Ph.D. Students' Perceptions and Practices of Rhetorical Moves in Abstract Writing: A Case Study at the Faculty of Science, Ben M'Sik, Casablanca.

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ARTICLE INFO	ABSTRACT
Research Paper *Article history:* Received: 13/06/2025 Revised: 15/07/2025 Accepted: 18/10/2025	The ability to craft a well-organized abstract is a critical skill for graduate students entering the academic community, particularly within scientific research. This study explores the use of rhetorical moves of research article abstracts written by graduate students at the Faculty of Science Ben M'Sik, Casablanca, Morocco. Using pre- and post-lecture questionnaires focused on rhetorical moves in abstracts, this research analyzes the impact of targeted instruction on students' academic writing skills. In addition, a corpus of 36 students' written research articles is analyzed to gain deeper insights into their application of rhetorical moves. The findings indicate significant improvements in the students' ability to compose effective abstracts and employ appropriate rhetorical strategies in their full-length articles. However, the study concludes that certain cultural influences may hinder these students' adherence to scientific conventions.

INTRODUCTION

Research articles (RAs) are considered a vital genre across all academic communities. As Hyland (2000) explains, RAs serve two simultaneous purposes: disseminating new knowledge to members of their discourse community and persuading them to accept the claims presented.

The research article abstract has become increasingly significant in recent years as a key tool for knowledge dissemination, particularly in the era of information overload within academia. As Lorés (2004) points out, the abstract acts as a gateway, influencing readers within a specific discourse

community to engage with an article, select a particular journal, or guide seminar and conference coordinators in deciding whether to accept or reject submitted papers.

For academics, mastering the discourse conventions that define scientific writing is crucial. Widdowson (1979) introduced the concept of a universal scientific discourse, suggesting that it is acquired through education. However, since Kaplan's (1966) pioneering work on contrastive rhetoric, subsequent research has shown that the structure of academic texts is influenced by socio-cultural factors, leading to rhetorical differences across cultures. Contrastive rhetoric scholars argue that these variations stem from the unique expectations of different discourse communities. Furthermore, writers of second languages may initially rely on rhetorical and textual strategies from their first language, transferring these to their second language writing before fully adapting to the norms and expectations of their new academic audience (Connor, 1996).

This study aims to explore the rhetorical structure of research article abstracts written by PhD students from the Faculty of Science across various hard sciences. Additionally, it seeks to investigate whether socio-cultural factors influence the use of rhetorical moves in these research articles. It aims to address the following questions:

1. How do Moroccan PhD students in the Faculty of Science structure their research article abstracts in terms of rhetorical moves?
2. How do disciplinary differences influence the distribution of rhetorical moves in research abstracts?
3. What socio-cultural factors contribute to variations in the use of rhetorical moves by Moroccan PhD students?

2.LITERATURE REVIEW

The following sections provide a concise overview of genre analysis, focusing on the research article as a genre and the research article abstract as a component of that genre. After this introduction, the prominent models for rhetorical analysis of research article abstracts are introduced. Key scholars such as Swales (1981), Bhatia (1994), and Hyland (2000), who have significantly contributed to the study of research article abstracts, are discussed in detail. Finally, a review of studies related to the analysis of research article abstracts is presented.

2.1. Genre Analysis

With the growing interest in writing in English for various purposes and across diverse contexts among ESL learners, greater attention has been directed toward genre studies (Connor, 1996). Genre analysis takes into account the broader context by examining not only how texts are constructed but also how they are interpreted, utilized, and applied within specific institutional or professional settings to achieve particular disciplinary goals (Bhatia, 2004). According to Hyon (1996), three distinct approaches influence genre analysis: New Rhetoric (NR), Systemic Functional Linguistics (SFL), and English for Specific Purposes (ESP).

