

Teaching Academic Literacy in Disciplinary Contexts: Insights and Implications from a Discourse Study

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Abstract—Academic literacy contributes to increasing students' performance in universities. Most current literacy models applied in universities are not without limitations. The aim of this study is to identify the linguistic differences that exist in the genre of laboratory reports. Hence a sample of laboratory reports were collected across sub disciplines and different year levels. A discourse analysis was conducted to examine different move structures in the variety of students' laboratory reports. The results show that there are subtle differences in the move structures in the same genre. These differences exist because of specific learning outcomes and pedagogical intentions for the laboratory programs. Therefore, this paper highlights the strengths of teaching literacy practices in collaboration with disciplinary teachers and language teachers to allow an opportunity for them to discuss pedagogical intentions and designs that impact language use and structure of written genres.

Index Terms—academic literacy, genre-based approach, pedagogical intentions

I. INTRODUCTION

Rapid development in tertiary education has inevitably been accompanied by increasing concerns about academic literacies and associated problems experienced by undergraduates. Due to the phenomenal development of the English language and the wide use of English in tertiary education, language related issues can be considered as one of the major challenges that the students face in universities. Many students in their first-year experience difficulties due to a lack of knowledge of language rhetoric which is an essential part of literacy, known as “a way of speaking and writing within the confines of specific social sanctions” Ref [1]. Higher competency in the English language is crucial for success in tertiary studies and prospective students should have sufficient English academic language skills to cope with the study requirements of their intended courses Ref [2]. Further, advanced written communication skills in English are expected in the graduate attributes in almost all degree programs in most of the Western countries. Not all students who enter universities are adequately prepared to face the numerous literacy based challenges,

and for many their written communication skills need further enhancement.

Catering to students' specific disciplinary needs is a major challenge faced by EAP (English for Academic Purposes) practitioners. Writing courses in tertiary institutions should be tailored to meet the needs of students encountering difficulties in associating linguistic features with communicative functions of academic texts Ref [3]. To fulfill this requirement, there should be a good rapport, understanding and agreement between the EAP practitioners and discipline specific academics about the expected learning outcomes for the students and to provide a consistent message to students.

The purpose of this paper is to outline implications and insights from a discourse analysis study of university students' writing conducted under the guidance of an applied linguist and a science academic. The paper will first highlight the problems in EAP or academic literacy teaching in native speaker contexts followed by a brief description of the study. It will then discuss the results to draw implications for teaching literacy in science disciplines.

II. LITERATURE REVIEW

Adequate written language proficiency is important for successful academic performance by students and indeed many studies have shown a positive correlation between students' language abilities and academic success Ref [4]. However, students encounter several problems when mastering academic literacies due to the increasing need to be able to identify genre based differences in literacies. Hamp-Lyons and Hyland, in Ref [5], state that,

The growth of English as the leading language for the dissemination of academic knowledge has transformed the educational experiences of countless students, who must now gain fluency in the conventions of English language academic discourse to understand their discipline and to successfully navigate their learning.

In recent years, applied linguists and language teachers, especially those concerned with the teaching of academic literacy, have shown a great deal of interest in genre-centered approaches to the analysis of written and spoken discourse. The genre-based approach simply means enhancing the language competencies using content-

based materials. Hence, genre-based language teaching raises learners' awareness of linguistic features and patterns closely associated with their specific academic genres which enhance their effective communication skills in their discipline. Developing content-based material for academic literacy practice is a challenge posed to academic language learning units.

Currently, there are two dichotomous literacy teaching models applied in universities in Australia: teachers with subject-specific knowledge attached to faculties and general literacy teachers working in a learning center. The former practice is based on the assumption that teachers who know the discipline well can teach literacy to suit particular disciplinary needs. According to Ref [6], the teachers who frequently use specific genre in their writing routines in the target discourse community will have a better knowledge and understanding of the writing conventions compared to those who use them occasionally. However, the latter, the generic approach, is based on the assumption that teachers who have literacy teaching experience can help students in any discipline. To date, these two approaches are being used and the effectiveness would depend on whether individual teachers are capable of addressing students' needs.

