

UNIVERSITY OF EDUCATION, WINNEBA

**A COMPARATIVE ANALYSIS OF THE RHETORICAL MOVES AND
METADISCOURSE ELEMENTS IN ABSTRACTS OF SCIENCE
CONFERENCES**

The logo of the University of Education, Winneba, is a circular emblem. It features a central shield with four blue circles arranged in a 2x2 grid. Above the shield is a crown. The shield is set against a red background with a white sunburst pattern. The entire emblem is surrounded by a blue border containing the text 'UNIVERSITY OF EDUCATION, WINNEBA' and '1962'.

BENEDICTA OBENG

MASTER OF PHILOSOPHY THESIS

2019

i



UNIVERSITY OF EDUCATION, WINNEBA

**A COMPARATIVE ANALYSES OF THE RHETORICAL MOVES AND
METADISCOURSE ELEMENTS IN ABSTRACTS OF SCIENCE
CONFERENCES**

BENEDICTA OBENG

**A Thesis in the Department Of Communication and Media Studies, Faculty of
Foreign Languages Education and Communication, Submitted to the School of
Graduate Studies in Partial Fulfilment**

**of the requirements for the award of the degree of
Master of Philosophy
(Communication Skills)
in The University Of Education, Winneba**

SEPTEMBER, 2019

DECLARATION

STUDENT'S DECLARATION

I, Benedicta Obeng, declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE:.....

DATE:.....

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of thesis as laid down by the University of Education, Winneba.

Dr. Albert Agbesi Wornyo

Signature :.....

DATE:.....

DEDICATION

Dedicated to my husband and children.



ACKNOWLEDGMENTS

Undertaking a research of this nature is an interesting but challenging experience one can go through. In the course of this research, several people have been of enormous help to me and therefore, deserve to be duly acknowledged.

First of all, I am grateful to the Almighty God for giving me the strength, wisdom, knowledge and in-depth understanding to conduct this study and for seeing me through my stay at the University of Education, Winneba. What shall I render unto the Lord; all I can say is thank you God.

My profound gratitude goes to my supervisor, Dr. Albert Agbesi Wornyo, for his patience, intellectual advice and for supervising my work. I really appreciate his efforts at making this work a success. Dr. Wornyo, I am extremely grateful.

My utmost thanks go to the lecturers and staff of the Department of Communication Studies, for their corrections and suggestions during faculty presentations. How can I forget our own Dean, Professor Andrews Ofori-Birikorang? Thank you Prof. for your words of encouragement and professional advice.

To Dr. Elijah Yin, Mr. Simon Ntumi and all family and friends, I say thank you. Finally, I would like to thank my dearest husband for his encouragement and support.

TABLE OF CONTENTS

DECLARATION	iii
DEDICATION	iv
ACKNOWLEDGMENTS	v
TABLE OF CONTENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF ABBREVIATIONS	xii
ABSTRACT	xiii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background to the Study	1
1.2 Problem Statement	5
1.3 Objectives	7
1.3.1 Research objectives:	7
1.4 Research Questions	7
1.5 The Significance of the Study	8
1.6 Delimitation/Scope of the Study	8
1.7 General organization of the Study	8
1.8 Summary of Chapter	9
CHAPTER TWO	11
2.1 Introduction	11

2.2 Soft Sciences and Hard Sciences	11
2.3 Moves	12
2.4 Abstracts	13
2.5 Models of rhetorical move analysis in abstracts	13
2.6 Empirical studies on move analysis of abstracts	15
2.6.1 <i>Variations in rhetorical moves of abstracts from experienced and novice writers</i>	17
2.6.2 <i>Variations in rhetorical moves in abstracts from two related fields</i>	18
2.6.3 <i>Rhetorical moves in conference proceedings abstracts</i>	19
2.6.4 <i>Variation of moves in research article abstracts synchronically and diachronically.</i>	21
2.6.5 <i>Differences between abstracts of PhD theses and research articles</i>	22
2.6.6 <i>A cross-disciplinary investigation of multi-word expressions in the moves of research article abstracts</i>	23
2.7 Metadiscourse	24
2.8 Theoretical Frameworks	28
2.8.1 <i>Systemic Functional Linguistic (SFL) Theory</i>	28
2.8.2 <i>The Theoretical Framework of Register</i>	33
2.8.3 <i>Genre Theory</i>	34
2.9 Theoretical Approach for the Study	39
2.10 Chapter Summary	41
CHAPTER THREE	42
RESEARCH METHODOLOGY	42
3.1 Introduction	42

3.2 Research Philosophy	42
3.3 Study Design	44
3.4 Unobtrusive Approach: Content Analysis	44
3.5 Selection of the corpus	46
3.6 Sampling Criteria/Sampling Procedures	47
3.7 Scope/Delimitation	48
3.8 Data Analysis Procedure (Rhetorical moves analysis)	48
3.9 Inter-rater reliability	49
3.10 Classification of Moves	49
3.11 Textual Space Analysis	50
3.12 Metadiscourse Analysis	50
3.13 Chapter Summary	53
CHAPTER FOUR	54
FINDINGS	54
4.1 Introduction	54
4.2 Rhetorical move structure	54
4.3.1 <i>Textual space</i>	57
4.4 Rhetorical Moves Sequences	59
4.5 Metadiscourse Analysis	61
4.5.1 <i>Examples of soft sciences hedges</i>	65
Should	65
4.5.1 <i>Examples of hard sciences hedges</i>	68
4.6 Chapter Summary	70
CHAPTER FIVE	71

DISCUSSION OF FINDINGS	71
5.1 Introduction	71
5.2 Rhetorical move structure variations between soft sciences and hard sciences abstracts	71
5.2.1 Variations in textual space in the abstracts of the soft sciences and the hard sciences	76
5.3 Rhetorical Move Sequences between the Soft Sciences and Hard Sciences Abstracts	77
5.3 The use of hedges and boosters as elements of metadiscourse	81
CHAPTER SIX	83
Summary of Findings, Conclusions and Recommendations	83
6.1 Introduction	83
6.2 Summary of the Study	83
6.3 Key Findings	84
6.4 Conclusions	85
6.5 Recommendations for Further Studies	86
REFERENCES	88
APPENDICES	97
Appendix A: Soft sciences abstracts	97
Appendix B: Hard Sciences Abstracts	111

LIST OF TABLES

Table	Page
2.1: Hyland's (2000) metadiscourse classification	27
3.1: List of 101 lexical items identified as hedges by Hyland (2005).	51
3.2: List of 64 lexical items identified as boosters by Hyland (2005)	52
4.1: A tabulation of rhetorical moves variation in soft sciences	55
4.2: A tabulation of rhetorical moves variation in hard sciences	56
4.3: Frequencies and percentages of rhetorical moves in soft and hard sciences	57
4.4: Frequency of rhetorical move sequences in soft sciences and hard sciences.	59
4.5: Frequency of hedges in soft sciences and hard sciences	62
4.6: Frequency of boosters in soft sciences and hard sciences	64

LIST OF FIGURES

Figure	Page
2.1: Schematic diagram illustrating Systemic Functional Linguistic (SFL) Theory	32
2.2: Tabiri's Levels of Communication: Discourse-Semantics	34
2.3: Schematic diagram illustrating the Genre Theory	39
2.4: A conceptual framework for the study	40
4.1: Percentage word composition of rhetorical moves in soft and hard sciences.	58
4.2 Frequency of move sequences in soft and hard sciences	60



LIST OF ABBREVIATIONS

CA	Conference Abstracts
CARS	Create a Research Space
CoBReG	Convention of Biomedical Research Ghana
CP	Conference Proceedings
ED	Education
ESP	English for Specific Purpose
HS	Health Sciences
IMRD	Introduction, Method, Results and Discussion
MA	Master of Arts
NR	New Rhetoric
RA	Research Article
SFL	Systemic-Functional Linguistics

ABSTRACT

An abstract represents the summary of a piece of scholarly writing. It is imperative for academics to include all essential rhetorical moves when writing an academic conference abstract (CA). The aim of this study was to investigate variations in the abstracts of the soft sciences abstracts (SSA) and that of the hard sciences (HSA) with a focus on rhetorical structure, sequence and metadiscourse elements. Two corpora were compiled comprising 30 abstracts from SSA and HSA purposively selected from the 4th International Postgraduate Conference, Cape Coast, Ghana and the Convention of Biomedical Research Ghana (CoBReG) books of abstracts for 2018. Hyland's (2000) model of rhetorical moves for abstracts comprising introduction (I), purpose (P), method (M), product (Pr) and conclusion (C), as well as Hyland's (2005) elements of metadiscourse which comprise 64 boosters and 101 hedges were used for the analysis of the selected abstracts. From the results, 43.3% of HSA followed Hyland's (2000) rhetorical structure whereas only 33.3% of SSA followed the model. Also, purpose, method, product and conclusion were obligatory moves whereas the introduction move was optional in the SSA. On the other hand, only method and product moves were obligatory with the rest being conventional in SSA. The most dominant move sequence for HSA was I-P-M-Pr-C (46.7%) followed by I-M-Pr-C (17%) and I-P-M-Pr (17%) whereas P-M-Pr-C (43.3%) was the most dominant sequence followed by I-P-M-Pr-C (33.3%) for SSA. Also, HSA employed more boosters (37) than SSA which included only 34 boosters. However, HSA included less hedges than SSA which were 58 and 69 respectively. The findings of this study provide a pedagogical support for future conference participants towards writing more successful conference abstracts.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The term “genre” has been well-defined as a type of text or discourse designed to achieve a set of communicative purposes (Swales & Feak, 2009). The study of diverse genres has substantially added to the understanding of language variation as each genre has genre-specific features and conventions. Genres such as business meetings, courtroom proceedings, medical checkups, conference proceedings, thesis and research publications constitute a vital medium for the dissemination of information for varying purposes with their own uniqueness and similarities. The study of genres has received tremendous attention from scholars in the field of Applied Linguistics, especially in the teaching and learning of languages, Mass Communication, Writing research, language reform and many other areas related to professional and academic communication as it provides critical pedagogical implications for language instruction (El-Dakhs, 2018).

Among all written genres, abstract is considered one important genre in disseminating new knowledge and discoveries in academic discourse communities. With limited cognitive capacity and information explosion with several journals being launched, the succinct summary of the entire document (i.e. abstract) in both print and electronic archives, has become an invaluable, informative tool for highly selective researchers to access pertinent scholarly literature. Given the pivotal role in scientific communication, abstracts do not only facilitate information retrieval but also determine publication success, be it acceptance or rejection (Huckin, 2001). Submitting an

abstract is the first requirement for an initial consideration of publication of a research article (RA) or conference participation. In information-rich environments, the strategic manipulation of rhetorical and linguistic features that conform to the standards of the target academia encountered can enhance opportunities for successful publication.

Within genres are sub-classifications of rhetorical units called 'moves'. The term 'move' refers to a discursal or rhetorical unit that performs a communicative function in a written or spoken discourse (Swales, 2004). Moves are often analysed in terms of their frequency, combinatory patterns and their status as optional or obligatory to the genre. Due to the centrality of moves to the analysis of the rhetorical structure, a number of models have described the frequent moves of different genres which include Bhatia's (1993) model for job application letters, Swales' (1990) model for research article introductions, Stoller and Robinson's (2013) model for moves in methodology sections of research articles. Other researchers focused on different aspects of research article such as introductions (Bunton, 2002; Samraj, 2005), literature review (Kwan, 2006) and conclusion (Bunton, 2005). Hyland (2000) and Swales (2004) focused on rhetorical moves of research article abstracts.

An abstract has been described as the most important aspect of a research article as it epitomizes the content of a research article or dissertation and many other forms of genre (Hyland, 2000). Abstracts constitute the first portion of an academic writing that readers use to judge the relevance and importance of the article (Hongwei & Yuying, 2011). As such, abstracts have been described as persuasive rhetorical tool (Hyland, *ibid*) because they provide convincing information to readers to enable them decide whether or not to read an entire article or perhaps, listen to conference presentation. Abstracts also fulfil an important social function that allows readers to see

how individuals work to position themselves within their communities (Hyland, *ibid*). Hence, an abstract acts as readers' screening device (Huckin, 2006). Therefore, the quality of an abstract and its persuasiveness is essential in attracting readers' attention to read an article. In writing abstracts, it is crucial for writers to ensure that they use effective rhetorical choices and follow appropriate sequence of the rhetorical moves in order to increase the rate at which the article will be read. In addition, abstracts reflect the writer's academic credibility and acceptability in a discourse community (Sidek, *et.al*, 2016). An important discourse community that utilizes abstracts in communicating their research is the science community which comprises the hard sciences and the soft sciences (Omidia *et al*, 2018).

According to the Science Council (2019), science constitutes the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence. Additionally, Helmenstine (2019) intimated that the soft sciences generally deal with intangibles and relate to the study of animal and human behaviours, interactions, thoughts, and feelings. Soft sciences, therefore, apply the scientific method to such intangibles, but because of the nature of living beings, it is almost impossible to recreate a "soft science" experiment with exactitude. Some examples of the soft sciences which are sometimes referred to as the social sciences include Sociology, Psychology and Anthropology. Here, human behaviour do change even under the same experimental conditions. Hard sciences, on the other hand, consist of experiments which are set up with controlled variables and objective measurements made (Helmenstine, 2019). Results of hard science experiments can be represented mathematically, and the same mathematical tools are used consistently to measure and calculate outcomes. Some examples of hard sciences

include Chemistry, Physics and Biology. In hard science studies, results do not change when the same materials and the same experimental protocols are used.

Earlier studies on rhetorical moves that distinguished between soft science and hard science disciplines compared rhetorical moves in the entire research article and abstracts of the two disciplines (Khansari, 2016). In that research, the traditional introduction, method, results and discussion (IMRD) model was used as the analytic tool. In his findings, research articles and abstracts in soft sciences mostly follow the IMRD model but those in hard sciences did not. Also, another related study was conducted by Omidia *et al.* (2018) who investigated disciplinary variations in research articles as it is reflected in the use of multi-word items in different moves using five moves structure adopted from Santos (1996) and Pho (2008). They analysed a corpus of 5910 abstracts from six disciplines from which identified moves were analysed using a mixed method of both qualitative and quantitative methods. From their findings, writers of abstracts in hard and soft science fields have different priorities for promoting their studies. That is, while hard fields view their methodology as a unique 'selling point' for their study, writers in soft fields prefer to place more emphasis on their research objectives and their possible theoretical implications.

Despite the fact that variations in rhetorical moves have been considered in the abstracts of soft and hard science research articles, that cannot be said of conference abstracts in the soft sciences and hard sciences. Academic conferences, however, constitute another important category of genre which give researchers the opportunity to disseminate their findings to an academic community. In such conferences, the quality of an abstract in most cases solely determines its inclusion or exclusion in conference proceedings and whether it will be suitable for oral or poster presentation

(Sidek *et al.*, 2016). In the context of conference proceedings which is the focus of the current study, genre analysis can provide valuable guiding principles for useful specialised research writing programmes by which tenderfoot researchers can learn about the conventions of their disciplinary communities which might be suitable for their specific discourse features, patterns and structures. The current study adopts genre analysis, a simplified approach to text level analysis which refers to the study of situated linguistic behaviour in institutionalised academic or professional settings, (Bhatia, 1997) to analyse abstracts from an academic conference proceeding. It utilises genre analysis to explore academic conference abstracts based on the rhetorical structure of the text which consists of moves. Along these lines, some models have described move analysis of research abstracts (Hyland, 2000; Bhatia, 1997; Santos, 1996; Pho, 2008).

According to Becher and Trowler (2001), academic disciplines can be fragmented into the four-domain matrix of knowledge: hard-pure, hard-applied, soft-applied, and soft-pure. The clear distinction between the knowledge fields can benefit the scholars from knowing the writing conventions in their own disciplines. It is also interesting to examine whether these two academic disciplines which are completely different in terms of disciplinary contents (hard and soft domains) but belongs to the same knowledge category (applied domain) share any certain similarities or differences in the conventional rhetorical styles of writing.

1.2 Problem Statement

Abstracts serve as vital test for determining the importance of a piece of academic writing (Hongwei & Yuying, 2011; Huckin, 2006). For this reason, a well-written abstract is necessary to invite readers' interest in one's research article or

presentation at a conference. The genre of research article abstracts attracted the attention of researchers, particularly following Swales (1990) assertion that, analysis of abstracts has been neglected by discourse analysts even though abstracts are quite revealing of disciplinary discourse (Sidek *et al*, 2016). Many researches were then directed at abstracts of research articles and thesis (Can, *et al.*, 2016; Lorés, 2004; Pho, 2008; Suntara & Usaha, 2013), and quite recently conference proceedings (Sidek *et al.*, 2016, Ninpanit, 2017).

It is worth noting that abstracts are important parts of academic conferences. It is imperative that each conference sets its own description and requirements that the submitted abstract should fulfill in order to be accepted. Generally, the length of the abstract varies between 200 and 350 words with the maximum limit of 500 words. The disciplines involved in conferences determine the structure of the conference abstracts. A conference abstract should be short and provide as much important information as possible. It should also conform to the communicative and linguistic form of the addressed discipline.