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The notion of genre is often regarded as "fuzzy" (Swales, 1990, p. 33) because it can be understood in various ways (Cope & Kalantzis, 1993; Hyon, 1996). For instance, within a systemic functional framework, Martin et al. (1987, p. 59) defined genre as "a staged, goal-oriented social process," whereas from a New Rhetoric perspective, Miller (1984) described genre as a form of social action. In the field of English for Specific Purposes, Swales' (1990) definition, developed for pedagogical applications, is

both widely recognized (Connor, 1996, p. 126) and "highly influential" (Paltridge, 2013, p. 347). Since this research operates within the ESP framework, Swales' (1990) definition serves as its basis. Swales defines genre as:

A class of communicative events, the members of which share some set of communicative purposes. These purposes are recognized by the expert members of the parent discourse community and thereby constitute the rationale for the genre. This rationale shapes the schematic structure of the discourse and influences and constrains choice of content and style. (Swales, 1990, p. 58)

Swales emphasizes the communicative purpose of a text, considering it a critical factor in identifying genres. Another key element in his definition is the concept of a discourse community, described as "socio-rhetorical networks that form to work towards sets of common goals" (Swales, 1990, p. 9). Thus, writing styles differ based on the communicative purposes and the discourse communities to which authors belong. It is important to note that communicative purposes can evolve, expand, or diminish over time (Swales, 2004).

Genre analysis can be conducted using both qualitative and quantitative methods. Researchers may focus on individuals' actions while producing specific texts or analyzing patterns by examining the distribution of features across genres (Hyland, 2009a). The former emphasizes individual writers' decisions, whereas the latter concentrates on collective rhetorical choices rather than specific instances. The next section delves into the three main approaches to genre analysis.

Overall, genre analysis helps us understand how language is used in a particular context. It is a major approach to analyzing texts.

2.2 Research Article Abstracts

As Yearley (1981) pointed out, the research article is one of the most prominent genres in academic writing, extensively studied and yielding numerous pedagogical insights. In earlier studies, the terms "genre" and "register" were often used interchangeably; however, Crookes (1986) clarified the distinction by categorizing it specifically as a genre.

An abstract serves as a concise summary of a research article, typically placed at the beginning of an academic paper. Its primary function is to assist researchers and readers in deciding whether to engage with the full text. According to the American National Standards Institute, an abstract is "an abbreviated, accurate representation of the contents of a document, preferably prepared by its author(s) for publication with it" (Lorés, 2004, p. 281).

The research article abstract has garnered significant attention in recent years, driven by the rapid increase in the exchange of information. This focus highlights the pivotal role abstracts play in the modern research landscape, where millions of research articles are published annually.

3. Theoretical Framework:

The analysis of rhetorical structures in academic writing has been significantly influenced by Swales foundational work. Swales (1981) pioneered the study of research articles, particularly in move analysis. He initially introduced a four-move model for research article introductions, comprising the following components:

- Move 1: Creating the field.

- Move 2: Reporting previous research studies.

- Move 3: Preparing for current research.

- Move 4: Presenting ongoing research.

A decade later, Swales (1990) refined this model into the "Create a Research Space (CARS)" framework, which restructured the introduction into three moves: Establishing a Territory, Establishing a Niche, and Occupying the Niche (Paltridge & Starfield, 2013, p. 287). These moves are further subdivided into specific steps as outlined in Table 1.

Table1: CARS model

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

(Adapted from Basturkmen, 2006, p. 57)

The CARS model has been widely adopted as a framework in later studies to analyze the structure of research article introductions and abstracts (e.g., Bhatia, 1997; Samraj, 2002, 2005). Each rhetorical move in this model is further divided into specific steps, providing a comprehensive guideline for structuring introductions in academic writing. However, this study adopts an alternative framework proposed by Swales (2004) and Pho (2013) to analyze the corpus under study, tailored to examine abstracts written by doctoral students in scientific disciplines at the Faculty of Science. This framework is particularly suitable as it offers a comprehensive and detailed approach to rhetorical move analysis. It is insightful and emphasizes every essential move necessary for constructing a well-organized abstract. The framework comprises the following coding scheme:

- Move 1: Situating the research (STR)

- Move 2: Presenting the research (PTR)

- Move 3: Describing the methodology (DTM)

- Move 4: Summarizing the findings (STF)

- Move 5: Discussing the research (DTR)

This framework enables a systematic analysis of abstracts by focusing on the key communicative purposes of each section, thus providing valuable insights into how doctoral students structure and present their research.

