijl.v8i2.9379

Dong, J., & Lu, X. (2020). Promoting discipline-specific genre competence with corpus-based genre analysis activities. *English for Specific Purposes*, *58*, 138-154. https://doi.org/10.1016/j.esp.2020.01.005

Driscoll, L. D., Paszek, J., Gorzelsky, G., Hayes, C. L., & Jones, E. (2020). Genre knowledge and writing development: Results from the writing transfer project. *Written Communication, 37(*1), 69-103. https://doi.org/10.1177/0741088319882313

Fang, Z. (2021). *Demystifying academic writing: Genres*, *moves, skills, and strategies*. Routledge.

Farnia, M., & Barati, S. (2017). Writing introduction sections of research articles in applied linguistics: Cross-linguistic study of native and non-native writers. *Indonesian Journal of Applied Linguistics, 7*(2), 248-256. http://dx.doi.org/10.17509/ijal.v7i2.8357

Fazilatfar, A. M., & Naseri, Z. S. (2014). Rhetorical moves in applied linguistics articles and their corresponding Iranian writer identity. *Procedia, 98*, 489-498. https://doi.org/10.1016/J.SBSPRO.2014.03.444

Ferguson, G., Pérez-Llantada, C., & Plo, R. (2011). English as an international language of scientific publication: A study of attitudes. *World Englishes, 30*(1), 41-59. https://doi.org/10.1111/j.1467-971X.2010.01656.x

Flowerdew, J. (2015). Some thoughts on English for Research Publication Purposes (ERPP) and related issues. *Language Teaching, 48*(2), 250-262. https://doi.org/10.1017/S0261444812000523

Hashemi, M. R., & Moghaddam, I. G. (2019). A mixed methods genre analysis of the discussion section of MMR articles in applied linguistics*. Journal of Mixed Methods Research, 13*(2), 242-260. https://doi.org/10.1177/1558689816674626

Hyland, K. (2004). *Disciplinary discourses: Social interactions in academic writing*. The University of Michigan Press.

Hyland, K. (2015). Academic publishing: Issues and challenges in the construction of knowledge. Oxford University Press.

Hyland, K. (2016). Academic publishing and the myth of linguistic injustice. *Journal of Second Language Writing, 31*, 58-69. http://dx.doi.org/10.1016/j.jslw.2016.01.005

Kanoksilapatham, B. (2005). Rhetorical structure of biochemistry research articles. *English for Specific Purposes, 24*(3), 269-292. https://doi.org/10.1016/j.esp.2004.08.003

Kanoksilapatham, B. (2007). Introduction to move analysis. In D. Biber, U. Connor & T. A. Upton (Eds.), *Discourse on the move: Using corpus analysis to describe discourse structure* (pp. 23-41). John Benjamins Publishing Company.

Kaufhold, K., & McGrath, L. (2019). Revisiting the role of 'discipline' in writing for publication in two social sciences. *Journal of English for Academic Purposes*, *40*, 115-128. https://doi.org/10.1016/j.jeap.2019.06.006

Kaya, F., & Yağız, O. (2020). Move analysis of research article abstracts in the field of ELT: A comparative study. *Journal of Language and Linguistic Studies, 16(*1), 390-404. https://doi.org/10.17263/jlls.712854

Kim, E. (2014). An analysis of move patterns in abstracts of social sciences research articles. *Journal of Korean Library and Information Science Society*, *45*(2), 283-309. http://dx.doi.org/10.16981/kliss.45.2.201406.283

Kurniawan, E., Lubis, A. H., Suherdi, D., & Danuwijaya, A. A. (2019). Rhetorical organization of applied linguistics abstracts: Does Scopus journal quartile matter?. *GEMA Online Journal of Language Studies, 19*(4), 184-202. http://doi.org/10.17576/gema-2019-1904-10

Kwan, B. S. C. (2006). The schematic structure of literature reviews in doctoral theses of applied linguistics. *English for Specific Purposes, 25*, 30-55. https://doi.org/10.1016/j.esp.2005.06.001

La-o-vorakiat, A., & Singhasiri, W. (2021). Move analysis of chemical biology research article introductions. *LEARN Journal: Language Education and Acquisition Research Network, 14*(2), 313-341.