Even though conference abstracts are persuasive and aim to impress both the screening committee, which is constituted by experts of the genre community and the attendants of a conference, the writers have to follow the entrenched structures and anticipations in the pertaining discipline. Despite the fact that the elements explored in conference abstracts are similar to the ones identified in research article abstracts as both genres share common characteristics, there could be diversities in terms of move structures and sequences, as well as the usage of metadiscourse parameters.

Some studies which reported on abstracts of conference proceedings focused on comparing rhetorical moves in research abstracts of the soft sciences (Loan, *et. al.*,

2014; Sidek, *et. al.*, 2016). Bondy *et al.* (2014) noted that hard sciences exhibit a stricter structure in presenting the relevant information, whereas in soft sciences like human studies, the structure of an abstract is more tolerant as the results in many researches could be interpreted in accordance with many diverse approaches. It is worth noting that the differences and similarities between abstracts from soft and hard sciences in academic conferences have not been explored. Also, the frequency and types of hedges and boosters which constitute an important aspect of metadiscourse in academic conference abstracts have been underinvestigated.

1.3 Objectives

The current study compares rhetorical moves, as well as, the use of elements of metadiscourse between abstracts of the soft sciences and the hard sciences.

1.3.1 Research objectives:

The specific objectives for the study are:

1. To investigate variations in the rhetorical move structure of abstracts of the soft sciences and the hard sciences.
2. To examine variations in the rhetorical move sequences of abstracts of the soft sciences and the hard sciences.
3. To compare the use of hedges and boosters as elements of metadiscourse in the abstracts of the soft sciences and the hard sciences.

1.4 Research Questions

1. What are the variations in the rhetorical moves in the abstracts of the soft sciences and the hard sciences?

2. What are the variations in the rhetorical move sequences followed in the abstracts of the soft sciences and the hard sciences?
3. What are the hedges and boosters used as elements of metadiscourse in the abstracts of the soft sciences and the hard sciences?

1.5 The Significance of the Study

This current research has implications for genre studies as well as implications for further research on rhetorical move variations. Since students participate in academic conferences, findings from the research will be a useful guide to them in writing suitable abstracts

Findings from this research will inform the academic community on best practices of rhetorical moves to include and the sequences to follow in writing quality and competitive research abstracts in either the soft sciences or the hard sciences for academic conferences.

In addition, findings from the research will be useful for conference organizers, editors and authorities of academic institutions in setting standards for abstracts.

1.6 Delimitation/Scope of the Study

The study considered abstracts published in the conference book of abstracts of Convention of Biomedical Research Ghana (CoBReG), 2018 and the 4th International Postgraduate Conference, 2018.

1.7 General organization of the Study

The study has been organized into five chapters. Chapter one comprises the general introduction of the study. This includes the background to the study, statement of the problem, general objective and specific objective, research questions,

significance of the study, delimitations, general organization of the study as well as the summary of the chapter.

Chapter two captures the review of relevant literature. Sub-headings such as brief overview of genre analysis, soft and hard sciences, models of rhetorical move analysis in abstracts, variations in rhetorical moves of abstracts from experienced and novice writers, rhetorical moves in conference proceedings abstracts as well as cross-disciplinary investigation of multi-word expressions in the moves of research article abstracts were included.

The third chapter contains the materials and methods. This includes study design, selection of the corpus, sampling criteria, inclusion criteria, rhetorical moves analysis, and classification of moves as well as metadiscourse analysis.

Chapter four captures the results obtained from the study. This comprises results for variations in rhetorical move structure, rhetorical move sequences as well as variations in metadiscourse parameters such as boosters and hedges.

The fifth chapter comprises discussion of findings. Here, significant findings identified are interpreted and discussed. The discussion highlights the major findings of the research and the inferences made from the point in view of findings from related previous studies.

The final chapter deals with the summary of the study, key findings, conclusions and recommendations for further research are included.

1.8 Summary of Chapter

This chapter of the research has outlined the background of the study, statement of the problem, objectives of the research and research questions that underpin the

study. In addition, the significance, delimitation and the general organization of the study has been presented. The next chapter will reveal the literature related to the study.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the necessary background that underpinned the analysis of the study by critically examining the related literature. This comprised introduction, review of moves and abstracts, models of rhetorical moves and empirical review on move analysis. Also, boosters and hedges as elements of metadiscourse, theoretical framework comprising systemic functional linguistic theory, theoretical framework of registers as well as genre theory. A theoretical approach was adopted for the study and the chapter was summarized.

2.2 Soft Sciences and Hard Sciences

According to the Science Council: "Science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence." Also, According to Helmenstine (2019), the soft sciences generally deal with intangibles and relate to the study of animal and human behaviours, interactions, thoughts, and feelings. Soft sciences apply the scientific method to such intangibles, but because of the nature of living beings, it is almost impossible to recreate a "soft science" experiment with exactitude. Some examples of the soft sciences which are sometimes referred to as the social sciences include Sociology, Psychology, and Anthropology among others.

Hard sciences, on the other hand, consist of experiments which are set up with controlled variables and objective measurements made. Results of hard science

experiments can be represented mathematically, and the same mathematical tools are used consistently to measure and calculate outcomes. Some examples of hard sciences include Chemistry, Physics, Biology among others. In hard science studies, results do not change when the same materials and the same experimental protocols are used unlike in soft sciences where human behaviour do change even under the same experimental conditions.

2.3 Moves

The term “move” in move analysis is “a functional term that refers to a defined and bounded communicative act that is designed to contribute to one main communicative objective, that of the whole text” (Lorés, 2004, p. 282). Santos (1996, p. 485) on the other hand attributed move to “a genre stage which has a particular, minor communicative purpose to fulfil, which in turn serves the major communicative purpose of the genre.” Swales (2004, pp. 228-9), ascribed move as a “discoursal or rhetorical unit that performs a coherent communicative function in a written or spoken discourse.” Ding (2007) added that a move is a tool to identify the textual regularity in different genres. While there is not a unified move analysis type to address different sections of research in general and research abstracts in particular, it is the most applicable way to investigate this genre (Crookes, 1986). Sticking to the definition of “move” provided by Connor, Davis and De Rycker (1995, p. 463) in which “move” is the identification of the textual regularities to “describe the functions which particular portions of the text realizes in the relationship to the overall task”, Ding (2007) posited that a conducive tool in genre analysis is move analysis because this tool can help

researchers identify the moves which are semantic and functional units of texts, particularly, abstracts.

2.4 Abstracts

An abstract constitutes both a summary and a refined reflection of the entire article (Swales, 1990). Bhatia (1993, p. 82) refers to the informative function of abstracts, claiming that they present “a faithful and accurate summary, which is representative of the whole article.” Aside from being informative, abstracts have a substantial role in promoting research reports. As such, Hyland (2009), for instance, states that abstracts are necessary for readers to judge and to make a decision on whether the entire article should be read or not. Many academic writers, therefore, try to “persuade their readers to read the whole article by their effective selection of rhetorical features” (Ren & Li, 2011, p. 163). Martín-Martín (2003; 2005) notes that abstracts constitute, after the paper’s title, the reader’s first encounter with the text. He further pointed out that there are few scholarly journals that do not require an abstract to be sent together with the original paper. In general, unlike their accompanying articles, abstracts are freely available online. Also, whereas many articles are written in languages other than English, they do have English abstracts. Thus, being able to compose useful abstracts is critical for academic writers and studying the language of abstracts is of significant value as well (Can *et al.*, 2016).

2.5 Models of rhetorical move analysis in abstracts

Hyland’s (2000) model specifies five basic moves for abstracts; (1) introduction, (2) purpose, (3) method, (4) product and (5) conclusion and this was based on the tradition IMRD model comprising of introduction, method, results and

discussion. Hyland modified this by teasing out purpose from the introduction and changing the name of results to the product. He also took out discussion and replaced it with the conclusion. Swales' (1990) Create a Research Space (CARS) model originally developed for introductory section of research articles consists of three rhetorical moves: Move 1: creating a research territory, Move 2: establishing a niche, and Move 3: occupying the niche. This was later modified by Swales (2004) in order for it to be used for abstracts. Despite the modification, the mandatory moves only took care of the introduction and purpose (Moves 1 to 3.1). The rest of the moves which formed the bulk of the abstract (method, results, conclusion and recommendation) were deemed optional. This was found to be problematic especially in analysing informative traditional abstract. With Swales' model much more suitable for persuasive abstracts and Hyland's model suitable for informative abstracts, Loan *et al.* (2014) used the two models separately to analyse either type of abstracts. However, Santos (1996) combined the two models and used them to analyse abstracts of research articles in linguistics for both persuasive and informative abstracts.

With the simplicity and much more effectiveness of Santos (1996) model in analysing all types of abstracts, Gillaerts (2013) updated this by adding sub-moves. This was used to analyse research article abstracts from a diachronic perspective. His moves were: Move 1. Situating the research, Step 1a. Current knowledge, Step 1b. Specific references, Step 1c. Indicating the gap; Move 2. Presenting the research Step 2a. Purpose, Step 2b. Research question / hypothesis; Move 3. Describing the methodology; Move 4. Summarizing the findings, and Move 5. Discussing the research, Step 5a. Conclusions: Step 5b. Recommendations.

2.6 Empirical studies on move analysis of abstracts

The majority of studies done on research abstracts had a discourse analytic focus (Bonn & Swales, 2007). The studies addressing discourse analytic considerations concentrated on move analysis of research abstracts (Hyland, 2000; Santos, 1996). Salager-Meyer (1990) conducted a study to investigate the discursal elements of medical research abstracts. The findings of her study did not show the existence of important discursal elements in the investigated research abstracts. Moreover, in a study on the research abstracts written by Johns (1997), it was revealed that, researchers had the tendency to transfer their first language features, among them, are the discursal elements, inappropriately to English research abstracts.

The structural variations of research abstracts across different disciplines have been investigated in multiple studies. Samraj (2005), for instance, conducted a comparative study on the research abstracts of conservation biology and wildlife behaviour. She selected 24 research abstracts from two journals associated with the types of investigated disciplines. The first phase of her study showed no difference in the move analysis of the research abstracts in the two disciplines. The research abstracts of the two disciplines showed a move pattern of Purpose-Method-Results-Conclusion (PMRC). Nevertheless, the second phase of her study showed that the rhetorical structure in conservative biology included another move, namely Introduction which was not seen in the wildlife behaviour. Samraj (2005) draws the conclusion that even close disciplines in terms of content might differ in their research abstracts rhetorical structures.

Similarly, a study conducted by Pho (2008) addressed the rhetorical structure and linguistic realization of research abstracts in the three journals of applied linguistics

and educational technology, namely *Modern Language Journal*, *TESOL Quarterly*, and *Computers and Education*. After examining 30 research abstracts, the researcher found out that (1) Presenting the research, (2) Describing the methodology, and (3) Summarizing the results were the three obligatory moves in the research abstracts of the mentioned journals. Similar to Samraj (2005), Pho concluded that the variety of rhetorical structures could be seen even in the research abstracts of the related disciplines.

In a similar manner, Tseng (2011) investigated the move structure of research abstracts in three applied linguistics journals, namely *TESOL Quarterly*, *Applied Linguistics*, and *Language Learning*. Using Santos' (1996) five-move pattern to analyze the move pattern of the selected research abstracts, Tseng (2011) figured out that except for Background move, other moves such as Aim-Method-Result-Conclusion (AMRC), were obligatory in the research abstracts.

Zand-Moghadam (2016) analyzed the rhetorical moves of MA thesis abstracts written from 1988 to 2015 in the field of TEFL in Allameh Tabataba'i University (ATU), an Iranian university. To this end, 300 MA thesis abstracts were analyzed based on Hyland's (2000) rhetorical move framework. To track the rhetorical move trends of the thesis abstracts and for the ease of analysis, they were analyzed in three time intervals. The results revealed that while in the first interval (1988-1997) the most frequent rhetorical moves were the 'Purpose', 'Method', and 'Product', in the other two intervals (1998-2007 and 2008-2015) the "Purpose" was the most used rhetorical move. In addition, the least frequent rhetorical moves were the "Introduction" and "Conclusion" for the three intervals. The findings, on top of these, indicated that the rhetorical move patterns of thesis abstracts moved from Purpose-Method-Product (P-

M-Pr) to Introduction-Purpose-Method-Product-Conclusion (I-P-M-Pr-C). That said, it can be concluded that in the examined thesis abstracts, the highest average of information was provided on the “Purpose” of the study, while the other moves, especially the conclusion move, was not deemed important; moreover, an increasing rate of information provision was detected on the “Method” and “Product” moves. This research bears some implications for L2 learners to better know their community of practice and writing instructors to prepare genre-based writing materials.

Also, Fazilatfar and Naseri (2014) conducted a study that aimed to investigate the possible relationship between generic organizations of research articles in applied linguistics Iranian journals and negotiation of researchers’ identities. Overall, 30 published research-based articles were selected randomly from four journals. After applying Pho’s (2008b) model of move analysis, the obtained results were associated with the instances of writer identity using Hyland’s framework (2002). The findings demonstrated different percentages of writer identity categories across different moves of articles. Results suggested that rhetorical moves performing various functions in articles need to be carried out by specific categories of authorial identity to better satisfy the expectations of their respective applied linguistics communities.

2.6.1 Variations in rhetorical moves of abstracts from experienced and novice writers

Ren and Li (2011) compared the rhetorical moves of abstracts in published research articles and master’s foreign-language thesis. This was based on the assumption that research article abstracts are written by experienced researchers whereas Masters students’ thesis abstracts are written by novice researchers. In their

work, two sets of 25 expert-written abstracts from five journals in Applied Linguistics and 25 abstracts of Chinese Masters students' thesis all in 2007 were subjected to Hyland's (2000) five rhetorical moves model. Random sampling technique was used. It was found out that experts seem to pay attention to the persuasive role rather than the informative role of research article abstracts, while student writers tend to pay more attention to the informative role rather than the persuasive role of the thesis. As such, though all the five (5) basic rhetorical moves in developing abstracts are commonly found in the abstracts written by both experts and student writers, experts tend to be more choosy in their use of the moves to best promote their papers, while student writers tend to include all the moves to be more informative of the content and structure of their thesis. Based on these findings, it was suggested that in order to help students construct an abstract that will have an impression on their readers, teachers might need to raise students' awareness of the different practices between student writers and expert writers and guide them to select the most appropriate rhetorical moves to fulfil their rhetorical goals. Due to the limited data of this study, the findings in the study need to be further tested in larger scale studies. The findings have implications on both inexperienced student writers, and expert writers since academic conferences receive participation from both experienced and novice writers.

2.6.2 Variations in rhetorical moves in abstracts from two related fields

Conference proceedings in most cases are organised for related fields. It is the bases of this that Suntara and Ushala (2013) investigated rhetorical moves in research article abstracts in two related disciplines. To do this, they explored rhetorical moves variations from 200 research article abstracts using three journals selected from the

fields of Applied Linguistics and three from Linguistics. Conceptual/theoretical studies were excluded and data obtained were quantitatively analysed for frequency and sequence of Hylands five move variations. The results obtained indicated that the most common move patterns for Linguistics were Purpose (P)-Method (M)- Product (Pr)- Conclusion (C), P-M-Pr and Introduction (I)-P-M-Pr-C whereas the preferred patterns were P-M-Pr-C, I-P-M-Pr-C and I-P-M-Pr from Applied Linguistics. Although there was variation in move pattern, the most frequent preference pattern among the two related disciplines was P-M-Pr-C pattern. The Introduction move was optional in both fields.

On the other hand, the Conclusion move was optional in the field of linguistics but conventional in the field of applied linguistics. It is worth noting that the samples in the present study are empirical research articles so the results can only apply to the empirical research genre. Other types of research articles such as the theoretical and conceptual papers have different structures and linguistic realisation of rhetorical moves. Thus, further studies of theoretical and conceptual papers from various disciplines may yield impressive results and give more pictures of research article abstracts. With findings from this research, it is anticipated there could be rhetorical moves variations in abstracts submitted for proceedings of the Convention of Biomedical Research Ghana (CoBReG) and the International Postgraduate Conference which will form the corpus of the present study.

2.6.3 Rhetorical moves in conference proceedings abstracts

The fact that academic conference proceedings constitute a critical platform on which researchers disseminate their research findings cannot be over-emphasised.

However, this type of academic discourse has received little attention. Among the few research works carried out on rhetorical moves in conference proceedings abstracts was one done by Sidek *et. al.* (2016). Their study aimed at examining whether the abstracts provided in conference proceedings include the essential rhetorical moves and whether the moves are presented in the sequence according to the Hyland (2000) five-move model. The study utilized the conference book of abstracts from the Public Higher Education Conference in Malaysia. Purposive sampling technique was used to select 23 abstracts. Abstracts written in English only and authored by academics in the field of Language and Education in Higher Education were selected. Also, empirically based papers were selected whereas theoretical and conceptual papers were excluded. From their results, approximately 83% of the conference proceeding abstracts analyzed had one or more missing rhetorical moves. Also, only 27.1% of authors included the purpose move. However, 82.6%, 95.7% and 78.3% of authors included the method, product and conclusion move respectively. Also, the most prominent move pattern was Purpose-Method-Product-Conclusion. The findings of this small-scale study lend further insights into the needs of professional development among academics, particularly in academic research report writing. The results corroborate with later research by Ninpanit (2017) who investigated the rhetorical structures of conference proceedings abstracts (CP) among Thai researchers based on Hyland's framework (2000). In order to find out what move sequences and move frequency are, CP abstracts across two disciplines, namely education (ED) (N=14) and health sciences (HS) (N=14) were randomly selected from the proceedings of a graduate research conference. The results indicated that purpose (P), methods (M), and product (P) moves were obligatory,

and introduction (I) and conclusion (C) moves were missing in the CP abstracts in education.