3.1 A Comparative Analysis of Swales' and Pho's Rhetorical Frameworks in Academic Writing Research

Previous research has extensively applied Swales' (2004) and Pho's (2013) frameworks to analyze rhetorical structures in academic writing, revealing their pedagogical utility in identifying gaps in novice

and expert discourse. Pho (2013) used his five-move framework to compare abstracts in applied linguistics and educational technology, noting disciplinary variations, particularly in the omission of discussion elements (Moves 1 and 5) in science-oriented abstracts. Similarly, Zand-Moghadam and Meihami (2016) applied Pho's model to 40 abstracts by Iranian postgraduate students in science and engineering, finding frequent use of Moves 3 and 4 but underuse of Moves 1 and 5, indicating limited rhetorical awareness. Ahmed (2015) combined Swales' and Pho's frameworks to analyze abstracts by native and non-native English speakers, highlighting non-native graduate students' struggles with Move 2 (Presenting the Research), which reduced abstract clarity. Fahim and Pishghadam (2007) used Swales' model to compare research article introductions by novice Iranian researchers and experts, noting novices' frequent omission of Moves 2 and 3 (Establishing and Occupying the Niche), underscoring deficiencies in contextualizing research. In contrast, alternative frameworks like Hyland's (2000) five-move IPMPC model, while effective in applied linguistics, lack the granularity of Swales' and Pho's frameworks for distinguishing communicative functions like situating research or separating findings from implications. Similarly, Bhatia's (1993) genre analysis, suited for promotional or legal genres, is less effective for the micro-level functional analysis required in scientific abstracts.

3.2 Rationale for Framework Selection

The choice of this framework is grounded in several key considerations:

- Relevance to Scientific Research Writing: Swales (2004) and Pho (2013) developed their frameworks specifically to examine academic writing, particularly abstracts. The detailed focus on rhetorical moves aligns well with the structure of scientific abstracts.

- Emphasis on Clarity and Organization: The five moves address all fundamental aspects of an abstract, ensuring clarity and coherence in presenting research objectives, methods, findings, and implications.

- Applicability to Novice Writers: The corpus consists of abstracts written by doctoral students who are likely developing their academic writing skills. This framework helps identify their strengths and weaknesses in abstract construction.

- Insightful Analysis of Communicative Goals: Each move represents a specific communicative goal, such as situating the research (Move 1) or discussing the findings (Move 5), which is crucial for evaluating how effectively these abstracts convey the intended messages.

- Adaptability Across Disciplines: The framework is versatile and can be applied to abstracts from various scientific disciplines, making it suitable for analyzing a diverse corpus.

4. Data Collection and Method

4.1. Participants

The study included approximately 36 first-year doctoral students enrolled in various hard sciences within the Faculty of Ben M'sik, Casablanca. However, only 30 of these participants completed and submitted the questionnaire both before and after the lecture conducted by the Instructor of English on June 12 and 13. These students were not specifically selected for the study but were chosen because they naturally represented a diverse cross-section of the academic community within the faculty.

The lecture was delivered by an experienced English lecturer with nearly a decade of expertise in teaching English for Specific Purposes (ESP) at the Faculty of Science. This extensive experience underscores the lecturer's ability to cater to the specialized language needs of students across various scientific fields.

4.2. Instrument

The primary instrument for data collection in this research was a closed-ended questionnaire consisting of some background questions to assess the lecture's impact. This format was selected to align with the exploratory nature of the study, as it is particularly effective for gathering structured data from a relatively large sample. The closed-ended questions enabled the efficient collection of quantitative data, allowing for straightforward analysis and interpretation. This approach facilitated the identification of trends and patterns, providing preliminary insights into the research topic.

The researcher also analyzed research article abstracts from various disciplines within the hard sciences, specifically Biology, Math, Physics, Chemistry, and Geology. All the abstracts were authored by PhD students from the Faculty of Science Ben M'Sik, Casablanca, and were retrieved from the IMIST e-resources database. The selection criteria focused on abstracts written by Moroccan novice researchers between 2022 and 2024, ensuring a representative sample of recent academic writing in these fields.

4.3. The Selection of the Corpus

To gain a better understanding, the corpus of this study comprises 50 research article abstracts from hard science disciplines, specifically Biology, Math, Physics, Chemistry, and Geology, all written by students from the same faculty with supervision. These abstracts were retrieved from the IMIST e-resource platform through academic institutional access, which facilitates the downloading of abstracts. The selection criteria for the corpus include abstracts written by Moroccan novice researchers between 2022 and 2024.

4.4. Description of Data Collection

The table below summarizes the number of research article abstracts analyzed in this study categorized by discipline. It highlights the distribution of abstracts across various fields, ensuring a balanced representation for the analysis.