A more recent trend is to involve both discipline teachers and language teachers to provide a better literacy learning experience to students, as described in Ref [7] & Ref [8]. However, there are practical issues with this model and it is only being applied in some cases by some teachers. One of the main problems is that it may be difficult to receive support from discipline teachers, or even to find discipline teachers who are happy to work with language teachers and are motivated to include literacy as a learning outcome. Further, the majority of current EAP teachers may be from linguistic disciplines. Teachers from the discipline-specific areas lack the ability to analyze the language specific issues though they have a better understanding of writing conventions. On the other hand, the teachers with linguistic backgrounds are more successful in analyzing the emerging rhetorics of language though they lack the better understanding of discipline-specific variations and pedagogy. Hence, the collaboration facilitates increased sophistication in teaching pedagogy, which leads to the enhancement of student performance. This discourse study that analyzed students' laboratory reports highlights the need for working in collaboration.

III. THE STUDY

Laboratory reports from two different universities were chosen for this study. These were drawn from across disciplines, and from different year levels. Having laboratory reports from different year levels and different sub disciplines contributes to the objective of the study by

diversifying the sample. A total of 36 reports were collected as follows; 8 from second-year biology laboratory projects, 8 from third-year biology laboratory projects, six from first-year physics laboratory experiments, six from first-year physics laboratory projects and eight-third year science experimental research placement projects. The research placement projects covered a range of science disciplines including physics, chemistry, oceanography, and ecology. This study used the Swales CARS (Create-A-Research Space) model, Ref [9] which has been predominantly used to analyze expert writing which follows the IMRD (Introduction, Method, Results and Discussion) structure. The frequency of occurrence of the different moves within the introductions of the laboratory and project reports was analyzed quantitatively. Results were compared and contrasted to investigate which Moves and steps are common in student writing. The CARS model is summarized in Table I.

According to the Swales (2004) model Ref [9], the introduction section is composed of 3 major Moves. Move 1 (establishing the territory) provides background information for topic generalization with increasing specificity. Topic generalization is supported by available literature highlighting the importance of the current study at the end. Move 2 (Establishing the niche) justifies the current study by indicating a knowledge gap, giving a positive justification or adding to what is known. Move 3 describes the present study in detail. This move includes 7 steps namely, announcing the study, presenting the research question or aim, definitional clarification, summarizing method, announcing principle outcomes, stating the value of the research and outlining the structure. Not all these steps are obligatory; they may vary depending on the discipline and purpose.

TABLE I. SWALES CARS MODEL (2004); RHETORICAL STRUCTURES IN THE INTRODUCTION OF RESEARCH ARTICLES WRITTEN BY EXPERTS REF [9]

Move 1: Establishing a territory (citations) Topic generalizations of increasing specificity
Move 2: Establishing a niche (citations possible) Step 1: Indicating a gap Step 2: Adding to what is known Step 3: Presenting positive justification
Move 3: Presenting the present work Step 1: Announcing present research descriptively and/or purposively (obligatory) Step 2: Presenting research questions or hypothesis* (optional) Step 3: Definitional clarifications (optional)* Step 4: Summarizing methods (optional) * Step 5: Announcing principal outcomes (PISF***) Step 6: Stating values of the present research (PISF***) Step 7: Outlining the structure of the paper (PISF***)

*Steps 2-4 of 3 are optional and not fixed in the order.

** PISF (Probable in some fields)

*** Moves 1 and 2 are likely to be cyclical, especially in longer introductions.

TABLE II. TYPICAL MOVES IN THE INTRODUCTION OF STUDENTS' LABORATORY REPORTS

2 nd year Biology Laboratory Reports	3 rd Year Biology Laboratory Reports
Topic generalization with increasing specificity (Move 1)	Topic generalization with increasing specificity (Move 1)
Announcing the present research	Announcing the present research

(Move 3–step 1)	(Move 3 – step 1)
Presenting the present research aim /Question (Move 3–step 2)	Presenting the present research aim /Question (Move 3 – step 2)
Summarizing the method (Move 3–step 4)	
1 st year Physics Experimental Reports	2 nd year Physics Project Reports
Topic generalization with increasing specificity (Move 1)	Topic generalization with increasing specificity (Move 1)
Announcing the present research (Move 3–step 1)	Announcing the present research (Move 3–step 1)
Presenting the present research aim/Question (Move 3–step 2)	Presenting the present research aim/Question (Move 3–step 2)
3rd year Research Placement Project Reports	
Topic generalization with increasing specificity (Move 1)	
Indicating a gap (Move 2–step 1)	
Adding to what is known (Move 2- step 2)	
Presenting positive justification (Move 2–step 3)	
Announcing the present research (Move 3–step 1)	
Presenting the present research aim /Question (Move 3 – step 2)	
Outlining the structure of the paper (Move 3– step 7)	

IV. RESULTS

Table II below provides the typical moves in students’ introduction sections of their reports.