On the other hand, conclusion move was conventionally employed, and introduction move was optionally used in the CP abstracts in health sciences. Additionally, the most dominant sequence between these two disciplines was different. An academic should have the basic knowledge of what an abstract should fundamentally constitute. It was therefore recommended that institutions of higher education provide the relevant professional development in order to ensure that academic researchers possess the required academic abstract writing skills. Sidek and his colleagues', as well as Ninpanit (2017) researches, constitute major and most current researches on rhetorical move variations in conference proceedings. However, their researches did not investigate variations between soft and hard sciences. This is the gap this current research seeks to fill.

2.6.4 Variation of moves in research article abstracts synchronically and diachronically.

An abstract summarizes the accompanying article in order to promote it. While many move-analysis studies of abstracts in applied linguistics (AL) have used similar coding frameworks and demonstrated similar rhetorical organizations, their findings have not yet been aggregated to show the overall picture. Can and his colleagues (2016) therefore examined move structures in Applied Linguistics abstracts and compared the results with previous studies both synchronically and diachronically. Fifty abstracts were collected from articles published in the journal English for Specific Purposes (ESP) between 2011 and 2013. Sentences were coded using a five-move scheme

adapted from previous studies. Combining the results from previous research and the present study showed that most Applied Linguistics abstracts give information on the purpose, methodology, and findings of the associated article, while about half of the articles omit introduction of the topic and discussion of the findings. The most essential three moves in ESP abstracts are P (presenting the research purpose, 100%), M (describing the methodology, 96%), and R (summarizing the findings, 92%). It was also found that authors frequently violated the move sequence expected by current schemes. These findings were found to be consistent with previous researches which suggest that future researchers informed by move analyses should explore the connection between the findings of move analyses and teaching materials for academic writing. The study investigated rhetorical moves variations in research articles in applied linguistics using current and previously published articles.

2.6.5 Differences between abstracts of PhD theses and research articles

El-Dakhs (2018) investigated why the abstracts of PhD theses and research articles were different using Hyland's (2000) model of the rhetorical structure of abstracts and Hyland's (2005) taxonomy of metadiscourse. In their research, 200 abstracts of PhD theses from prestigious American and British universities were compared with 200 research article (RA) abstracts in highly ranked journals in the field of Applied Linguistics. The results revealed some differences, including a lengthier description of methodology, findings and implications in RA abstracts whereas there were lengthier introductions in thesis abstracts.

Additionally, thesis abstracts included more transitions, evidential and hedges while RA abstracts made more use of code-glosses and self-mentions. Other variations were

noted concerning sub-categories of moves and metadiscourse markers. The Convention of Biomedical Research Ghana (CoBReG) which will be used for my studies receives participation from PhD students as well as established researchers who have published several research articles in prestigious journals. However, these categories cannot be distinguished in the conference book of abstracts from which sample abstracts will be obtained.

2.6.6 A cross-disciplinary investigation of multi-word expressions in the moves of research article abstracts

Omidia *et al.* (2018) investigated disciplinary variations in RA as it is reflected in the use of multi-word items in different moves using five moves structure adopted from Santos (1996) and Pho (2008). They analysed a corpus of 5910 abstracts from six disciplines from which identified moves were analysed using a mixed method of both qualitative and quantitative methods. It was found out that exclusive bundles used to fulfil the communicative aims of Move 3 (describing the methodology) were only present in hard science abstracts. Interestingly, it was also found out that all the exclusive bundles in Move 5 (discussing the research and its findings) belonged to soft science abstracts. It could be concluded that members of different academic domains have different priorities for representing their research in academic abstracts. Writers of abstracts in hard and soft fields have different priorities for promoting their studies. That is, while hard fields view their methodology as a unique ‘selling point’ for their study, writers in soft fields prefer to place more emphasis on their research objectives and their possible theoretical implications. It is recommended that these variations are

investigated in conference proceedings abstracts since both soft and hard sciences disciplines are featured.

2.7 Metadiscourse

Metadiscourse comes into play when conducting analysis on discourse. This term was originally used by Harris (1959) in describing writers' or speakers' point of language use in order to enable them to draw a link among themselves, the receiver and the produced text (either spoken or written).

Later, Hyland (2005) made it clear on the necessity to examine the notion of metadiscourse terms on one hand and how the term is used on the other hand. This was aimed at showing the importance of metadiscourse in academic purposes and applied linguistics. Essentially, Hyland (2005) defined an established point of reference with regards to metadiscourse as he proposed 101 hedges and 64 boosters. He also established an aspect of linguistic research with a different perspective to writing within genres and broader discourse analysis.

Despite the fact that there are various descriptions of metadiscourse (Salar & Behzad, 2016; Hyland, 2005, 2004), several academics seem to agree on the linguistic and sociocognitive behavioral aspects of writers or speakers. With this, social engagement with the receiver, reader or listener are aimed at. To state it more simply, every writer, within all discourse settings, targets to achieve specific goals. These goals are expressed taking into consideration multiple factors. One such factor is the view of language being more than a way of exchanging information.

Hyland (2000) categorized metadiscourse into two. These were interactive metadiscourse and interactional metadiscourse. Interactive metadiscourse illustrates the

writer's awareness of readers in organizing discourse. It was aimed at assisting writers to express their points of view and guide readers' understandings of the text as the writer assumed. Interactional metadiscourse, however, emphasizes on the writers interaction with readers. It aims at involving readers in the argument and help the writer to express his or her attitude towards the text and readers. The sub-classifications of both interactive and interactional metadiscourse have been presented in Table 2.1.

2.7.1 Hedges and boosters

Hedges and boosters belong to the interactional metadiscourse according to Hyland and Tse (2004). They are used to show the writer's stance towards the presented information. Hedges mostly designate a certain degree of uncertainty which includes lexical items such as maybe, almost, from this perspective and perhaps. Boosters, on the other hand, are mainly used to support a writer's statement, as an aftermath of presenting strong evidence on the matter of investigation. Words and phrases categorized as boosters are certainly, indeed and undeniably. There are more examples of the usefulness of modality markers in writing a successful text. The use of hedges and boosters in English has also been researched with respect to cross-cultural differences in metadiscourse. A recent example is the study by Yağiz and Demir (2015) who investigated the use of boosters in research articles which were written in English by Turkish, Japanese and Anglophonic authors. Their results showed that Turkish authors use fewer boosters (such as epistemic verbs, epistemic adjectives and epistemic adverbs) in comparison to Anglophone and Japanese writers who use a higher number of boosters. As boosting supports authors' statements and findings in their articles, Yağiz and Demir (2015) explained that these differences in the use of metadiscourse markers do not mean that the Turkish authors are less confident about

their studies and research. They clarify that Turkish authors' cultural background dictates a subtler way of writing in comparison to the Anglophonic authors. Yağiz and Demir (2015) further pose the issue of English as a second or foreign language used by non-native authors. They propose that it is probably the lack of adequate knowledge of English metadiscoursal practices by non-native writers of English that stands behind the differences among authors with different first language backgrounds when comparative studies of this kind are done. There are but a few studies dealing with hedging in CAs. In a corpus of 60 English CAs submitted for an international conference in Linguistics, Agathopoulou (2009) found much more extensive use of hedging in high-rated rather than low-rated CAs, especially, in the moves Territory and Discussion. Moreover, in these moves, while in the high-rated CAs hedges outnumbered boosters by far, in the low-rated CAs there was an equal number of hedges and boosters. Nkemleke (2010) examined 207 English CAs of international linguistics conferences in Cameroon, UK and Germany and found that Cameroonians lag behind their academic peers abroad regarding the required use of hedging in English academic writing. On the other hand, in a corpus of 106 English CAs in social sciences from various conferences, Uysal (2014) found that in English CAs, native English and Indian authors employed hedging significantly less than their Turkish and Japanese counterparts. Uysal states that results such as these "call simple assumptions and overgeneralizations regarding Western and Eastern cultural styles into question" (p. 180).

Table 2.1: Hyland's (2000) metadiscourse classification

Category	Function	Examples
Interactive		
Transitions	Express relations between main Clauses	in addition; but; thus; and
Frame markers	Refer to discourse acts, sequences or stages	finally; to conclude; my purpose is
Endophoric Markers	Refer to information in other parts of the text	noted above; see Fig; in section 5
Evidentials	Refer to information from other Texts	according to Kwesi; Yaw states
Code glosses	Elaborate propositional meanings	namely; e.g.; such as; in other words
Interactional		
Hedges	Withhold commitment and open dialogue	might; perhaps; possible; about
Boosters	Emphasize certainty or close dialogue	in fact; definitely; it is clear that
Attitude markers	Express writer's attitude to proposition	unfortunately; I agree; surprisingly

2.8 Theoretical Frameworks

2.8.1 Systemic Functional Linguistic (SFL) Theory

The Systemic-Functional Linguist (SFL) approach to language, developed by Halliday in the 1960s, is a descriptive and interpretative theory of language that analyzes language as a strategic (or purposeful) and meaning-making resource (Halliday & Hassan, 1976; Halliday & Matthiessen, 2004). Halliday borrowed his fundamental ideas from the Prague School of linguists. There are two theoretical conceptions of SFL - the notion of 'system network' and the three metafunctions of language.

The first of these to be discussed in this section is the system network. Within this standpoint, SFL claims that meanings are located in a stratified systemic pattern of choices available for users when communicating their messages. In this theory, language is realized through the choices users make within a system which includes the lexico-grammatical level of text organization.

In addition to the system network, metafunction constitutes an essential component to the understanding of the systemic functional approach. It was derived from the twofold premise that language use is 'purposeful behaviour' and that it is structured according to the purposes of its users. This implies that the form of texts (texture) and their content should not be dissociated when one is analysing a text regarded as a form of social action (discourse). Halliday and Matthiessen (2004) also claim that context underlies the whole stratified system of language, for the layers of content (lexicogrammar and semantics) and the layers of expression (phonetics and phonology) have to interface with the extra-linguistic context ('what goes on outside

language’) to organize the ‘construal of experience’ and the ‘enactment of social processes into meaning (the stratum of semantics) and wording (the stratum of lexicogrammar) (Amua-Sekyi, 2010).

The second point is that SFL is concerned with how the speakers generate utterances and texts to convey their intended meanings through the generalised metafunctions that relate language to the outside world where interactants and their social roles matter. Metafunctions refer to the intrinsic functions that language is meant to perform in society. SFL theorists claim that it is these intrinsic functions of language that have, over the years, influenced its structure and organisation. According to SFL, language has three metafunctions: ideational, interpersonal and textual (Halliday & Hassan, 1976; Halliday & Matthiessen, 2004).

The ideational function refers to the use of language to represent or encode experience and meaning (Al-Khasawneh, 2010). The ideational metafunction is sub-classified into two components, namely, the experiential function and the logical function. The experiential component, as the name implies, emphasises the idea that language is a representation of experience. Thus, through this function, a speaker or writer is able to encode language in his/her experience of the phenomena of the real world as well as his/her experience of the internal world of his/her own consciousness: reactions, cognitions and perceptions, and also his linguistic acts of speaking and understanding (Halliday, 1971). The second component of ideational metafunction, which is the logical sub-function, refers to the logical relations that exist among the structural units of language such as coordination, subordination, modification and apposition (Halliday, 1971). The ideational meta-function (content) focuses on the linguistic representation of the world around us. This is the grammatical resources for

construing our experience of the world around and inside us. This is analysed in terms of transitivity system which is a choice between the six processes and the participants and circumstances associated with those processes. Thus, a clause in its ideational function is a means of representing patterns of experience to build a mental picture of reality. This is what people employ to make sense. This is what people employ to make sense of their experience of what goes on around them and inside them. These processes are sorted out in the semantic system of the language and expressed through the grammar of the clause. The system that works out the types of process and hence participants in the process and circumstances associated with the process is known as the Transitivity system (Halliday cited in Sadighi & Bavali, 2008). This corresponds with 'field' which is a linguistic representation of action as in who is doing what, to whom, when, and where. This is what is referred to as the Transitivity system, which deals with subject and object notion.

The interpersonal meta-function (level of formality) explains the interaction between speaker and addressee as well as the grammatical resources for engaging in social roles in general and speech roles in a dialogue form. Hence, interpersonal function corresponds with tenor, which is concerned with asking questions and making statements or giving commands (Halliday cited in Sadighi & Bavali, 2008).

The third meta-function (organisation) that Halliday talks about is the textual meta-function, which corresponds with mode. The textual-function is concerned with the creation of text with the presentation of ideational and interpersonal meanings as information that can be shared by the speaker and the listener. This function describes how texts are organised. That is what is made explicit and what is assumed as

background knowledge, how the known and the new are related, and how coherence and cohesion are achieved.

Language serves an interpersonal function in that it is a tool for establishing social relations, for creating and enacting identities and for creating social worlds. When people get involved in a communicative event, they do not only transmit and share meaning, but they also negotiate, establish and maintain relationships. They thus, define their social roles and assert their personality by managing the discourse in a peculiar way suitable to the context. All these are done through language, and the ability of language to do this is inherently a characteristic of its organisation. Interpersonal function, therefore, deals with the social and power relations among language users.

The textual function of language relates to its internal organisation of information in a text. As a semiotic system, language dedicates some of its lexicogrammatical resources to establishing links among the tokens of meaning it expresses. These resources include intra-sentence and inter sentence cohesive devices as well as inter-paragraph connectors. Generally, these resources maintain unity and continuity among the various ideational units in a text. It relates participants' situational roles to the discourse produced (Halliday, 1971).

The above exposition reveals the essence of systems or structures which help form an interlocking text and the text is produced only to the context. This brings to fore "context of situation". As pointed out earlier, language is only wrong or right depending on the context of use. Context of situation as a set of typified semiotic and semantic relations that make up a scenario of persons and actions and events from which the things which are said derive their meaning. Halliday's exposition on the context of situation led to what is referred to as register. When a particular context of situation

reoccurs for some time, typified ways of linguistic configurations referred to as lexico-grammatical features are formed. These lexico-grammatical features or resources that become typified in a particular context of use of language are what he referred to as *register*.

In view of the complexity of the linguistic phenomena which SFL seeks to analyse, only the ideational meanings realized in the lexico-grammatical stratum of hedges and boosters was analysed. The study focused on rhetorical moves in academic conferences abstracts of soft sciences and hard sciences. SFL theory has been summarized in the Figure 2.1.

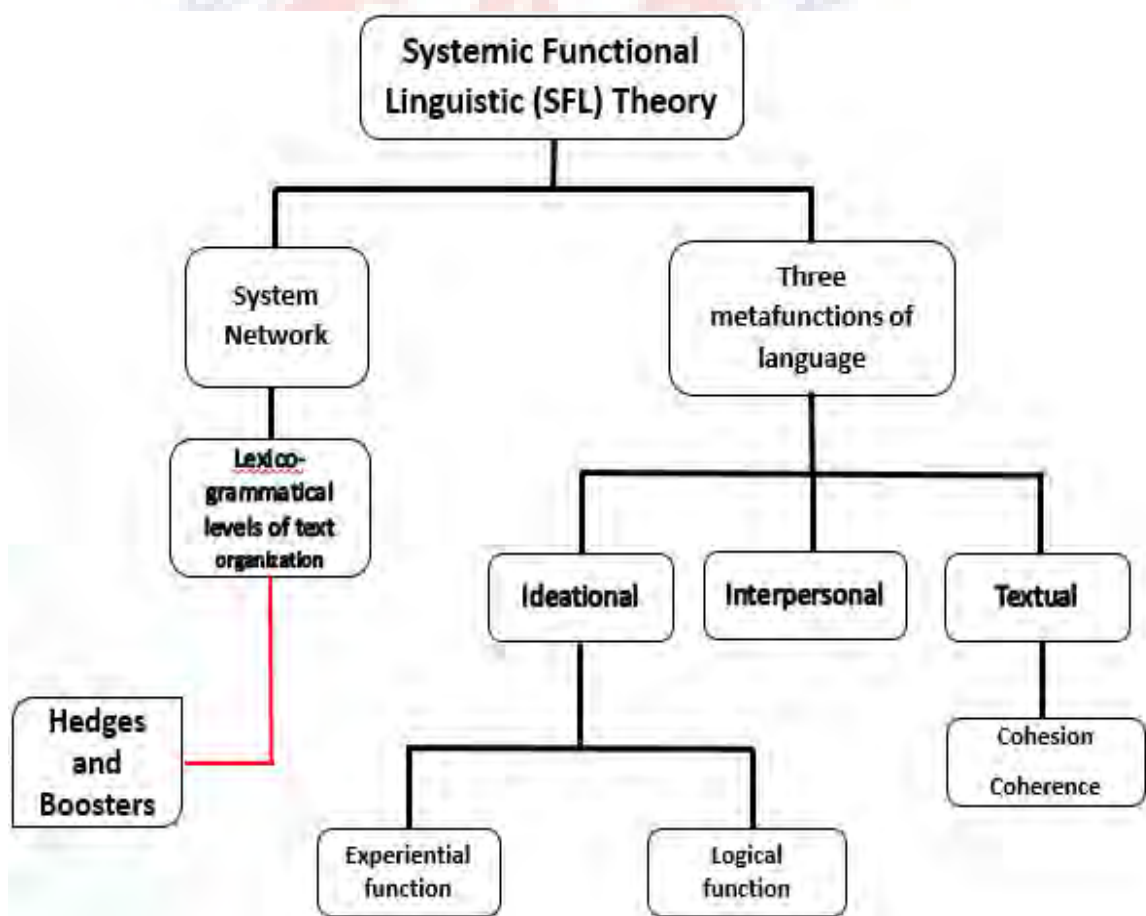


Figure 2.1: Schematic diagram illustrating Systemic Functional Linguistic (SFL) Theory (Adapted from Halliday (1971))

2.8.2 *The Theoretical Framework of Register*

According to Halliday (1985), register is the clustering of semantic features according to the situation type. Register in clearer terms looks at words that are used to form structures for meaning to be realised in a given contexts. And these must be construed as pertaining to the text type. This leads to what is referred to as ‘field’ which is the context within which language is situated; the ‘tenor’ which explains the relationship between participants in the language community, and ‘mode’ is the medium in which language is communicated. This means that the ‘field’ of discourse reveals the system of activity within a particular setting, which includes the participants, practices and the circumstances involved. The ‘tenor’ of discourse also describes the social relationships that are ensued between the participants and lastly the “mode” is identified by the channel or wavelength of communication, whether it is spoken or written.