Table 2: Distribution of Abstracts Across Disciplines

Discipline	Number of Abstracts (N=10)
Biology	10
Physics	10
Math	10
Geology	10
Chemistry	10

3.5. Textual Analysis of Articles

The following coding scheme, based on Swales' (2004) and Pho's (2013) frameworks, will be used to analyze the rhetorical structure of research article abstracts. This scheme systematically categorizes the abstracts into five key rhetorical moves, as outlined below:

Table 3

Move	Function/Description	Examples from the Corpus
Move 1: Situating the research (STR)	Setting the scene for the current research (topic generalization).	The relationships between biodiversity conservation and ecosystem services are widely debated.
Move 2: Presenting the research (PTR)	Stating the purpose of the study, research questions, and/or hypotheses.	This study aimed to 1) identify different characteristics of Kew Mae Pan and Pha Mon Nature Trail, 2) investigate the problems of tourism management, and 3) propose the guidelines for managing sustainable tourism in Kew Mae Pan and Pha Mon Nature Trail.
Move 3: Describing the methodology (DTM)	Describing the materials, subjects, variables, procedures, etc.	This research is quantitatively and qualitatively conducted. The representative samples are eight key informants from the agency relevant to ancient remains and 400 respondents who are people in the area of ancient remains.
Move 4: Summarizing the findings (STF)	Reporting the main findings of the study.	Findings also revealed conditions for success in developing creative tourism in a community-based tourism context.
Move 5: Discussing the research (DTR)	Interpreting the results/findings and/or giving recommendations, implications, or applications of the study.	The findings from the current study suggest that perceptions of touristic attractions/activities are different by country although some similarities do exist.

This coding scheme will serve as the foundation for analyzing the rhetorical structures present in the abstracts under study, providing a comprehensive understanding of their organization and linguistic features.

4.5. Analysis of Students' Responses to the Questionnaire

The questionnaire included two types of questions: background questions and questions specifically related to academic writing, particularly focusing on the abstract. The participants were from various scientific departments, and the first question aimed to determine whether they had published any research. Only 8.3% of the participants had published work, which can be attributed to the fact that they are first-year doctoral students who are just beginning their academic journeys. This distribution is illustrated in the accompanying graph.

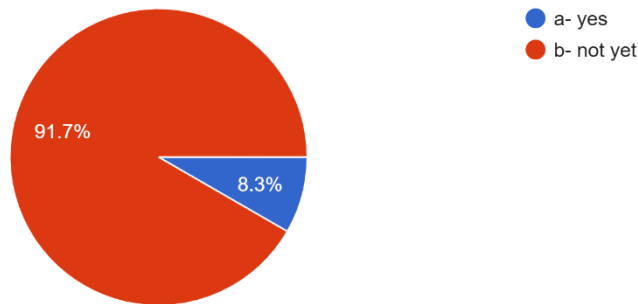**Publication**

36 responses

Figure 1. Participants' Research Publication Status

Another key question posed to participants was: "Do you know what a rhetorical move in academic writing is?" Prior to the lecture, 91.7% admitted to being unfamiliar with the concept, which is unsurprising given their lack of formal instruction in academic writing. Meanwhile, only 8.3% reported some familiarity but acknowledged the need for further practice to enhance their academic writing skills.

Do you know what a rhetorical move in academic writing is?
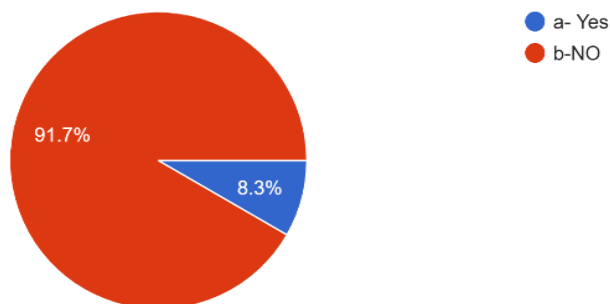
36 responses

Figure 2. Participants' Awareness of Rhetorical Moves in Academic Writing

Another key question in the study was: *"Do you know the components of an abstract?"* Prior to the lecture, **61.1%** of participants admitted that they were unfamiliar with the structural components of an abstract. However, after the lecture and engagement in practical exercises, this number significantly decreased, with **95.8%** of participants demonstrating familiarity with abstract components.