Table III below summarizes students’ use of moves in their introductions in laboratory reports from different year levels and selected sub-genres. The frequency of the occurrences of different moves as a percentage is shown.

TABLE III. FREQUENCY OF OCCURRENCE (%) OF DIFFERENT MOVES FOR EACH SAMPLE OF STUDENT REPORTS.

Move/ Step	Biology Lab reports	%	Physics Lab reports	%	Physics Projects	%	Research placement projects	%
Move 1	Present	100	Present	100	Present	100	Present	100
Move 2								
Step 1	Absent	0	Absent	0	Absent	0	Sometimes present	25
Step 2	Absent	0	Absent	0	Absent	0	Sometimes present	37.5
Step 3	Absent	0	Absent	0	Absent	0	Sometimes present	25
Move 3								
Step 1	Present	100	Present	100	Present	100	Present	100
Step 2	Present	100	Present	100	Present	100	Present	100
Step 3	Sometimes present	18	Absent	0	Absent	0	Absent	0
Step 4	Sometimes present	50	Absent	0	Absent	0	Absent	0
Step 5	Absent	0	Absent	0	Absent	0	Absent	0
Step 6	Absent	0	Absent	0	Absent	0	Absent	0
Step 7	Absent	0	Absent	0	Absent	0	Sometimes Present	12.5

Move 1 (Topic generalizations of increasing specificity) is present in almost all the lab reports where students depict their knowledge and understanding of the field. In contrast, Move 2 (Establishing a niche) is completely absent in experimental laboratory reports in both biology and physics .Yet, it is present in research placement projects. Some steps of Move 3 (Announcing present research descriptively and/or purposively, Presenting research questions or hypothesis) were present in all reports but other steps were evident only in some reports.

V. DISCUSSION

Discourse analysis of students’ writing conducted in this study has provided insights on potential subtle differences within a genre, particularly in university writing. Laboratory programs are designed to provide the students with the skills required to undertake research. The study has seen that when writing laboratory reports students try to mimic the experts’ writing style. For

example, students’ rhetorical structures in some genres conformed to CARS move structures, a model used to analyze research articles written by experts Ref [9]. Although students broadly follow the IMRD structure in sciences, there are subtle variations, based on the expectations of the designed task and the desired learning outcomes in different year levels and sub-disciplinary variations in academic genres.

The analysis in this study shows that students seem to have developed skills to write intuitively to attract their audience by including different rhetorical structures. Results shown in Table II above show that rhetorical structures of student introductions were consistent across genres except for 3rd year research placement project reports. Students do not necessarily address a gap in science knowledge in laboratory reports, instead they affirm what experts have found and also get experience applying practical skills. Since identifying a gap is not an expected learning outcome for undergraduate laboratory

programs, the absence of this Move in experimental lab reports of first years and second years is understandable. In the final year, some students are given a project under the supervision of an academic and they are exposed to a real research experience. They are supposed to identify a gap with the assistance of the academic supervisor. Thus, establishing a niche is an advanced skill which was present in research placement reports. These results have shed light on literacy instruction students receive in these disciplines. Since this study was conducted with the guidance of a science academic and a linguist, the subtle variations within this laboratory report genre and the reasons for those differences could be identified.

This study, therefore, highlights the importance of the collaboration of discipline specific academics and EAP practitioners. Further, EAP teachers need to have a good understanding of discipline-specific differences and teaching and learning outcomes and also science teachers who teach academic literacy should be able to see such differences when analyzing models to educate their students. Collaboration facilitates sophistication in pedagogy in both academic literacy practice and discipline specific areas.

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