The construction of a particular text is resonated or controlled by the field, tenor and mode. Hence, these elements come together to perform a certain linguistics function. This gives a text both *texture* and *structure*: texture comes from coherence in the way that the meanings fit together, and structure from certain obligatory elements appropriate to the purpose and context of the particular text (Arancon, 2013). Language is viewed as a “resource for making meaning”, where language and context are inseparable (Arancon, 2013). This explains the stratification of language study as presented in Figure 2.2. That is, the model in Figure 2.2 was taken from Arancon (2013) and modified as Tabiri’s levels of communication.

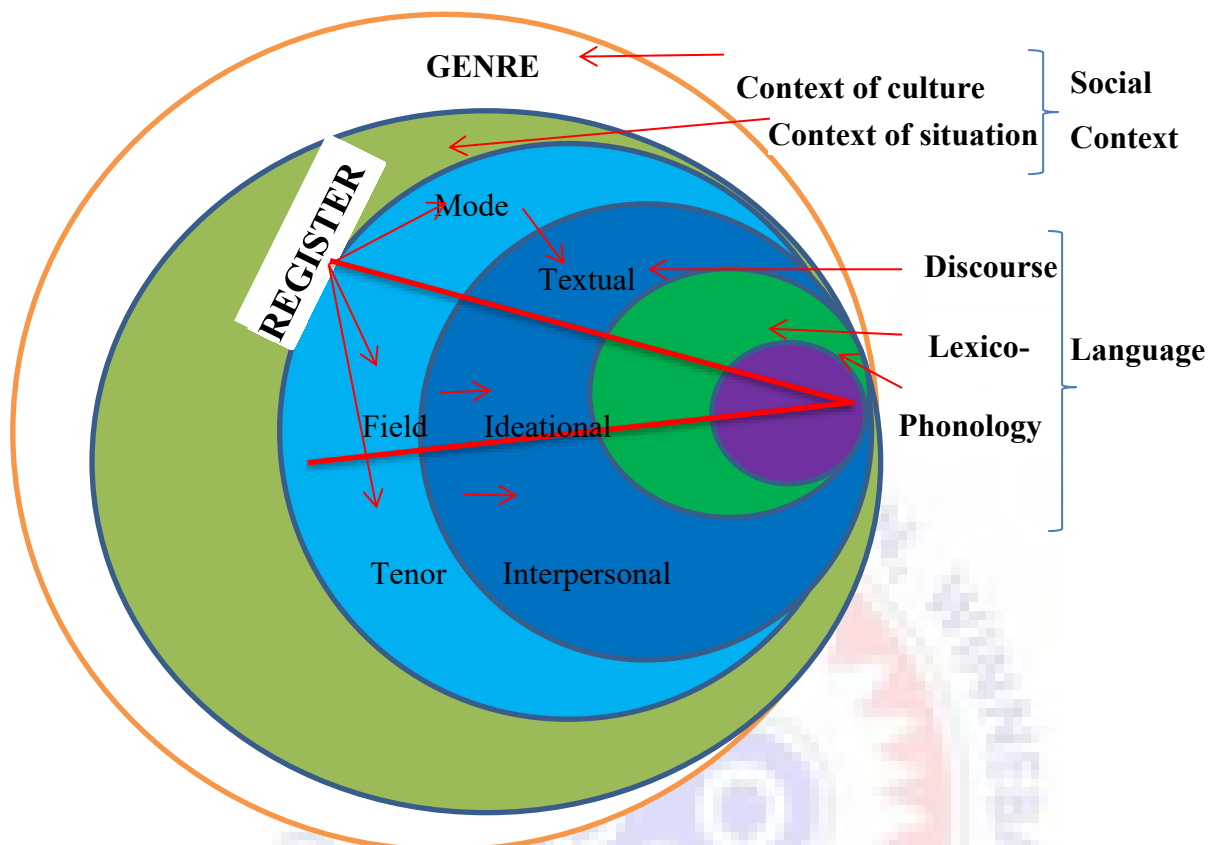


Figure 2.2: Tabiri's Levels of Communication: Discourse-Semantics (Adapted from Arancon, 2013).

2.8.3 Genre Theory

This section discusses the three schools of genre theory. It is then followed by a discussion on genre theory as espoused by Bhatia (2004) and how his theory is applied to a text. There are three schools of thought concerning the theory of genre. The first school of thought is the New Rhetoric (NR), which is also known as the North American School; the second is the Sydney School in Australia; and finally the English for Specific Purpose (ESP), which steers between the two schools. The New Rhetoric considers genre as a socially standard strategy, embodied in a typical form of discourse that has evolved for responding to a recurring type of rhetorical situation (Coe &

Freedman, 1998). Miller (1984), Berkenkotter and Huckin (1995) and Freedman and Medway (1994) are key scholars in this school of thought.

The New Rhetoric focuses on the context of a genre and studies the relationship between text type and rhetorical situation. Moreover, through ethnography, texts reveal attitudes, values and beliefs of the community that make use of the genre. Freedman and Medway (1994) believe that knowing the social context that surrounds a text helps in choosing the rhetoric which is suitable for a specific writing situation.

The focus of the Sydney School is the social purpose of a genre and describes the schematic structures that have developed to serve such purposes. This school of thought sees a genre as a staged, goal-oriented social process (Martin, 1992). According to Hyland (2002), the Sydney School stresses on the purposeful, interactive and sequential character of different genres and the ways that language is systematically linked to the context of the genre. Scholars in this school include Martin (1992, 1997), Cope (1993). They give attention to the moves, patterns of lexical, grammatical and cohesive choices which create the function of the stages and also focus on language and literacy education, especially for schools and adult migrant programmes.

The final school of thought, the English for Specific Purposes, is aimed at learners in specialized fields (Richards, 1988) - graduate students, students in technical or business training classes. The ESP rather steers between the first two schools. It draws on the systemic functional aspect of text structure by the Sydney School and employs the notion of intertextuality and dialogism by the New Rhetoric, emphasizing communicative purpose and the formal properties of texts. This school of thought considers a genre as a class of structured communicative events employed by specific discourse communities whose members share broad communicative purposes (Swales,

1990). Some scholars of the ESP are Swales (1990, 1993), Bhatia (1993) and Johns (1997).

The interest of scholars in the ESP has been to focus on translating research findings into materials for both L1 and L2 tertiary students as well as professionals. The underlying factor, therefore, is that genre analysis basically aims at describing and explaining the regularities of purpose, form and situated social action. The Australian and the ESP schools go a step further to make these genres functional for teachers in the classroom. The present study is, therefore, situated in the English for Specific Purposes (ESP) approach to genre analysis, spearheaded by Bhatia (1993). According to Bhatia (1993), the concept of genre has been so prevalent in literature, sociology and rhetoric for a long time and has assumed importance in linguistics recently. Genre analysis provides an insightful and thick description of academic and professional texts and has become a powerful and useful tool to arrive at significant form-function correlations, which can be utilized for a number of applied linguistic purposes.

Genre analysis is the study of situated linguistic behaviour in institutionalized academic or professional settings (Hyland, 2002). It does not only exhibit genuine interest in how people make use of language to achieve communicative goals but also presents a dynamic explanation of how expert users of a language control generic conventions to achieve a variety of complex goals. Bhatia (1993,1) agrees with Swales' (1990, 45) definition of genre as "a recognisable communicative event characterised by a set of communicative purpose(s) identified and mutually understood by the members of the professional or academic community in which it regularly occurs." The genre, according to Bhatia (1993) is most often highly structured and conventionalised with constraints on allowable contributions in terms of their intent, positioning, form and

functional value. These constraints, however, are often exploited by the expert members of the discourse community to achieve private intentions within the framework of socially recognised purpose(s).

In doing genre analysis, according to Bhatia (1993), the genre analyst must first identify the communicative purpose of the genre because it is the most privileged criterion for the identification of a genre (Bhatia 1993). The analyst must also understand that the essential unit of genre analysis is the “move” which enables categorization of sections of a text based on their archetypical communicative purpose. A ‘move’ can be explained as “an identifiable unit with a single purpose and analysing a move is a top-down approach to investigate the discourse structure of a genre” (Biber et al., 2007). It is the communicative purpose which determines the schematic structure embedded in a genre. The second step is for the analyst to assign a structural interpretation to the genre to be analysed by identifying the moves. Structural interpretation of the text-genre highlights the cognitive aspects of language organisation and reveals preferred ways of communicating intention in specific areas of inquiry (Bhatia, 1993). Bhatia (1993) advises analyst to note that moves do not necessarily coincide with paragraphs as it is possible to have two or three moves in one paragraph.

The next step is for the analyst to determine the frequency of moves and the textual space allocated to that move since the importance of a move is determined by these two features (Alfaki, 2015). The analyst determines the frequency of the moves by counting the number of occurrence of that move in the entire data. The textual space for each identified move should be identified. This is done by counting the words in each move. The fourth step is for the analyst to consider the sequence of the moves. Bhatia (1993) notes that it is not always obligatory for the writer of the genre to present

the moves in the same order. He observed that there can be a degree of freedom in the sequencing of the moves. The analyst then analyses the lexico-grammatical features in the text.

According to Bhatia (1993), the lexico-grammatical features can be analysed quantitatively by studying the specific features of language that are predominantly used in the variety to which the text belongs. This, according to him, can be done by undertaking a large-scale corpus-based statistical analysis of a representative sample of the variety in question. Again, the analyst can analyse frequency of syntactic properties in different genres as this provide necessary empirical evidence to confirm or disprove some of the intuitive and impressionistic statements made about the high or low incidence of certain lexico-grammatical features of various genres. Finally, the genre analyst double checks his/her finding against reactions from a specialist informant, who, generally, is a practicing member of the disciplinary culture in which the genre is routinely used. The specialist informant's reaction confirms the findings of the analyst, brings validity to his/her insights and adds psychological reality to his analysis. Bhatia (1993) advises that sometimes the analyst can consult a second informant to validate some or all of the data from the first one. Bhatia's (1993) genre theory is very useful for the present study as it will help in the identification of the moves in the data collected for my study. The genre theory and the various schools of thought have been summarised in Figure 2.3.

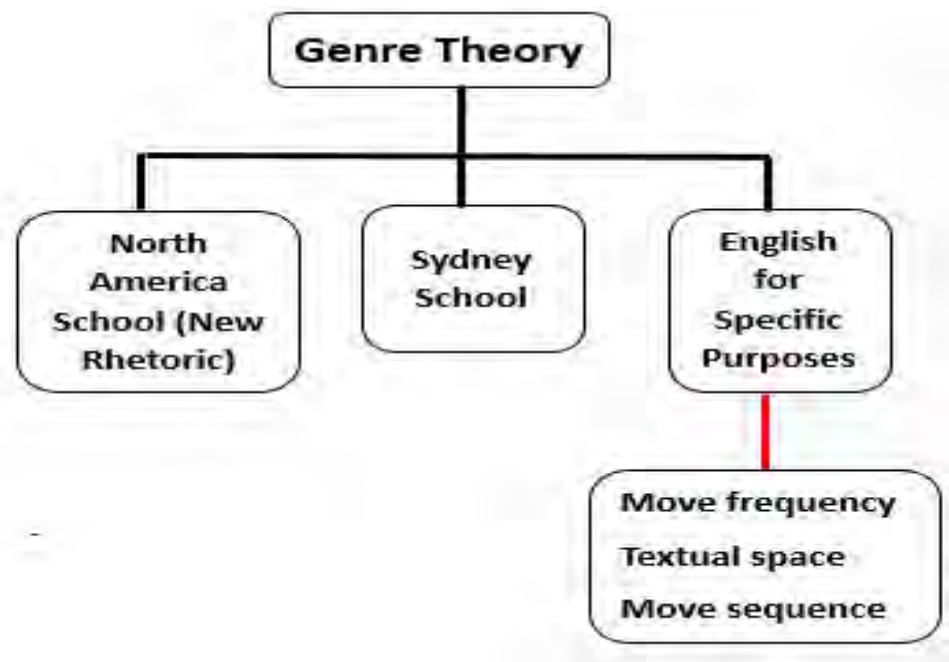


Figure 2.3: Schematic diagram illustrating the Genre Theory (Adapted from Bhattia (1993, 2004))

2.9 Theoretical Approach for the Study

The English for Specific Purpose (ESP) proposed by Swales (1990) was adopted for this study. In this approach, genre is seen as encompassing a class of structured communicative events utilised by specific discourse communities whose members share diverse purpose (Swales, 1990). The ESP has been perceived by Bloor (1998) as an application of SFL due to ESP's emphasis on communicative purpose and formal properties of texts.

This study concentrates on this approach as it takes into consideration the generic structure by looking at the textual space, sequencing and frequency. It also focuses on the lexico-grammatical features of hedges and boosters. Based on the unpinning theories, a conceptual framework was draw as shown in Figure 2.4. In this framework, academic conferences abstracts from hard science and soft science

disciplines were obtained and analysed for variations in metadiscourse elements (i.e. hedges and boosters) using the Hyland's (2005) model. Also, the conference abstracts were analysed for variations in move structure and sequence using the Hyland's (2000) as shown in Figure 2.4.

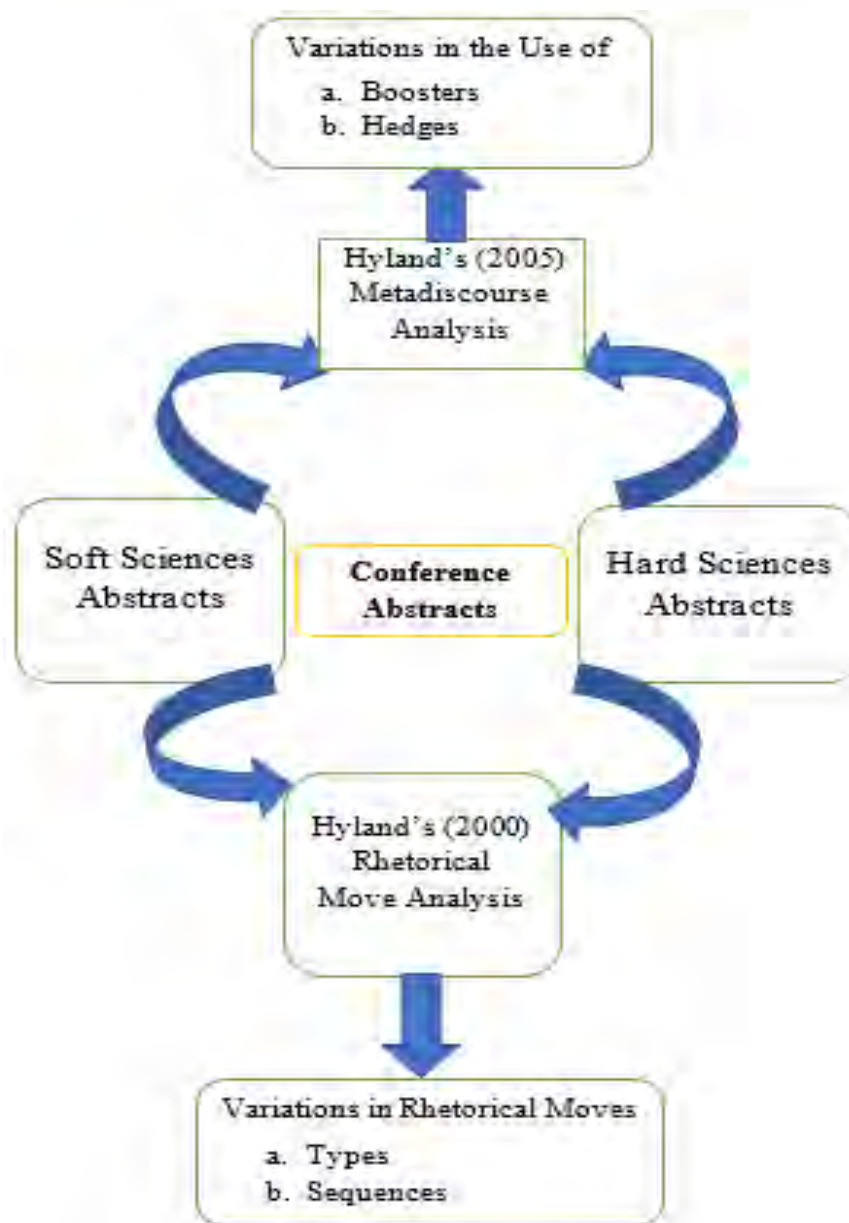


Figure 2.4: A conceptual framework for the study

2.10 Chapter Summary

The chapter has reviewed some literature related to the study. The chapter begun with introduction, review of moves and abstracts, models of rhetorical moves and empirical review on move analysis. Also, boosters and hedges as elements of metadiscourse, theoretical framework comprising of systemic functional linguistic theory, theoretical framework of registers as well as genre theory. A theoretical approach was adopted for the study and the chapter summarized. The next chapter explores the research methodology adopted for the study.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter focuses on study design, selection of the corpus, sampling criteria, inclusion criteria, rhetorical move analysis, classification and metadiscourse analysis. Also, the chapter summary was included.