Furthermore, some participants acknowledged the existence of disciplinary variations in abstract structure, particularly among research articles in the hard sciences. This recognition highlights an increased awareness not only of the general conventions of abstract writing but also of the nuanced differences that exist across scientific disciplines. These findings underscore the effectiveness of targeted instruction in enhancing students' understanding of academic writing conventions.

Before the lecture	After the lecture

Do you know the main components of an abstract?
36 responses

Do you know the main components of an abstract?
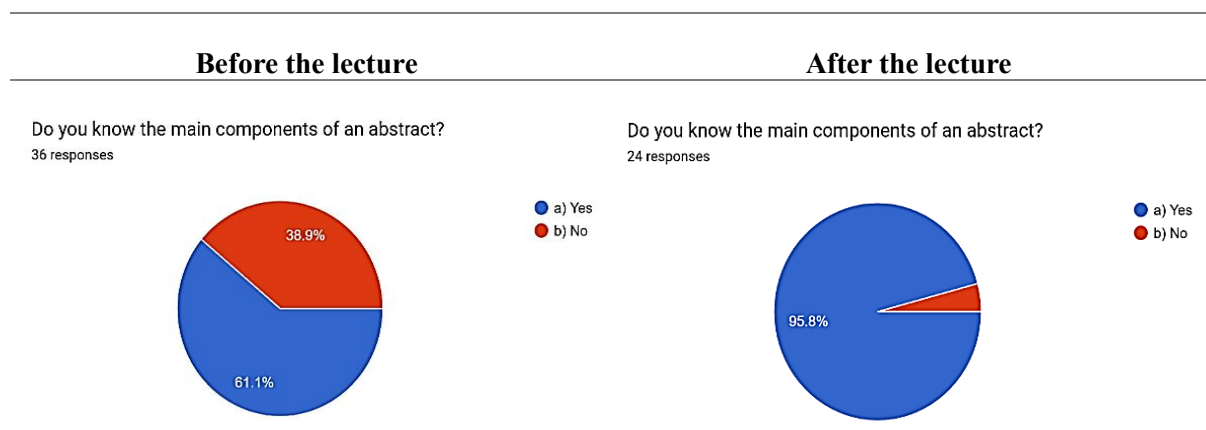24 responses

Figure 3. Participants' Familiarity with Abstract Components Before and After the Lecture

After the lecture, there was a noticeable shift in perspective. A significant 87% of participants recognized academic articles as being of paramount importance in engaging with the scientific community. This change highlights the lecture's impact in raising awareness about the crucial role that academic writing, particularly articles, plays in contributing to and establishing credibility within the scientific discourse. The shift demonstrates a growing understanding among participants that publishing research articles is not only a way to disseminate findings but also a critical avenue for academic dialogue and recognition.

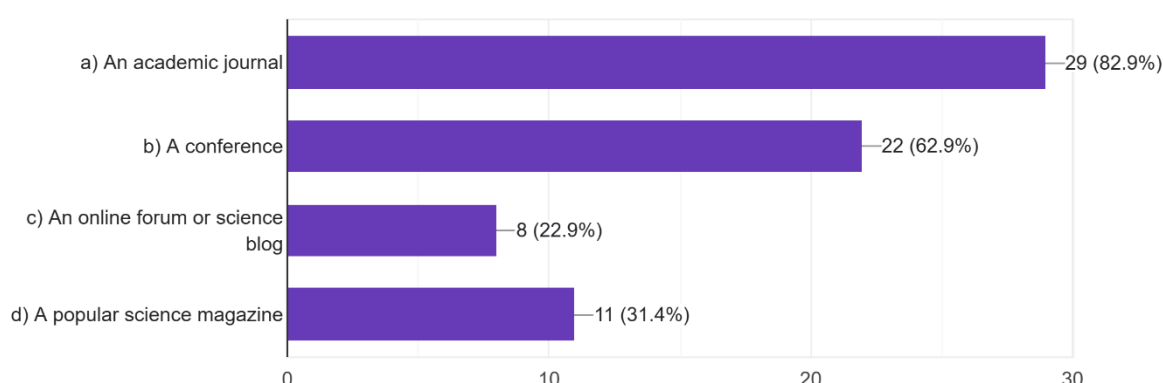2-: What do you need to promote yourself as a researcher?
35 responses

Figure 4. Strategies for Promoting Oneself as a Researcher

The findings of this study reveal a significant improvement in participants' understanding of academic writing conventions, particularly regarding the structure and components of research article abstracts. Prior to the lecture, **61.1%** of participants admitted to being unfamiliar with the components of an abstract. However, after engaging in practical exercises, this percentage dropped considerably, with **95.8%** of participants demonstrating familiarity with abstract structure. This shift underscores the effectiveness of targeted instruction in bridging knowledge gaps in academic writing.