Lim, J. M. H. (2006). Method sections of management research articles: A pedagogically motivated qualitative study. *English for Specific Purposes, 25*(3), 282-309. https://doi.org/10.1016/j.esp.2005.07.001

Lubis, A. H., & Kurniawan, E. (2020). A review of genre analysis of research abstracts: Lessons learned and recommendations for future research directions, pedagogical practices, and policies. In D. S. Anshori, et al. (Eds.), *Language, Education, and Policy for the Changing Society: Contemporary Theory and Research* (pp. 595–625). Universitas Pendidikan Indonesia Press.

Luthfianda, S. N., Kurniawan, E., & Gunawan, W. (2021). Rhetorical structures of introductions in soft and hard science international journals written by Indonesian scholars. *JELTL (Journal of English Language Teaching and Linguistics*), *6*(2), 343-358. https://dx.doi.org/10.21462/jeltl.v6i2.563

Maswana, S., Kanamaru, T., & Tajino, A. (2015). Move analysis of research articles across five engineering fields: What they share and what they do not. *Ampersand 2*. 1-11. https://doi.org/10.1016/j.amper.2014.12.002

Musa, F. N., Khamis, N., & Zanariah, J. (2015). The structure of method section in engineering research articles. *Asian Social Science, 11*(17), 74-82. http://dx.doi.org/10.5539/ass.v11n17p74

Nwogu, K.N. (1997). The medical research paper: Structure and functions. *English for Specific Purposes, 16*(2), 119-138. https://doi.org/10.1016/S0889-4906(97)85388-4

Pho, P. D. (2008). How can learning about the structure of research articles help international students? In T. McGrath (Ed.), *Conference Proceedings of the 19th ISANA International*

Education Conference, 2-5 December 2008. https://isana.proceedings.com.au/docs/2008/paper_Dzung.pdf

Posteguillo, S. (1999). The schematic structure of computer science research articles. *English for Specific Purposes*, *18*(2), 139-160. https://doi.org/10.1016/S0889-4906(98)00001-5

Ramadhini, T. M., Wahyuni, I. T., Ramadhani, N. T., Kurniawan, E., Gunawan, W., & Muniroh, R. D. D. A. (2021). The rhetorical moves of abstracts written by the authors in the field of hard sciences. In Y. Wirza, I. L. Damayanti, W. Gunawan, E. D. A. Imperiani, A. A. Danuwijaya, L. Hakim (Eds.) *Thirteenth Conference on Applied Linguistics (CONAPLIN 2020)* (pp. 587-592). Atlantis Press. https://dx.doi.org/10.2991/assehr.k.210427.089

Rashidi, N., & Meihami, H. (2018). Informetrics of *Scientometrics* abstracts: A rhetorical move analysis of the research abstracts published in *Scientometrics* journal. *Scientometrics, 116*, 1975-1994. https://doi.org/10.1007/s11192-018-2795-6

Ren, H., & Li, Y. (2011). A comparison study on the rhetorical moves of abstracts in published research articles and master's Foreign- language theses. *English Language Teaching, 4*(1), 162-166. https://doi.org/10.5539/elt.v4n1p162

Salager-Meyer, F. (2014). Writing and publishing in periphery scholarly journals: How to enhance the global influence of multilingual scholars?. *Journal of English for Academic Purposes, 13*, 78-82. http://dx.doi.org/10.1016/j.jeap.2013.11.003

Samraj, B. (2002). Introductions in research articles: Variations across disciplines. *English for Specific Purposes, 21*(1), 1-17. https://doi.org/10.1016/S0889-4906(00)00023-5

Sawaki, T. (2023). High use of direct questions and relative absence of promotional intention in Japanese peer-reviewed research article introductions compared to their English counterparts. *English for Specific Purposes*, *69*, 19-32. https://doi.org/10.1016/j.esp.2022.09.002

Shi, H., & Wannaruk, A. (2014). Rhetorical structure of research articles in agricultural science. *English Language Teaching, 7*(8), 1-13. http://dx.doi.org/10.5539/elt.v7n8p1