3.2 Research Philosophy

There are two philosophies in social science. That is the positivists and the interpretivists philosophies. The positivists believe that social science disciplines should use the same methods and approaches as biology and physics to study the social world. By adopting such “scientific” techniques social scientists should be able, eventually, to uncover the laws that govern societies and social behaviour just as scientists have discovered the laws that govern the physical world (Neuman, 2007).

The positivists are of the view that every good scientific research should reveal objective truths about the causes of social action. Just as physics reveals that water boils at 100 degrees, good social research should tell us about absolute reasons for people’s behaviour. The positivists are interested in understanding the general laws that shape human behaviour, as a result, social scientists should also be interested in examining society as a whole. They are interested in explaining patterns of human behaviour or general social trends. In other words, they are interested in studying the ‘bigger picture’ objectively (Punch, 2005).

The positivists use quantitative methods such as questionnaires, official statistics (e.g. data from Ghana Statistical Service), and social surveys. These types of

data are crucial to Positivist research. Positivists need to collect statistical information in order to make comparisons. And in order to uncover general social trends. These methods also allow the researcher to remain relatively detached from the research process – this way, the values of the researcher should not interfere with the results of the research and knowledge should be objective (Myers, 2000).

The interpretivists, on the other hand, share a different view from the positivists. They believe that subjective understanding of people cannot be undermined, hence, serious importance should be given to it. Their focus is not on objectivity but subjective understanding. Thus interpretivism integrates human interest into a study. Accordingly, “interpretive researchers assume that access to reality is only through social constructions such as language, consciousness, shared meanings, and instruments” (Bryman, 2008: 105). According to Myers (2000), development of interpretivist philosophy is based on the critique of positivism in social sciences. Accordingly, this philosophy emphasizes qualitative analysis over quantitative analysis.

The main disadvantage associated with interpretivism relates to the subjective nature of this approach. It gives room for bias on behalf of researcher. Primary data gathered in interpretive studies cannot claim generalizability since it reflects individual perspectives and values instead of the structure. Consequently, the reliability and representativeness of research data are undermined to a certain extent as well.

In this thesis, the researcher the interpretivists philosophies to inform the data gathering process and analysis.

3.3 Study Design

According to Dey (1993), a research design is a way in which data for research is synthesized and analyzed. According to McMillan and Schumacher (1993: 479), qualitative research is defined as, “primarily an inductive process of organizing data into categories and identifying patterns (relationships) among categories.” This definition implies that data and meaning emerge “organically” from the research context. Qualitative research works out under a combination of observations, interviews, and document reviews. Qualitative research design seeks to develop a holistic, descriptive, and narrative data to inform the researcher’s understanding of a social or cultural phenomenon. This thesis utilised a qualitative methods to analyse the rhetorical differences between hard and soft sciences in two conference abstracts.

3.4 Unobtrusive Approach: Content Analysis

Unobtrusive research includes analysis of observational behavior, historical analysis of existing data such as statistics, physical traces of empirical data, and the content of culture. Unobtrusive research may not be considered as highly important like the traditional research methods, but it is an important tool in research as it does not interrupt or break the data gap and, therefore, allow some ideas to circulate within a particular space and time (Brabazon, 2010).

Neuman (2007) explained that content analysis is a type of unobtrusive research that is used to determine the presence of certain words or ideas in a set of texts or sets. Researchers explore the cohesion, meaning, and interaction of such words and ideas, and then make inferences about the messages within the texts, the authors, and the audience within a specific culture and time. Text, in this context, can broadly mean

books, articles, interviews, debates, newspaper articles, historical documents, speeches, broadcasts, informal chat or any spoken language.

In fact, indexing parts of a text using a structured content strategy can provide information about the content of the messages. When the analytical processes and procedures are precisely stated, content analysis can easily be replicated in the sense that other researchers can reproduce the test. It is possible to conduct a content analysis in a quantitative and qualitative manner (Punch, 2005).

Content analysis examines both the manifest and the latent content of a text. The former refers to the observable, countable components of the message whilst the latter denotes the meaning behind the manifest content. Manifest content in the form of images of women in advertisements engaged in activities such as domestic work or childcare, for example, might be taken as indicators of gender stereotyping, a latent concept. Both approaches (manifest and latent content) still require interpretation but the interpretations differ in gravity and level of thought (Graneheim & Lundman, 2004).

Content analysis can be used to study the main and structural characteristics of a text. Notable observations on what is said in the message. It's about how to do a structured job (Schreier, 2012). A content analysis of advertisements, for instance, might distinguish between the way in which the benefits of a product are described (substantive features) and the way in which the advertisement makes use of headings, different font sizes, the placement of graphics and so on (form features) (Punch, 2005).

Neuman (2007) argues that quantitative content analysis is one of the most common characteristics of research studies. However, there are some basic characteristics, especially the use of a validation strategy and the reliability evaluation method, which justifies its use as a research design, not just an analytical method.

The basic idea of qualitative content analysis is not just to proceed from the basic principle of Quantitative Content Analysis, but to understand the process of assigning categories to text passages as a qualitative-interpretive act, following content-analytical rules. In this context, Content Qualitative Analysis is a mixed method: it uses sections in the text as qualitative steps, working through many text passages and analysis of frequencies of categories as quantitative step (Bryman, 2008). It is important to note that, the qualitative content analysis itself is to be understood as a data analysis technique within a rule guided research process, and this research process is bound to both qualitative and quantitative research standards (Insch *et al.*, 1997; Harris, 2001).

Despite the numerous advantages that come along with content analysis, the procedure has its own weaknesses. The sampling process has been criticised to be associated with bias. Developing the coding scheme involves interpretation, even of manifest content, and thus risk similar biases to those faced by other measurement techniques (Insch *et al.*, 1997). Abstraction of content from its context can also create problems. There could be loss of meaning especially when words are taken in isolation. The approach also risks overlooking what is not said in a particular text, and at times what is omitted may be as important as what is included.

3.5 Selection of the corpus

The corpus to be studied in this research was drawn from the 4th International Postgraduate Conference and the Convention of Biomedical Research (CoBReG) books of abstracts for 2018 conference. The conferences were held from the 12th to 14th of June and 1st to 3rd of August 2018 respectively. The two conferences books of abstracts were purposively selected because the CoBReG book of abstract

predominantly contained several areas of laboratory-based research that could be classified as hard sciences. The 4th International Postgraduate Conference was also purposively selected as they predominantly contained abstracts that could be classified as soft sciences. Also, both conferences were held within a similar period in a year with about two months interval. Time was considered because earlier research agree that writing skills of people within a particular community change with time (Can *et al.*, 2016). Also, both were held in a similar geographical location (i.e. Ghana) with most of the participants coming from Ghana. This was considered because it has been established that culture plays an important role in determining lexico-grammatical choices of writers, particularly, the use of metadiscourse elements such as hedges and boosters (Lazoglou, 2017).

In all, 43 abstracts were published in the books of abstracts for the postgraduate conference book of abstracts comprising researches from the soft science disciplines such as sociology, psychology, business studies and education. For CoBReG, 93 abstracts were published in the book of abstracts which contained abstracts from the hard sciences such as Medicinal Plant Research, Pharmacology, Biochemistry, Anatomy, Chemical Pathology and Physiology. From this number, two subcorpora were compiled with 30 abstracts from the hard science disciplines and 30 others from the soft science disciplines.

3.6 Sampling Criteria/Sampling Procedures

The researcher purposively selected 30 laboratory-based hard sciences abstracts from the CoBReG conference book of abstracts and another 30 abstracts from the soft sciences disciplines from the 4th International Postgraduate Conference, 2018.

Purposive sampling technique was used to select only abstracts of empirical studies to be sure that theoretical and conceptual papers were excluded. This is in line with Hyland's (2000) assertion that abstracts of empirical studies show more explicit and relevant rhetorical moves compared to those of theoretical and conceptual papers. At the end of the process, it was found that the remaining of the abstracts for the soft sciences were 30. The researcher therefore used the non-probability sampling procedure in selecting a corpus of 30 to make a fair balance of abstracts for both soft and hard sciences.

3.7 Scope/Delimitation

The study was limited to only abstracts published in the 2018 edition of both conferences books of abstracts. Also, only abstracts of empirical studies were included. Abstracts of theoretical and conceptual papers were excluded. This is in line with Hyland's (2000) assertion that abstracts of empirical studies show more explicit and relevant rhetorical moves compared to those of theoretical and conceptual papers.

3.8 Data Analysis Procedure (Rhetorical moves analysis)

Hylands (2000) classification of rhetorical moves (introduction, purpose, method, product and conclusion) was used to analyse the move structure of the data. This was chosen ahead of other established models such as Bhatia's (1993) and Santos (1996) due to the larger sample from broader category of eight disciplines including applied linguistics, physics, biology, sociology philosophy, marketing electrical and mechanical engineering from which Hyland drew his samples unlike Santos' model which focused only on applied linguistics (Suntara & Usaha, 2013). This makes it the most reliable model to analyse abstracts from the soft and hard science disciplines.

Identification of the various moves was done manually by the researcher. The researcher carefully read the abstracts one after the other and indicated whether there was the presence of a move or an absence of a move by ticking under the moves on a coding sheet with either of the signs, (\surd for presence of move) and (\times for absence of a move). After the sorting activity, the number of moves under each of Hyland's 5 moves classifications were counted, analysed and as simple frequencies and percentages. The percentages were calculated using Microsoft Excel version 2013 on Microsoft Windows 7 software. Graphs were plotted using Graphpad prisms version 7.

3.9 Inter-rater reliability

To obtain an accurate classification of rhetorical units in the data set an earlier method was used (Croucher & Cronn-Mills, 2015). Here, the researcher went over the process of sorting and classification for three times. Another communication skills student was also asked to classify the rhetorical units of the same data set. Of the sixty abstracts, fifty-eight of them were classified without any discrepancy, hence inter-rater reliability was calculated to be 96.7%. The differences identified were analysed again and rectified until there were no more conflicting results.

3.10 Classification of Moves

Moves were categorised into three types according to their frequency (Biber et al., 2007) and classified as obligatory ($\geq 90\%$), conventional ($\geq 60\%$), and optional ($< 60\%$). This is in contrast with the types of frequency adopted by Swales (1990), Bhatia (1993) and Afful (2005), who categorized all moves from 50% upwards as obligatory moves and those below 50% as optional moves. The classification adopted by Biber *et al.* (2007) was adopted because of its robust nature and that Ninpanit (2017)

used it to analyse abstracts of conference proceedings. This afforded easy comparisons with previous studies.

3.11 Textual Space Analysis

The number of words in each of the moves classified were also counted using the Microsoft-word-count to determine which of the moves was devoted a higher number of words. The counted words were then expressed in percentages of word composition and presented as graphs. The higher the percentage word composition employed by a researcher, the more important that move is to the researcher.

3.12 Metadiscourse Analysis

In terms of the lexico-grammatical resources, the study employed the use of boosters and hedges, which are essential elements of metadiscourse. This was based on Hyland's (2005) lists which comprise 101 lexical items and phrases identified as hedges and 64 other lexical items and phrases identified as boosters. The frequency of each of the lexical items was counted using Microsoft Word search tool and the context screened for either hedges or boosters in their usage. Tables 3.1 and 3.2 contain the list of the hedges and boosters. The frequencies were indicated on a coding sheet.

Table 3.1: List of 101 lexical items identified as hedges by Hyland (2005).

1. About	29. Fairly	53. May	81. Suggested
2. Almost	30. Feel	54. Maybe	82. Suggests
3. Apparent	31. Feels	55. Might	83. Suppose
4. Apparently	32. Felt	56. mostly	84. Supposed
5. Appear	33. Frequently	57. Often	85. Supposes
6. Appeared	34. From my	58. On the whole	86. Suspect
7. Appears	perspective	59. Ought	87. Suspects
8. Approximately	35. From our	60. Perhaps	88. Tend to
9. Argue	perspective	61. Plausible	89. Tended to
10. Argued	36. From this	62. Plausibly	90. Tends to
11. Argues	perspective-	63. Possible	91. To my
12. Around	37. Generally	64. Possibly	knowledge-
13. Assume	38. Guess	65. Postulate	92. Typical
14. Assumed	39. Indicate	66. Postulated	93. Typically
15. Broadly-	40. Indicated	67. Postulates	94. Uncertain
16. Certain amount	41. Indicates	68. Presumable	95. Uncertainly
17. Certain extent	42. In general	69. Presumably	96. Unclear
18. Certain level	43. In most cases-	70. Probable	97. Unclearly
19. Claim	44. In most	71. Probably	98. Unlikely
20. claimed	instances	72. Quite-	99. Usually
21. Claims	45. In my opinion-	73. Rather	100. Would
22. Could	46. In my view	74. Relatively	101. Wouldn't
23. Couldn't	47. In this view	75. Roughly-	
24. Doubt	48. In our opinion	76. Seems	
25. Doubtful	49. In our view	77. Should	
26. Essentially	50. Largely	78. Sometimes	
27. Estimate	51. Likely	79. Somewhat	
28. Estimated	52. Mainly	80. Suggest	

Table 3.2: List of 64 lexical items identified as boosters by Hyland (2005)

1. Actually	23. Finds	44. Proved
2. Always	24. Found	45. Proves
3. Believe	25. In fact	46. Realized
4. Believed	26. Incontestable	47. Realizes
5. Believes	27. Incontestably	48. Really
6. Beyond Doubt	28. Incontrovertible	49. Show
7. Certain	29. Incontrovertibly	50. Showed
8. Certainly	30. Indeed	51. Shown
9. Clear	31. Indisputable	52. Shows
10. Clearly	32. Indisputably	53. Sure
11. Decidedly	33. Know	54. Surely
12. Definite	34. Known	55. Think
13. Definitely	35. Must	56. Thinks
14. Demonstrate	(Possibility)-	57. Thought
15. Demonstrated	36. Never	58. Truly
16. Demonstrates	37. No doubt	59. True
17. Doubtless	38. Obvious	60. Undeniable
18. Establish	39. Obviously	61. Undeniably
19. Established	40. Of course	62. Undisputedly
20. Evident	41. Prove	63. Undoubtedly
21. Evidently	42. Proven	64. Without doubt
22. Find	43. Realize	

3.13 Chapter Summary

The chapter contained discussions on the methodological processes that were employed in the study. These included research philosophy, study design, content analysis, selection of the corpus, sampling criteria/sampling procedure, inclusion criteria and data analysis procedure. Also, Classification of moves, Textual Space Analysis were discussed. The chapter ended with the chapter's summary.



CHAPTER FOUR

FINDINGS

4.1 Introduction

This chapter presents the results from the study which include rhetorical move structure, textual space, move sequences and metadiscourse elements (hedges and boosters) employed in the conference abstracts. The chapter was subsequently summarized.

4.2 Rhetorical move structure

To determine the rhetorical move variations between the soft sciences and the hard sciences, Hyland's (2000) rhetorical move framework of 5 move structure comprising introduction (I), purpose (P), method (M), product (Pr) and conclusion (C) was adopted. Quantitative content analysis was used to identify, code and analyse the various moves in the various abstracts.