Overall, these findings underscore the **impact of structured academic writing instruction** in improving students' comprehension of research article conventions. By integrating practical exercises

and targeted discussions, students not only gained technical knowledge of abstract writing but also developed a broader understanding of the role of research dissemination in the scientific community.

5. Results and Discussion

5.1. Rhetorical Move Distribution

As mentioned in methodology, Swales' (2004) and Pho's (2013) frameworks were used as a preliminary framework for the present study. Details of the reasons why these frameworks were chosen are mentioned above. In relation to the Abstract, the abstract of articles were analyzed according to Pho's (2013) framework, as shown in Table 2.

Table 4: **Distribution of Moves in the Abstract**

Moves	Number of texts containing move (%)	Biology (N=10)	Physics (N=10)	Math (N=10)	Geology (N=10)	Chemistry (N=10)
Move 1: Situating the research (STR)	36 (72%)	5	7	8	9	6
Move 2: Presenting the research (PTR)	30 (60%)	7	8	4	7	4
Move 3: Describing the methodology (DTM)	50 (100%)	10	10	10	10	10
Move 4: Summarizing the findings (STF)	49 (98%)	9	10	10	10	10
Move 5: Discussing the research (DTR)	43 (66%)	10	8	10	8	7

The table presents the distribution of rhetorical moves in the abstracts of scientific research articles across various disciplines: Biology, Physics, Math, Geology, and Chemistry. The moves analyzed follow Pho's (2013) framework and are categorized as follows:

Move 1: Situating the Research (STR)
This move appears in 72% of the texts overall, with varying frequencies across disciplines. The highest occurrence is in Geology (90%), followed by Math (80%). Physics and Chemistry show lower usage (70% and 60%, respectively), while Biology has the lowest at 60%.

Move 2: Presenting the Research (PTR)
This move is present in 60% of the texts overall, with Physics and Math showing the highest frequencies (80% and 70%, respectively). Biology and Geology appear to use this move less frequently, at 60%, while Chemistry has the lowest frequency at 40%.

Move 3: Describing the Methodology (DTM)
All disciplines (100%) include this move, indicating that describing methodology is a crucial component of the abstracts across all fields.

Move 4: Summarizing the Findings (STF)

Similar to Move 3, this move is also present in nearly all the texts (98%), with Geology and Chemistry (100%) showing full inclusion. The frequency remains high across all disciplines, underscoring the importance of summarizing research findings in academic abstracts.

Move 5: Discussing the Research (DTR)

This move is included in 66% of the texts, with Biology and Math showing the highest occurrences (100% and 90%, respectively). The move is less frequent in Physics, Geology, and Chemistry, with the latter having the lowest presence (70%).

Overall, the table reveals a strong emphasis on Moves 3 and 4 (Describing the Methodology and Summarizing the Findings), which are universally present in all disciplines. In contrast, Moves 1 and 2 (Situating and Presenting the Research) show more variation, particularly in disciplines like Chemistry and Biology. Move 5 (Discussing the Research) has a moderate but notable presence, especially in Biology and Math. This analysis highlights the disciplinary differences in abstract composition, with certain moves being more integral to specific fields.

The analysis of rhetorical move distribution in abstracts reveals notable disciplinary variations, which can be attributed to both the epistemological nature of the disciplines and the socio-cultural factors shaping academic writing practices.

4.2. Disciplinary Differences in Move Usage

The prominence of **Move 3 (Describing the Methodology, 100%)** and **Move 4 (Summarizing the Findings, 98%)** across all disciplines suggests that research abstracts in the hard sciences prioritize procedural clarity and empirical results. These moves are essential for scientific communication, where objectivity and reproducibility are fundamental. The universal presence of Move 3 aligns with the expectation that research methodology is expected to be explicitly detailed, allowing for validation and replication of findings. Similarly, the near-universal use of Move 4 highlights the necessity of succinctly reporting research outcomes, which is a central function of abstracts in scientific discourse.