Stoller, F. L., & Robinson, M. S. (2013). Chemistry journal articles: An interdisciplinary approach to move analysis with pedagogical aims. *English for Specific Purposes, 32*(1), 45-57. https://doi.org/10.1016/j.esp.2012.09.001

Suherdi, D., Kurniawan, E., & Lubis, A. H. (2020). A genre analysis of research article 'findings and discussion' sections written by Indonesian undergraduate EFL students. *Indonesian Journal of Applied Linguistics, 10*(1), 59-72. https://doi.org/10.17509/ijal.v10i1.24989

Swales, J. M. (1990). *Genre analysis: English in academic and research settings*. Cambridge University Press.

Swales, J. M. (2004). *Research genres: Explorations and applications*. Cambridge University Press.

Wahyuni, I. T., Gunawan, W., Muniroh, R. D. D. A., & Kurniawan, E. (2021). Rhetorical moves and genre development in soft science research article abstracts. *Indonesian EFL Journal*, *7*(2), 121-130. https://doi.org/10.25134/ieflj.v7i2.4565

Ye, Y. (2019). Macrostructures and rhetorical moves in energy engineering research articles written by Chinese expert writers. *Journal of English for Academic Purposes*, *38*, 48-61. https://doi.org/10.1016/j.jeap.2019.01.007

Yin, S., Gao, Y., & Lu, X. (2023). Diachronic changes in the syntactic complexity of emerging Chinese international publication writers' research article introductions: A rhetorical strategic perspective. *Journal of English for Academic Purposes*, *61*, 101205. https://doi.org/10.1016/j.jeap.2022.101205

Zamani, G., & Ebadi, S. (2016). Move analysis of the conclusion sections of research papers in Persian and English. *Cypriot Journal of Educational Science, 11*(1), 09-20. https://doi.org/10.18844/cjes.v11i1.344

Zekrati, S. (2015). A move analysis of discussion section of medical articles. *Taiwan International ESP Journal, 7*(1), 38-50.

Zhang, B., & Wannaruk, A. (2016). Rhetorical structure of education research article methods section. *PASAA: Journal of Language Teaching and Learning in Thailand, 51*, 155-184.

Appendix A. Move categorization

Code	Step	Move
	Abstract	
a1	Background of research	
a2	Purpose	
a3	Method	Abstract
a4	Results	
a5	Conclusion	
	Introduction	
11	Reference to established knowledge in the field	Presenting background information
12	Reference to main research problems	
21	Reference to previous research	
22	Reference to limitations of previous research	Reviewing related research
31	Reference to research purpose	
32	Reference to research questions/hypothesis	
33	Reference to main research procedure and outcome	Presenting new research conducted by the author(s)
34	Reference to the structure of the article	
	Method	
41	Identifying research design	Describing research design
51	Indicating source of data	
52	Indicating data size	
53	Indicating criteria for data collection	
54	Indicating data collection procedure	Identifying source of data and method adopted in collecting them
55	Justifying data collection procedure	
56	Providing background collection details of data	
57	Indicating compliance of data collection with ethical standard	
61	Identifying main research apparatus	
62	Recounting experimental process	Describing experimental procedures
63	Indicating criteria for success	
71	Defining terminologies	
72	Indicating process of data classification	
73	Identifying analytical instrument and procedure	Describing data analysis procedures
74	Indicating modification to instrument and procedure	
	Findings/Results	
81	Restating methodology	
82	Restating research questions	
83	Stating background information	Reporting results

84	Stating general findings	
85	Stating specific findings	
91	Interpreting results	
92	Comparing and contrasting results with previous studies	Commenting on results
93	Evaluating results (or research)	
	Discussion (Conclusion)	
101	Stating the main results and significance	Highlighting overall results and their significance
b1	Giving background information	
b2	Stating a specific outcome	
b3	Interpreting the outcome	
b4	Indicating significance of outcome	Explaining specific research outcomes
b5	Comparing and contrasting present and previous outcomes	
b6	Indicating limitations of outcomes	
c1	Indicating research implications	
c2	Promoting further research	Stating research conclusions