Tables 4.1 and 4.1 are coding sheets adopted for the hard sciences and the soft sciences respectively. Table 4.3, however, presents a descriptive statistics of the results obtained comprising frequencies of moves and their corresponding percentages

Table 4.1: A tabulation of rhetorical moves variation in soft sciences

No.	Introduction	Purpose	Method	Product	Conclusion
1	×	√	√	√	√
2	√	√	√	√	√
3	√	√	√	√	√
4	×	√	√	√	√
5	√	√	√	√	√
6	√	√	√	√	√
7	×	×	√	√	×
8	×	√	√	√	√
9	×	√	√	√	√
10	√	√	√	√	√
11	×	√	√	√	√
12	×	√	√	√	√
13	√	√	√	√	√
14	√	√	√	×	√
15	√	×	√	√	√
16	√	√	√	√	×
17	×	√	√	√	√
18	√	√	√	√	√
19	√	√	√	√	√
20	×	√	√	√	√
21	√	√	√	√	√
22	×	√	√	√	√
23	×	√	√	√	√
24	×	√	√	√	√
25	√	√	√	×	√
26	√	√	√	√	√
27	×	√	√	√	√
28	√	√	√	√	√
29	×	√	√	√	√
30	×	√	√	√	√
Total	15	28	30	28	28

Table 4.2: A tabulation of rhetorical moves variation in hard sciences

No.	Introduction	Purpose	Method	Product	Conclusion
1	×	√	√	√	×
2	√	√	√	√	×
3	×	√	√	√	√
4	√	√	√	√	×
5	√	√	√	√	√
6	×	√	√	√	√
7	√	×	√	√	√
8	√	√	√	√	√
9	√	√	√	√	√
10	√	√	√	√	√
11	√	√	√	√	×
12	√	√	√	√	√
13	√	√	√	√	√
14	√	√	√	√	√
15	×	√	√	√	√
16	√	×	√	√	√
17	√	√	√	√	√
18	√	√	√	√	√
19	√	×	√	√	√
20	√	√	√	√	√
21	√	√	√	√	√
22	√	√	√	√	×
23	×	√	√	√	√
24	×	√	√	√	×
25	√	√	√	√	√
26	√	√	√	√	×
27	√	×	√	√	√
28	√	√	√	√	√
29	√	×	√	√	√
30	√	√	√	√	√
Total	24	25	30	30	24

Table 4.3: Frequencies and percentages of rhetorical moves in soft and hard sciences

Moves	Soft Sciences		Hard Sciences	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Introduction	15	50.0	24	80.0
Purpose	28	93.3	25	83.3
Method	30	100.0	30	100.0
Product	28	93.3	30	100.0
Conclusion	28	93.3	24	80.0

Results presented in Tables 4.1, 4.2 and 4.3 show the frequencies of rhetorical moves in soft and hard sciences. It was found that 15 out of 30 abstracts of the soft sciences had the introductory move representing 50% whereas 24 abstracts in the hard sciences had the introductory move representing 80%. On the purpose move, 28 abstracts contained the purpose move representing 93.3% in the soft sciences whereas 25 abstracts representing 83.3% were found in the hard sciences. The method move was the only move which recorded 30/30 in both soft and hard sciences representing 100%. The product move recorded 28 in the soft sciences and 30 in the hard sciences representing 93.3 and 100% respectively. In the conclusion move, the soft sciences recorded 28 inclusion representing 93.30% whereas the soft sciences recorded 24 inclusion representing 80%.

4.3.1 Textual space

Textual space involves the amount of space a move occupies with regard to the number of words in that move. This was performed by counting the number of words

using Microsoft® office word counter. The textual space has been computed as the percentage word composition and presented graphically as shown in Figure 4.1.

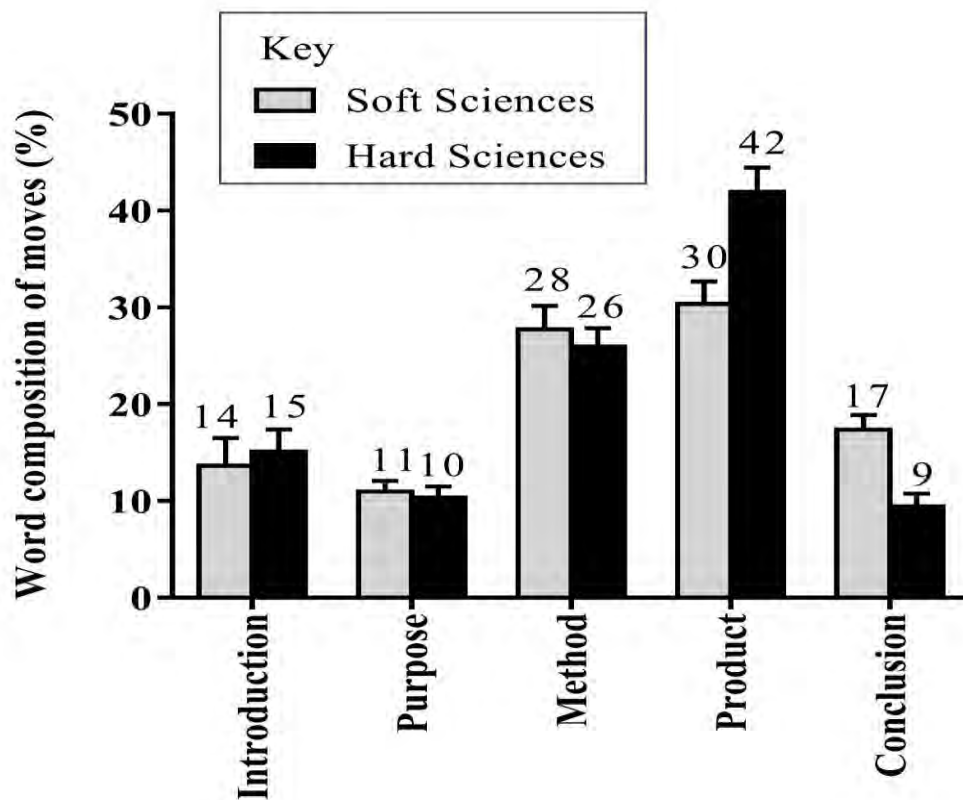


Figure 4.1: Percentage word composition of rhetorical moves in the soft and hard sciences.

As presented in Figure 4.1, the highest textual space of an average of 42% was allocated to the product move by the hard sciences. This was followed by the method, introduction, purpose and conclusion move which occupied an average of 28%, 15%, 11% and 9% respectively. Similarly, the most predominant move type that occupied the highest textual space was the product move which was allocated an average of 30%. This was followed by method, conclusion, introduction and purpose. It could also be

realized that the move types in hard sciences that occupied more space than their corresponding move types in soft sciences were the product and introduction move.

4.4 Rhetorical Moves Sequences

To determine the variations in the move sequences, Hyland's (2000) framework of move sequence comprising introduction-purpose-method-product-conclusion was adopted. The various moves were coded on a coding sheet as presented in Figure 4.1 and 4.2. The sequences were developed and quantified. Simple frequencies and percentages were computed and presented in Table 4.4 and Figure 4.2.

Table 4.4: Frequency of rhetorical move sequences in soft sciences and hard sciences.

No.	Move Sequence	Soft Sciences		Hard Sciences	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	I-P-M-Pr-C	10	33.3	14	46.7
2	P-M-Pr-C	13	43.3	4	13.3
3	I-P-M-C	2	6.7	-	-
4	I-M-Pr-C	2	6.7	5	17
5	I-P-M-Pr	1	3.3	5	17
6	M-Pr-C	1	3.3	-	-
7	M-Pr	1	3.3	-	-
8	P-M-Pr	-	-	2	6.7
Total		30	100	30	100

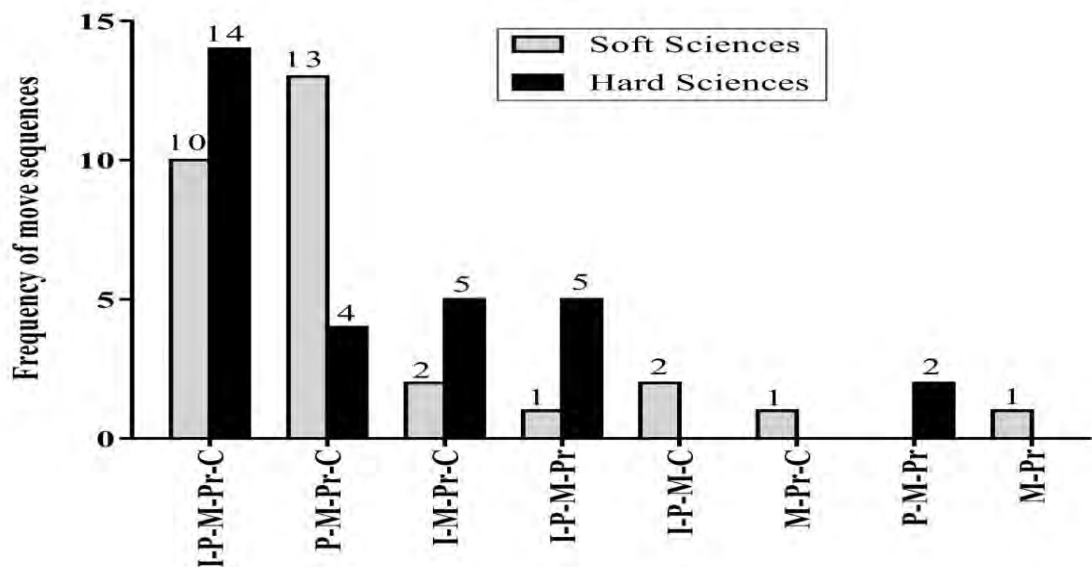


Figure 4.2 Frequency of move sequences in soft and hard sciences

Table 4.4 and Figure 4.2 show the most common rhetorical move sequence in the soft sciences was P-M-Pr-C which occurred in 13 out of the 30 abstracts representing 43.3%. This was followed by I-P-M-Pr-C which occurred in about 33.3% (10 out of 30) of the soft sciences abstracts. I-P-M-C and I-M-Pr-C occurred only twice in the soft sciences abstracts. Move structures I-P-M-Pr-C, M-Pr-C and M-Pr occurred only once in the soft sciences abstracts.

In the hard sciences abstracts, on the other hand, the most familiar rhetorical move structure was I-P-M-Pr-C which occurred in almost half (14 out 30) of the abstracts representing 46.7%. This was followed by I-M-Pr-C and I-P-M-Pr with each occurring in 17% of the hard sciences abstracts. This was followed by P-M-Pr-C and P-M-Pr which occurred in 13.3 and 6.7% of the abstracts respectively.

Rhetorical move structures such as I-P-M-C, M-Pr-C and M-Pr which occurred in the soft sciences did not occur at all in the hard sciences whereas P-M-Pr which occurred in the hard sciences did not occur in the soft sciences.

4.5 Metadiscourse Analysis

To address the last research question on variations in metadiscourse analysis between the soft sciences and the hard sciences, Hyland (2005) lists of interactional markers were utilized in this part of the study. Here, the focus was on the use of hedges and boosters in the selected conference abstracts. Hyland cites a total number of 101 lexical items and phrases which are used as hedges, and 64 used as boosters. Each of the lexical items were identified in the abstracts using Microsoft word search. The hit words that appear are contextually analysed to ensure they were employed as hedges or boosters. They were then presented as simple frequencies as shown in Tables 4.6 and 4.7.

Table 4.5: Frequency of hedges in soft sciences and hard sciences

Soft Sciences		Hard Sciences		
	Hedge	Frequency	Hedge	Frequency
1	Should	22	Should	1
2	Suggested/suggests/suggest	11	suggest/suggests/suggested	10
3	Indicate/indicated/indicates	6	Indicate	3
4	Could	5	Could	3
5	Often	5	Often	1
6	Largely	3	Largely	1
7	Would	3	Would	2
8	Almost	1	Almost	3
9	May	2	May/Might	8
10	About	1	About	2
11	Claim	1	Claim	1
12	Estimate	1	Estimated	2
13	Relatively	1	Relatively	6
14	Seems	1	Seemingly	2
15	From the perspective	1	Quite	1
16	Likely	1	Possibly/ Possible	4
17	Mainly	2	Mostly	1
18	Usually	1	Tended to	1
19	Argue	1	In most	1
20			Essential	1
21			Generally	2
22			Approximately	1
23			Apparent	1
Total:		69	Total:	58

As shown in Tables 4.5 and 4.6, analysis of the meta-discoursal elements using Hyland's 101 lexical items and phrases as hedges (Hyland, 2005), revealed that in the hard sciences, 'should' appeared 22 times as a hedging element. 'suggested, Suggests and Suggest' also appeared 11 times. 'Indicate, Indicated and Indicates appeared six times. The element 'Could' and 'Often' appeared five times each whereas 'Largely and 'Would' appeared 3 times each. 'Mainly' and 'May' occurred twice each whereas 'About', 'Almost', 'Argue', 'Claims', Estimated, 'From the perspective', 'Likely', 'Relatively', 'Seems' and 'Usually' appeared once in all the 30 abstracts as a hedging element. In total, 69 hedging elements were found in the soft sciences abstracts.

On the other hand in the hard sciences, it was realized that the hedging element, 'Suggest', 'Suggests' and 'Suggested' appeared 10 times whereas 'May', 'Might', and 'Relatively' appeared 8 and 6 times respectively. 'Possible', 'indicate', 'Could' and 'Almost' all appeared 3 times each whereas 'Would', 'Seemingly', 'Generally', 'Estimated' and 'About' also appeared twice each in the abstracts. 'Tended to', 'Should', 'Quite', 'Possible', 'Often', 'Mostly', 'Largely', 'In most cases', 'Essential', 'Claim', 'Approximately' and 'Apparent' appeared once each in all the 30 abstracts of hard sciences. In all, 58 hedging elements were found in the hard sciences.

Table 4.6: Frequency of boosters in soft sciences and hard sciences

Soft Sciences			Hard Sciences	
1	Booster	Frequency	Booster	Frequency
2	Show/showed/shown	8	Show/showed/shown	15
3	Found	11	Found	7
4	Established	3	Established	1
5	Must	3	Must	2
6	Evident/evidence/evidently	2	Evidence	3
7	Indeed	1	Indeed	1
8	Realized	1	Evident	1
9	Clear/Clearly	3	Known	5
10	Always	1	Demonstrated	1
11			Believed	1
	Total	33	Total	37

Analyzing the aspect of boosters using Hyland's 64 boosters in the soft sciences, it was found out that the word, 'Found' appeared 11 times whereas 'Show', 'Showed' and 'shown' appeared 8 times. 'Established', 'Must' and 'Clear or Cleary' appeared three times each. 'Evident and evidently' appeared twice whereas 'Realized', 'Indeed' and 'Always' all appeared once each. In total, there were 33 booster elements found in the soft sciences.

On the other hand, in the hard sciences, the booster elements 'Show, Showed and Shown' appeared 15 times whereas 'Found', 'Known', 'Evidence' and 'Must'

appeared 7, 5, 3, and 2 times respectively. 'Indeed', 'Evident', 'Established', 'Demonstrated' and 'Believed' appeared once each in the 30 abstracts of hard sciences. In total, 37 boosters were recorded in the hard sciences.

4.5.1 Examples of soft sciences hedges

Should

Therefore, it is recommended that, the IEPA **should** intensify its collaborative efforts with the Ministry of Education especially the Ghana Education Service towards its continual provision of the needed education and training aimed at improving planning, leadership and management capabilities of personnel in the education sector. (S4)

Suggested/Suggests/suggesting

The results of the study further indicated that transformational leadership style significantly influenced financial performance, innovation and employee turnover, **suggesting** that leadership style affect organizational performance. (S2)

The findings **suggests** that the training and certification graduates received from IEPA, to a large extent, remains relevant to their job placement. (S4)

Indicated

Evidence from the study **indicated** that salary and promotion, supportive staff and general satisfaction were the major factors that contribute to job satisfaction of staff of UCC. (S1)

Could

The key findings were that parent-school partnership in the area of provision of learning resources (textbooks, mathematical sets, and exercise books etc.), visiting the school, monitoring pupils' school work and attending PTA meetings **could** greatly have impact on pupils' academic performance. (S12)

Often

However, students are **often** not afforded the full opportunity to participate in decisions by adult members of their colleges, directly or indirectly. (S5)

Largely

The study found that, **largely**, IEPA and her graduates have contributed, and still continues to contribute to the training of the country's human resources to take up useful roles in the education sector as well as other productive sectors of the Ghanaian economy suggesting that, IEPA indeed was/is chalking up some modest gains in various sectors of the Ghanaian economy.(S29)

Mainly

The findings of the study revealed that students' participation in decision-making at UCC is **mainly** centred on decisions on an assessment of lecturers, hall administration, students' welfare, and preparation of time table. (S27)

May

Furthermore, the respondents agreed with the statements that cost-sharing **may** have negative effect on their academic performance. (S17)

About

The food security indices estimated revealed that less than a quarter (24.1%) of the households were food secure, 22.1 percent were marginally food secure, **about** half (49.7%) were moderately food insecure while 4.1 percent were severely food insecure. Maize farming households were most significantly food secure using LCS followed by the FES and then FCS.(S21)

Almost

It is recommended that the Ghana Education Service (GES) should increase the involvement of teachers in discussions and decisions relating to the curriculum and its implementation through the institution of suggestion boxes and similar other media for **almost** all teachers' concerns to be heard and addressed.(S8)

Argued

The recent one is WFP's CARI Console which was **argued** to be rigorous and valid for assessing food security at household and national levels. (S21)

Claim

Cashew farmers perceive extension not to have performed its roles adequately to help develop the value chain. Financial support (particularly loans) from banks is not available to cashew farmers and majority of them (90.3%) **claim** banks in the Brong-Ahafo are not cashew farmer friendly.(S20)

Estimated

The food security indices **estimated** revealed that less than a quarter (24.1%) of the households were food secure, 22.1 percent were marginally food secure,

about half (49.7%) were moderately food insecure while 4.1 percent were severely food insecure. (S21)

From the perspective

The article concludes that challenges identified in this study by students suggest that **from the perspective** of students, cost-sharing affects quality tertiary education negatively. (S18)

Likely

The findings again suggest that students who experience high stakes of test anxiety are more **likely** to perform academically low. (S9)

Seems

This brings to bare the relationship between test anxiety and academic performance which is an enlightenment on what literature **seems** to suggest that high stakes of test anxiety account for low academic performance. (S9)

4.5.1 Examples of hard sciences hedges

About

About twice the MIC was required to prevent 50% biofilm formation ($BIC_{50} = 57.48 \mu\text{g/mL}$ (H11)

Almost

Although the overall prevalence of *P. falciparum* and *P. malariae* in the study sites were only 22% and 1% respectively, one school had a prevalence of **almost** 90% *P. falciparum* and 6% of *P. malariae*.(H5).