Conversely, **Moves 1 (Situating the Research, 72%) and 2 (Presenting the Research, 60%)** exhibit more variability. These moves involve broader contextualization and problem justification, which may not always be considered essential in hard sciences, where research abstracts tend to be more concise and results-driven. The lower occurrence of Move 2 in Chemistry (40%) and Move 1 in Biology (60%) may reflect a disciplinary preference for focusing on methods and results over extensive background information. This is consistent with Hyland's (2004) findings that disciplines differ in their epistemological approaches to knowledge construction. While some emphasize cumulative empirical data, others value theoretical positioning and framing. Therefore, the inclusion of contextualizing moves can vary depending on whether a field adheres to a positivist or interpretivist orientation.

Move 5 (Discussing the Research, 66%) appears more frequently in Biology (100%) and Math (90%), suggesting that these disciplines engage more in interpreting and reflecting on findings within the abstract itself. This could be linked to the nature of scientific argumentation in these fields, where theoretical implications and broader applications are often discussed even at the abstract level. In contrast, the lower occurrence of Move 5 in Chemistry (70%) and Geology (80%) might indicate a preference for presenting results without extensive interpretation, leaving such discussions for the full article. These patterns are further supported by research on disciplinary discourse (Becher & Trowler, 2001), which shows that fields with higher levels theoretical abstraction, such as Mathematics, are more likely to include moves that discuss implications or generalizations.

4.3. Sociocultural Influences on Rhetorical Structure

Beyond disciplinary conventions, the observed variations may also stem from **sociocultural factors** influencing Moroccan PhD students' academic writing practices. Contrastive rhetoric research (Kaplan, 1966; Connor, 1996) suggests that rhetorical structures are shaped by the educational and linguistic backgrounds of writers. Moroccan students, particularly those writing in English as a foreign language, may exhibit different rhetorical patterns compared to native English-speaking authors.

A key factor shaping the use of rhetorical moves is **students' prior academic training**. In Morocco, undergraduate and master's programs in hard sciences often focus more on technical content than on explicit instruction in academic writing. Many students receive limited training in structuring research articles according to international conventions, which could explain inconsistencies in the realization of these moves. For instance, the relatively lower use of Move 2 (Presenting the Research) might suggest that students are less accustomed to explicitly stating research objectives in a structured manner, possibly due to the influence of writing practices in French or Arabic, where purpose statements may be embedded within other sections rather than explicitly marked.

Moreover, Moroccan academic writing culture tends to emphasize **data presentation over argumentation**. This could account for the strong emphasis on Moves 3 and 4 (Methodology and Findings) and the comparatively lower occurrence of Move 5 (Discussing the Research). In many cases, novice researchers may view discussion as implicit within the findings or as part of a broader interpretation in the main article, rather than an essential component of the abstract itself.

This interpretation aligns with Alharbi and Swales (2011) who observed that Arabic-speaking EFL writers tend to underuse explicit rhetorical moves. ,This tendency is often attributed to cultural preferences that favor implicitness and indirectness in academic dscourse. Rakrak (2020) further explains that Moroccan writing instruction has been shaped by product-oriented instructional approaches that prioritize grammatical accuracy and structural form over critical rhetorical engagement. In addition, Zakhir and O'Brien (2016), in their analysis of Moroccan language education policy, highlight the lingering influence French neo-colonial traditions, particularly in scientific disciplines, where writing conventions remain to be structured and impersonal, and heavily informed by established French academic norms.

5.4. The Role of Academic Writing Instruction

The findings also highlight the need for more systematic academic writing instruction in Moroccan universities, particularly at the master's and PhD levels. While science students may develop research writing skills informally through exposure to journal articles, **formal training in genre conventions**— such as move-based abstract writing—remains limited. This lack of formal instruction may explain why certain moves, especially Move 2 (Presenting the Research), are underutilized.

Introducing structured academic writing courses that focus on **rhetorical awareness, genre analysis, and disciplinary conventions** could help students produce more internationally competitive research articles. Furthermore, providing targeted feedback on move usage in research abstracts could enhance students' ability to structure their writing more effectively.