Apparent/apparently

Ninety participants were recruited; 45 were patients clinically diagnosed with hypertension and other 45 participants were also **apparently** healthy controls.

(H20)

Appear

The thin anterolateral abdominal muscles on the affected side **appear** to show increased tone during rest, lacking the ability to contract optimally during activity when compared to the non-affected side. (H12)

Approximately

Protease activity determined revealed **approximately** 70% inhibition of proteolytic activity at $\frac{1}{2}$ MIC. (H11)

Certain amount/level/active

The phylogeny of their VP4 genes confirmed the recent suggestion that certain P[8]b strains originated in Asia and subsequently migrated to Europe, from where they were seeded to the Middle East, and then sub-Saharan Africa.

(H25)

Could/couldn't

Boiling was found to give generally lower GI in the white and water yams, and **could** therefore be applied in the preparation of diets with lower GI for diabetics. (H26)

Variations in cell cycle arrest, phenotypes and cytokinesis in *Leishmania spp.* was triggered by compounds suggesting differences in effects on parasites, hence further investigation **could** present potential leads against

Leishmaniasis. (H16)

4.6 Chapter Summary

The chapter provided results that answered the research questions posed at the beginning of the thesis. These included results for rhetorical move structure, textual space, move sequences and the use of metadiscourse elements such as hedges and boosters. The chapter ended with a summary.



CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Introduction

This chapter presents the discussion of the results obtained from the study. This include discussions on rhetorical move structure variations, differences in textual space, move sequences and metadiscourse analysis.

5.2 Rhetorical move structure variations in soft sciences and hard sciences abstracts

The results from the study revealed that abstracts from the two disciplines conform to the general structure of abstracts. They make use of all the moves that have been identified to be present in abstracts. These moves are the introduction, purpose, method, product and conclusion. The accrued results support the work of Hyland's (2000) whose model specifies five basic moves for abstracts; (1) introduction, (2) purpose, (3) method, (4) product and (5) conclusion and this was based on the traditional IMRD model comprising of introduction, method, results and discussion. Hyland modified this by teasing out purpose from the introduction and changing the name of results to the product. He also took out discussion and replaced it with the conclusion.

The results support the claims of Ren and Li (2011) who reported that expert writers are often selective in the number of moves they include in their abstracts. As such, only moves that can contribute to their persuasive agenda are included in their abstracts unlike novice student writers whose primary concern is to satisfy informative function of abstracts and as many moves that could support that purpose. The

participants of the two conferences were experts in their respective fields and in cases where students were involved in the writing of the abstracts, expert supervisors gave their inputs. Ren and Li (2011) made this assertion based on the assumption that research article abstracts are written by experienced researchers whereas Masters students' thesis abstracts are written by novice researchers. In their work, two sets of 25 expert-written abstracts from five journals in Applied Linguistics and 25 abstracts of Chinese Masters students' thesis all in 2007 were subjected to Hyland's (2000) five rhetorical moves model. Random sampling technique was used. It was found that experts seem to pay attention to the persuasive role rather than the informative role of research article abstracts, while student writers tend to pay more attention to the informative role rather than the persuasive role of the thesis. As such, though all the five (5) basic rhetorical moves in developing abstracts are commonly found in the abstracts written by both experts and student writers, experts tend to be more selective in their use of the moves to best promote their papers, while student writers tend to include all the moves to be more informative of the content and structure of their thesis.

Though abstracts from both the soft and the hard sciences showed some similarities, they also showed some striking variations that needed to be highlighted. To begin with, whereas 43.3% of HSA followed Hyland's (2000) five move rhetorical structure, only 33.3% of SSA followed the Hyland's model. This was in a sharp contrast with an earlier published research where approximately 87% of the conference proceeding abstracts analyzed had one or more missing rhetorical moves (Sidek *et al.* 2016), hence deviating from the model prescribed by Hyland (2000). In another study conducted by Ninpanit (2017), none of the abstracts submitted for the conference completely followed the Hyland's model as there were one or more missing moves. It

is worth-mentioning that Hyland (2000) proposed that a good and well-written abstract should all follow the relevant rhetorical moves which are introduction, purpose, method, product and conclusion.

From results, the introduction move occurred in only 50% of the soft sciences abstracts but in 80% of the hard science abstracts. This suggests it was an optional move (<60%) in soft sciences but conventional move in hard sciences abstracts (>60% but less than 90%). This agrees with an earlier report by Suntara & Ushala (2013) who found that the introductory move is an optional move in soft sciences. Suntara & Ushala (2013) investigated rhetorical moves in research article abstracts in two related disciplines of soft sciences. To do this, they explored rhetorical moves variations from 200 research article abstracts using three journals selected from the fields of Applied Linguistics and three from Linguistics and they found that both disciplines consider the introductory move as optional. On the other hand, Ninpanit (2017) who investigated the rhetorical structures of conference proceedings abstracts (CP) among Thai researchers based on Hyland's framework (2000) found that abstracts in education (soft science discipline) perceive the introductory move as optional whereas those in health (a mixture of hard and soft sciences) perceive the introductory move as a conventional move. In their research, CP abstracts across two disciplines, namely education (ED) (N=14) and health sciences (HS) (N=14) were randomly selected from the proceedings of a graduate research conference and analysed.

With respect to the purpose move, over 93% of soft sciences abstracts included it whereas 83% of hard sciences abstracts included it. This means it was obligatory (>90%) move in soft sciences but conventional (>60% but less than 90%) in the hard sciences abstracts. The findings sharply deviates from an earlier related study in

conference abstracts conducted by Sidek *et al.* (2016) who found that only 27.1% of authors included the purpose move. This means the purpose move was optional. Their study aimed at examining whether the abstracts provided in conference proceedings include the essential rhetorical moves and whether the moves were presented in the sequence according to the Hyland's (2000) five-move model. Their study utilised the conference book of abstracts from the Public Higher Education Conference in Malaysia. Purposive sampling technique was used to select 23 abstracts. Abstracts written in English only and authored by academics in the field of Language and Education in Higher Education was selected. Also, empirically based papers were selected whereas theoretical and conceptual papers were excluded. The corpus used in this study could be categorized as soft sciences. However, this current study strongly agrees with the results obtained by Ninpanit (2017) who found that the purpose move was obligatory in both education and health sciences abstracts published in the said conference proceedings.

On the method move, the results from the study indicate that all abstracts in both the soft and the hard sciences included it in their abstracts. This suggests the method move was considered obligatory (>90) by authors from both soft sciences and hard sciences background. This agrees with the results obtained by both Sidek *et al.* (2016) and Ninpanit (2017). This is simply the case because all these studies examined only empirical studies but not theoretical/conceptual research abstracts. As argued by Hyland (2000), empirical studies fall in line with his model because they constitute original empirical research which usually includes methods used. Again, although Can *et al.* (2016) did not use the Hyland (2000) framework, they still found out Applied Linguistics abstracts place more emphasis on methods with 96% of the fifty abstracts

used included the describing the method move. It is not natural to have the method move omitted from an abstract of an empirical study. According to Sidek *et al.* (2016) it is rather baffling to have an empirical study abstract that did not include the method move. By excluding the method move, an abstract can be considered incomprehensible due to the fact that the methodology of a research has been ascribed as the index of the legitimacy of the results of the research (Sidek *et al.*, 2016). As such, an abstract without the method move makes the findings presented in the abstract to be questionable because it is missing the basis of how the findings were derived. In addition, such a significant exclusion at the abstract level may reflect the author's deficit as an academic author and a researcher. Importantly, all the abstracts considered in this study included the method move which gives credence to the quality of abstracts published in the conferences books of abstracts.

The results of the present study also revealed that the product move recorded 28 in the soft sciences and 30 in the hard sciences representing 93.3 and 100% respectively. It could therefore be concluded that both disciplines see the product move as obligatory (>90%) despite the fact that it was higher in the hard sciences (100%) than the soft sciences (93%). The findings strongly agree with that of Sidek *et al.* (2016) who also found that 97% of conference abstracts include the product move hence making it an obligatory move. These findings were also not different from those obtained by Ninpanit (2017) who conducted similar research in conference abstracts. Ninpanit also found that both education and health sciences abstracts consider the product move as obligatory.

Another important findings from this research was that in the conclusion move, the soft sciences recorded 28 inclusions representing 93.30% whereas the hard sciences

recorded 24 inclusions representing 80%. This means the conclusion move can be classified as obligatory in soft sciences but conventional in hard sciences. The results deviated slightly from obtained by Sidek *et al* (2016) in that they obtained 78% inclusion in their conference abstracts analysed. With this, the conclusion move was conventional similar to that obtained for soft sciences but comes short of the obligatory classification (80%) obtained for hard sciences. Again, a striking deviation from the results of the study was the one obtained by Ninpanit (2017). In his report, the conclusion move was found to be missing in the education abstracts but conventionally applied in the health sciences abstracts.

5.2.1 Variations in textual space in the abstracts of the soft sciences and the hard sciences

As intimated by Afful (2005), the importance of a rhetorical move is determined by the textual space allocated to it. This simply means the higher the textual space of a particular move, the more important that move is to the author. From the results obtained from the present study, the highest textual space of 42% was allocated to the product move in the hard sciences. This was followed by the method (28%), introduction (15%), purpose (10%) and conclusion (9%) moves. Similarly, the most predominant move type that occupied the highest textual space in the soft sciences abstracts was the product move which was allocated an average of 30% of textual space. This was followed closely by the method (28%) conclusion (17%), introduction (14%) and purpose (11%) moves. It could also be realized that the move types in hard sciences that occupied more space than soft hard sciences were the product and introductory moves. The implications of the findings is that the abstracts of both the hard sciences

and the soft sciences place more emphasis on the product move and the method move. However, the most prominent difference between the two abstracts lied at where the least emphasis placed. From the study, in hard sciences abstracts, the least emphasis was placed on the conclusion move whereas the purpose move was the least important move in the abstracts soft sciences. It is worth-mentioning that Omidia *et al.* (2018) have reported earlier that writers of abstracts in hard and soft fields have different priorities for promoting their studies. That is, from their research, while hard fields view their methodology as a unique 'selling point' for their study, writers in soft fields prefer to place more emphasis on their research objectives and their possible theoretical implications. This findings did not come out clearly in the current research as both results and method were given prominence in both hard sciences and soft sciences abstracts.

The reasons behind this observations in the current study cannot be explained by only the findings of study because the individual participants were not interviewed. It will be interesting to consider probing the participants for the reasons behind their choice of moves in subsequent studies.

5.3 Rhetorical Move Sequences in the Abstracts of Soft Sciences and Hard Sciences

From the results of the current study, it was evident that the most common rhetorical move sequence in the soft sciences was P-M-Pr-C which occurred in 13 out of the 30 abstracts representing 43.3%. This was followed by I-P-M-Pr-C which occurred in about 33.3% (10 out of 30) of the soft sciences abstracts. I-P-M-C and I-M-

Pr-C occurred only twice in the soft sciences abstracts. Move structures I-P-M-Pr-C, M-Pr-C and M-Pr occurred only once in the soft sciences abstracts.

In the hard sciences abstracts, the most familiar rhetorical move sequence was I-P-M-Pr-C which occurred in almost half (14 out 30) of the abstracts representing 46.7%. This was followed by I-M-Pr-C and I-P-M-Pr with each occurring in 17% of the hard sciences abstracts. This was followed by P-M-Pr-C and P-M-Pr which occurred in 13.3% and 6.7% of the abstracts respectively. Likewise, it was found that rhetorical move sequences such as I-P-M-C, M-Pr-C and M-Pr which occurred in the soft sciences did not occur at all in the hard sciences whereas P-M-Pr which occurred in the hard sciences did not occur in the soft sciences.

Juxtaposing the results obtained with other results of empirical research on the subject, a study by Sidek *et al.* (2016) was adopted since that study shares common features with the present study. Both studies were conducted using conference abstracts and analysed using Hyland's (2000) rhetorical move analytical framework. In Sidek's (2016) study, the most prominent move pattern was Purpose-Method-Product-Conclusion (42.1%). This same move sequence was the most dominantly (46.7%) used in the soft sciences abstracts. However, this was not the case when it came to the hard sciences abstracts as this particular move type was among the least used (13.3%). This indicates that there were variations in rhetorical move sequences between the two disciplines.

The present study results corroborates partially with a research by Ninpanit (2017) who investigated the rhetorical structures of conference proceedings abstracts (CP) among Thai researchers based on Hyland's framework (2000). According to that study, of the 14 CP abstracts in education, the most preferred sequence was P-M-Pr

(93.86%) in which introduction move and conclusion move were missing. The reason assigned to this observation was that the background information was not always critical for the understanding of the gist of a CP abstract (Sidek *et al.*, 2016). Despite the fact that education discipline is classified as a soft science discipline, the findings deviate from the results obtained for soft sciences abstracts analysed in this present study where the most dominant move pattern was P-M-P-C. Interestingly, the most preferred sequence in education CP abstract according to Ninpanit's (2017) study did not occur at all in the soft sciences abstracts of this present study but rather twice (representing 6.7%) in the hard sciences abstracts. With respect to the CP abstracts in health sciences, P-M-P-C (57.14%) was found to be the most preferred sequence, whereas the traditional sequence of abstract writing according to Hyland (2000), I-P-M-P-C followed with 21.43% occurrence. This was not too different from the results obtained for both soft sciences and hard sciences disciplines with the move sequence P-M-P-C being the most preferred and second most preferred respectively.

In relating the current study to other studies, Suntara and Ushala's (2013) study was compared. They investigated rhetorical moves in research article abstracts in two related disciplines. To do this, they explored rhetorical moves variations from 200 research article abstracts using three journals selected from the fields of Applied Linguistics and three from Linguistics. Conceptual/theoretical studies were excluded and data obtained were quantitatively analysed for frequency and sequence of Hyland's five move variations. The results obtained from Suntara and Ushala's (2013) study indicated that the most common move patterns for Linguistics were Purpose (P)-Method (M)-Product (Pr)-Conclusion (C), P-M-Pr and I-P-M-Pr-C whereas the preferred patterns for Applied Linguistics were P-M-Pr-C, I-P-M-Pr-C and I-P-M-Pr.

Although there were variation in move pattern, the most preference pattern among the two related disciplines was P-M-Pr-C pattern. This also agrees with the most preferred move sequence in the soft sciences abstract as observed in the present study. It is important to note that both Linguistics and Applied Linguistics fall in the category of soft sciences as shown in this current study.

Apart from the above evidences, to corroborate the results with other empirical evidence, Can *et al.*, (2016) examined move structures in Applied Linguistics abstracts and compared the results with previous studies both synchronically and diachronically. Fifty abstracts were collected from articles published in the journal English for Specific Purposes (ESP) between 2011 and 2013. In their study, sentences were coded using a five-move scheme adapted from previous studies. Combining the results from previous research and their present study showed that most Applied Linguistics abstracts give information on the purpose, methodology, and findings of the associated article, while about half of the articles omit introduction of the topic and discussion of the findings. The most essential three moves in ESP abstracts are P (presenting the research purpose, 100%), M (describing the methodology, 96%), and R (summarizing the findings, 92%). It was also found from their study that that authors frequently violated the move sequence expected by current schemes. These findings were found to be consistent with previous researches which suggest that future researchers informed by move analyses should explore the connection between the findings of move analyses and teaching materials for academic writing.

5.3 The use of hedges and boosters as elements of metadiscourse

An analysis of the metadiscoursal elements using Hyland's (2005) 101 lexical items and phrases as hedges revealed that more hedges were used in the soft sciences (69) compared to 58 used in the hard sciences abstracts. As presented in Tables 4.5 and 4.4, the most common hedge item in the hard sciences was 'should' which appeared 22 times in hard sciences but only once in soft sciences abstracts. On the other hand, 'suggest, suggested, suggests' was the most prevalent hedge used in the hard sciences abstracts (10) as against 11 by soft sciences abstracts (second to 'should'). On the use of boosters, the hard sciences abstracts utilised a total of 37 compared to 34 utilised by soft science. The most prominent booster in hard sciences abstracts was 'show/showed/shown' which occurred 15 times as against 8 in the soft sciences abstracts. On the other hand, the most prominent booster in the soft sciences abstracts was 'found' which occurred 11 times as against 7 times in the hard sciences abstracts.