6. Limitations and Implications of the Study

6.1. Limitations

This study provides valuable insights into the rhetorical structures of abstracts by Moroccan PhD students in the Sciences; however, several limitations must be acknowledged. First, the corpus consists of 50 abstracts, which may not fully capture the diversity of rhetorical structures used by all Moroccan PhD students in the Sciences. Expanding the dataset to include cross-institutional, cross-sectional, and multi-year samples could enhance the generalizability of the findings. Second, while the study includes

multiple hard sciences disciplines—Biology, Physics, Chemistry, Geology, and Mathematics—it does not account for potential variations within subfields. Future research could explore whether sub-disciplinary differences influence rhetorical move structures. Third, this study focuses exclusively on abstracts written by non-native Moroccan PhD students, without comparison to abstracts produced by native English-speaking researchers. This limits the ability to determine the extent to which L1 rhetorical transfer or socio-cultural influences shape the writing patterns of Moroccan students. Fourth, the study does not systematically track students' prior exposure to academic writing instruction. Differences in the training received during their Bachelor's and Master's, and Master's programs could impact their abstract writing, but these variations were not explicitly analyzed. Fifth, the lecture intervention employed in this study was limited in scope, consisting of a short period of lecturing without extended workshops or group work interventions. This brief duration may have restricted the students' ability to fully internalize and apply the rhetorical strategies taught, potentially limiting the effectiveness of the intervention. Future studies could incorporate longer-term workshops or collaborative group work to assess their impact on rhetorical move development. Finally, while the qualitative nature of move analysis offers valuable insights, it does not quantitatively assess the effectiveness of different rhetorical moves in terms of readability, clarity, or publication success. Future studies could incorporate reader-response analysis or machine-learning-based textual analysis to provide additional perspectives.

6.2. Implications

6.2.1. Pedagogical Implications

The findings of this study underscore the need for explicit academic writing instruction within Moroccan universities, particularly in the structuring of research article abstracts. Many students appear to struggle with effectively deploying specific rhetorical moves, suggesting a gap in formal training. To address this issue, Master's and PhD programs should integrate genre-based writing instruction that explicitly teaches students how to construct abstracts using disciplinary conventions.

Furthermore, the disciplinary variation in move usage suggests that a one-size-fits-all approach to academic writing instruction may be inadequate. Therefore, discipline-specific writing courses should be developed to meet the unique rhetorical expectations of different scientific fields.

6.2.2. Socio-Cultural Considerations

The results of this study suggest that Moroccan PhD students' abstract writing may be influenced by first-language rhetorical structures, leading to deviations from internationally recognized conventions. This aligns with previous research on contrastive rhetoric, which emphasizes the role of socio-cultural factors in shaping academic discourse. To bridge this gap, academic writing programs should incorporate contrastive rhetoric approaches, helping students recognize and adapt to the expectations of the global academic community.

Additionally, the findings reflect potential institutional gaps in academic writing instruction. Many students have limited formal exposure to research writing training during their earlier academic careers, which affects their ability to construct well-structured abstracts. Universities should address this by offering specialized academic writing workshops, mentorship programs, and peer review initiatives that focus on rhetorical move structuring and effective stance expression.

6.2.3. Implications for Future Research

Given the findings of this study, future research should expand the corpus to include abstracts from multiple Moroccan universities and compare them with abstracts written by native English-speaking researchers. This comparison could provide insights into whether the observed rhetorical patterns stem from linguistic influences, cultural conventions, or gaps in academic training.

Furthermore, a longitudinal study tracking students' abstract writing before and after targeted academic writing instruction could provide stronger evidence of the effectiveness of genre-based pedagogy. This could help determine whether explicit instruction in rhetorical moves significantly improves students' ability to construct well-structured abstracts.

Additionally, investigating the role of PhD supervisors in shaping students' academic writing practices could be valuable. Analyzing supervisor feedback on abstracts could reveal whether targeted guidance on rhetorical structuring enhances students' writing competence.

In sum, this study highlights the need for greater academic writing support at Moroccan universities and provides a foundation for future research on rhetorical move structures in scientific abstracts. Addressing these challenges through targeted instructional interventions could improve Moroccan PhD students' ability to engage effectively in the global academic discourse.

7. Conclusion

The study reveals both disciplinary and socio-cultural influences on the rhetorical move structure of Moroccan PhD students' research abstracts. While methodology and findings remain central across all disciplines, backgrounding, purpose statements, and discussion moves show significant variation. These differences may be linked to **disciplinary epistemologies, students' prior academic training, and broader cultural expectations of academic writing**. Addressing these issues through enhanced academic writing instruction could help Moroccan researchers better align their abstracts with international publishing standard.

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