On the flip side, Salager-Meyer (1991) conducted a study to investigate the discoursal elements of medical research abstracts. The findings of her study did not show the existence of important discoursal elements in the investigated research abstracts. However, in a study on the research abstracts written by Johns (1990), it was revealed that researchers from diverse cultures had the tendency of transferring their first language features, as discoursal elements, inappropriately to English research abstracts.

Other studies, however, reveal strong differences between abstracts submitted by authors who use English as native language compared to non-native English writers (Salar & Behzad, 2016). From the study, native English users present their ideas and findings making use of extensive linguistic choices of metadiscourse. This means that

native English writers due to their command over the language employ diverse boosters and hedges to persuade others on the personal stance. This brings to the forefront the sociocultural mentality of the academic system. In this present studies, authors of soft sciences employed more hedges (69 times) as opposed to 58 by hard sciences authors. However, hard sciences authors used more boosters (37) as against 33 by soft sciences authors. This could be attributed to the fact that hard sciences present facts backed by laboratory findings and are therefore certain about their results. Soft sciences however are very cautious in generalizing their findings since their opinions of participants can easily change. Yağiz and Demir (2015) suggested that the use of metadiscoursal, interactional markers is influenced by socio-cultural factors, academic background and is language-specific.

In a corpus of 60 English CAs submitted for an international conference in Linguistics, Agathopoulou (2009) observed that much more extensive use of hedging in high-rated rather than low-rated CAs. As such, extensive use of metadiscourse elements, particularly hedging, corresponds with a well-written high-rated abstracts. In Agathopoulou's (2009) study, it was found that the high-rated conference abstracts were written by English native speakers. As such, it could be argued, based on hedging alone, that the soft sciences abstracts from the study may be highly-rated than the hard sciences abstracts.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents an overview of the entire work. It comprises a summary of the study, which is followed by key findings; and based on the key findings, conclusions were drawn. Again, relying on the key findings of the study, recommendations together with suggested topics for further studies are presented.

6.2 Summary of the Study

The main thrust of this current study was to compare rhetorical moves structure and sequence, as well as, the use of elements of metadiscourse in the abstracts of the soft and hard sciences from conference book of abstracts. To achieve this, three research objectives were formulated. These were to investigate the rhetorical move structure between the soft sciences and hard sciences, examine rhetorical move sequences between the soft sciences and the hard sciences and finally to compare the use of hedges and boosters as elements of metadiscourse in the soft sciences and hard sciences abstracts. In the quest of sampling, 30 selected laboratory-based hard sciences abstracts from the CoBReG conference book of abstracts and another 30 abstracts from soft sciences disciplines from the 4th International Postgraduate Conference, 2018. Rhetorical move and metadiscourse analysis were performed using Hyland's (2000) rhetorical moves and Hyland's (2005) framework of metadiscourse (hedges and boosters). Content qualitative and quantitative analysis was adopted for the study.

6.3 Key Findings

On the first research objective, it was found that 15 out of 30 (50%) of abstracts of the soft sciences had the introductory move whereas 80% (24 out of 30) of abstracts in the hard sciences included the introductory move. On the purpose move, 28 abstracts included the purpose move representing 93.3% in the soft sciences whereas 25 abstracts representing 83.3% were found in the hard sciences. The method move was the only move which recorded 30/30 in both soft and hard sciences representing 100%. The product move recorded 28 in the soft sciences and 30 in the hard sciences representing 93.3 and 100% respectively. In the conclusion move, the soft sciences recorded 28 inclusions representing 93.30% whereas the hard sciences recorded 24 inclusions representing 80%.

The second research objective sought to determine the most common rhetorical move sequence in the soft and hard sciences of the conference books of abstracts. The most common move sequence in the soft sciences was P-M-Pr-C which occurred in 13 out of the 30 abstracts representing 43.3%. This was followed by I-P-M-Pr-C which occurred in about 33.3% (10 out of 30) of the soft sciences abstracts. I-P-M-C and I-M-Pr-C occurred only twice in the soft sciences abstracts. Move structures I-P-M-Pr-C, M-Pr-C and M-Pr occurred only once in the soft sciences abstracts. In the hard sciences abstracts, on the other hand, the most prevalent rhetorical move structure was I-P-M-Pr-C which occurred in almost half (14 out 30) of the abstracts representing 46.7%. This was followed by I-M-Pr-C and I-P-M-Pr with each occurring in 17% of the hard sciences abstracts. This was followed by P-M-Pr-C and P-M-Pr which occurred in 13.3 and 6.7% of the abstracts respectively. Rhetorical move structures such as I-P-M-C, M-Pr-C and M-Pr which occurred in the soft sciences did not occur at all in the hard

sciences whereas P-M-Pr which occurred in the hard sciences did not occur in the soft sciences.

On the last research objective, an analysis of the metadiscoursal elements using Hyland's (2005) 101 lexical items and phrases as hedges revealed that more hedges were used in the soft sciences (69) compared to 58 used in hard sciences abstracts. The most common hedge item in the hard sciences was 'should' which appeared 22 times in hard sciences but only once in soft sciences abstracts. On the other hand, 'suggest, suggested, suggests' was the most prevalent hedge used in hard sciences abstracts (10) as against 11 by soft sciences abstracts (second to 'should'). On the use of boosters, the hard sciences abstracts utilized a total of 37 compared to 34 utilised by soft science. The most prominent booster in hard sciences abstracts was 'show/showed/shown) which occurred 15 times as against 8 in the soft sciences abstracts. On the other hand, the most prominent booster in the soft sciences abstracts was found which occurred 11 times as against 7 times in the hard sciences abstracts.

6.4 Conclusions

It can be concluded from the results of the study show that the 'purpose', 'method', 'product' and 'conclusion' moves were obligatory in the soft sciences conference book of abstracts whereas the 'introduction' move was optional. On the other hand, with the exception of the 'method' and 'product' moves which were obligatory, the rest were conventional moves in the hard science conference book of abstract.

Also, from the results obtained from the study, I-P-M-Pr-C was the most prevalent move in hard science abstracts while P-M-Pr-C was the most preferred move

sequence in soft sciences abstracts. The analysis also shows that the rhetorical strategies deployed by the scholars in these two applied disciplines are relatively similar.

In effect, this study confirmed the closeness between these two applied disciplines with respect to metadiscourse elements such as hedges and boosters. It was realized that the soft sciences abstracts dominated in the number of hedges used whereas the hard sciences abstracts dominated in the number of boosters used.

Because abstracts are of great importance in dissemination scientific findings, knowledge of basic rhetorical structures will enable learners and novice scholars in their fields to fully engage in academic writing tasks and enhance their chances of success for publishing in scholarly leading publication as well as presenting their findings at academic conferences. At this juncture, it should be noted here that the number of hard science and soft sciences abstracts used in this study are not exactly the typical representative of the hard-applied disciplines and the soft-applied disciplines, respectively. Accordingly, the interpretation and the generalization of the findings should be done with caution.

6.5 Recommendations for Further Studies

Some interesting points of views recommended for further investigations are in order. First, genre analysis is a product-oriented approach to textual analysis. Further research on discovering how learners develop their rhetorical strategies and how texts are organized from the very beginning is critical and the analysis of the developmental process of writing can be supplemented by employing qualitative tools, such as interviews and think-aloud protocols. Second, in order to visualize a clearer and more precise picture of how a genre in a particular field is structured, the examination of the

·
rhetorical structures of abstracts across sub-disciplines is suggested. Finally, the samples of this study are contextualized in the fields of hard science and soft sciences disciplines and all are in English language and were written by non-native speakers. The comparison between native and non-nativeness can provide more evidence on variation imposed by cultures. In addition, in order to gain deeper insights into cultural and disciplinary variations of language choices, further studies may explore the abstracts in other disciplines and/or languages.



REFERENCES

- Afful, J. B. A. (2005). A rhetorical analysis of examination essays in three disciplines: The case of Ghanaian undergraduate students. National University of Singapore, Singapore.
- Agathopoulou, E. (2009). Characteristics of high-rated and low-rated conference abstracts: A genre-based analysis. *Options and practices of LSP. University of Crete*, 150-170.
- Alfaki, I. M. (2015). University students' English writing problems: Diagnosis and remedy. *International Journal of English Language Teaching*, 3(3), 40-52.
- Al-Khasawneh, F. M. S. (2010). Writing for academic purposes: Problems faced by Arab postgraduate students of the College of Business, Uum. *ESP World*, 2(28), 1-23.
- Amua-Sekyi, E. T. (2010). English as a second language in Ghana and English language teaching: Problems and prospects. *The Oguaa Educator*, 12 (1) 24-30.
- Arancon, R. P. (2013). The use of SFL genre theory for the analysis of students' writing skills in ESP. *Volumen Monográfico*, 7, 245-262.
- Auberbach, C. F., & Silverstein, L. B. (2003). *Qualitative data: An introduction to coding and analysis*. New York: New York University Press.
- Becher, T., & Trowler, P. R. (2001). *Academic tribes and territories: Intellectual enquiry and the culture of disciplines*. Buckingham, Philadelphia: Society for Research into Higher Education & Open University Press.
- Berkenkotter C. & Huckin, T. (1995). *Genre knowledge in disciplinary communication*. Hillsdale, NJ: Lawrence Erlbaum.

- Bhatia, V. K. (2004). *Worlds of written discourse: A genre based view*. Continuum Series Advances in Applied Linguistics. London: Longman.
- Bhatia, V.K. (1993). *Analysing genre: Language use in professional settings*. London: Longman.
- Bhatia, V. K. (1997). Introduction: Genre analysis and world Englishes. *16*(3), 313-319.
- Biber, D., Connor, U., & Upton, T. A. (2007). *Discourse on the move: Using corpus analysis to describe discourse structure* (Vol. 28). John Benjamins Publishing.
- Bloor, M. (1998). English for specific purposes: The preservation of the species (some notes on a recently evolved species and on the contribution of John Swales to its preservation and protection). *English for Specific Purposes*, *17*(1), 47-66.
- Bryman, A. (2008). *Social Research Methods*, (3rd Edn.). New York: Oxford University Press Inc.
- Bunton, D. (2002). *Generic moves in Phd thesis introductions*. In J. Flowerdew (ed.) *Academic Discourse*. (pp.57-75). Lon: Longman.
- Bunton, D. (2005). The structure of PhD conclusion chapters. *Journal of English for Academic Purposes*, *4*, 207-224.
- Can, S., Karabacak, E., & Qin, J. (2016). Structure of Moves in Research Article Abstracts in Applied Linguistics. *Publications*, *4*(3), 23.
- Coe, R. M. & Freedman, A. (1998). Genre theory: Australian and North American approaches, in M. Kennedy (Ed.), *Theorizing composition* (pp. 136-147). Westport, CT: Greenwood Publishing Company.

- Connor, U., Davis, K., & De Rycker, T. (1995). Correctness and clarity in applying for overseas jobs: A crosscultural analysis of U.S. and Flemish applications. *Text, 15*(4), 457-476.
- Cope, B. (1993). Bibliographical essay: developing the theory and the practice of genre-based literacy. In: B. Cope & M. Kalantzis (eds.). *The powers of literacy: a genre approach to teaching writing*.
- Creswell, J. W. (2009). Mapping the field of mixed methods research. *Journal of Mixed Methods, 3*(2), 95-105.
- Crookes, G. (1986). Towards a validated analysis of scientific text structure. *Applied Linguistics, 7*(1), 57-70.
- Dey, I. (1993). *Creating categories. Qualitative data analysis. london: Routledge.*
- Edwards, SM, li, H. & lee, J.-H.(2002) *forced exposure and psychological reactance: antecedents and consequences of the perceived intrusiveness pop-up ads. Journal of Advertising, 31*(3), 83-95.
- azDing, H. (2007). Genre analysis of personal statements: Analysis of moves in application essays to medical and dental schools. *English for Specific Purposes, 26*(3), 368-392.
- El-Dakhs, D. A. S. (2018). Why are abstracts in PhD theses and research articles different? A genre-specific perspective. *Journal of English for Academic Purposes, 36*, 48-60.
- Fazilatfar, A. M., & Naseri, Z. S. (2014). Rhetorical moves in applied linguistics articles and their corresponding Iranian writer identity. *Procedia-Social and Behavioral Sciences, 98*, 489-498.

- Gillaerts, P. (2013). Move Analysis of Abstracts from a Diachronic Perspective: A Case Study. In Johannesson, Nils-Lennart / Melchers, Gunnel / Björkmann, Beyza (eds) *Of butterflies and birds, of dialects and genres. Essays in honour of Philip Shaw*.
- Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24, 105–112.
- Halliday, M.A.K. & Hasan, R. (1976). *Cohesion in English*. London: Longman.
- Halliday, M.A.K. (1985). *An introduction to functional grammar*. London: Edward Arnold.
- Halliday, M.A.K. & Matthiessen C.M.I.M. (2004). *An introduction to functional grammar* (3rd ed.), London: Hodder Arnold.
- Halliday, M.A.K. (1971). Linguistics function and literacy style: an inquiry into the language of William Golding's, *The Inheritors*. In S. Chatman (Ed.) *Literary style: a symposium* (106) (pp.330-368). New York: Oxford University Press.
- Halliday, M.A.K. (1994). *An introduction to functional grammar* (2nd ed.). London: Edward Arnold.
- Harris, H. (2001). 'Content analysis of secondary data: A study of courage in managerial decision making', *Journal of Business Ethics*, 34(3/4), 191–208.
- Helmenstine, A. M. (2019). What is the Difference Between Hard And Soft Science? <https://www.thoughtco.com/hard-vs-soft-science-3975989> (Assessed On 18th January 2019).

- Hongwei, R. & Yuying, L. (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.
- Huckin, T. (2006). *Abstracting from abstracts*. In M. Hewings (ed.), *Academic Writing in Context* (pp. 93-103). London: Continuum.
- Hyland, K. (2000). 'Speaking as an insider: promotion and credibility in abstracts', in Hyland, K. (ed.), *Disciplinary discourses: Social interactions in academic writing*. London: Longman, 63–84.
- Hyland, K. (2003). Genre-based pedagogies: A social response to process. *Journal of Second Language Writing*, 12, 17-29.
- Hyland, K. (2009). *Teaching and Researching Writing*, 2nd ed.; Routledge: Abingdon, UK.
- Hyland, K. (2013). *Genre and Discourse Analysis in Language for Specific Purposes*. In C. A. Chapelle, *The Encyclopedia of Applied Linguistics* (pp. 1-8). Blackwell Publishing.
- Hyland, K. & Tse, P. (2005). Hooking the reader: A corpus study of the evaluative that in abstracts. *English for Specific Purposes*. 24: 123-139
- Insch, G. S., Moore, J. E. and Murphy, L. D. (1997). 'Content analysis in leadership research: Examples, procedures, and suggestions for future use', *The Leadership Quarterly*, 8(1), 1–25.
- Johns A. M. (1997). *Text, role, and context: Developing academic literacies*. Cambridge and New York NY: Cambridge University Press.
- Khansari D. (2016). *Comparison of rhetorical moves in research articles and abstracts in soft and hard sciences*. Masters Thesis. University Putra Malaysia.

- Kwan, B. S. C. (2006). The schematic structure of literature reviews in doctoral theses of applied linguistics. *English for Specific Purposes*, 25(1), 30-55.
- Loan, N. T. T., Li, Q., Pramoolsook, I., & Linh, N. D. (2014). TESOL conference abstracts: discrepancies between potential writers' knowledge and actual composition. *3L: Language, Linguistics and Literature, The Southeast Asian Journal of English Language Studies.*, 20(3), 161-176.
- Lazoglou, M. (2017). *A Rhetorical Analysis of Conference Abstracts in Greek and English: A Corpus-based Comparison*. Doctoral dissertation, Aristotle University of Thessaloniki.
- Lorés, R. (2004). On RA abstracts: from rhetorical structure to thematic organisation. *English for specific purposes*, 23(3), 280-302.
- Martin, J. R. (1997). Analysing genre: functional parameters. In F. Christie & J. R. Martin (Eds.), *Genre and institutions* (p. 3-39). London: Continuum.
- Martín-Martín, P (2005). *The Rhetoric of the Abstract in English and Spanish Scientific Discourse: A Cross-Cultural Genre-Analytic Approach*; Peter Lang: Bern, Switzerland.
- Martín-Martín, P. A (2003). A genre analysis of English and Spanish research paper abstracts in experimental social sciences. *English for Specific Purposes*, 22, 25–43.
- McMillan, J. H. & Schumacher, S. (1993). *Research in education: A conceptual understanding*. New York: Harper Collins.
- Miller, C. (1984). Genre as social action. *Quarterly Journal of Speech* 70, 175- 178.

- Myers, M. (2000). Qualitative research and generalization question: Standing firm with Proteus. *The Quality Report*, 4 (3/4). Available at: <http://www.nova.edu/ssss/QR/QR4-1/myers.html> retrieved on 7/09/ 2019.
- Neuman, W. L. (2007). *Basics of Social Research Qualitative and Quantitative Approaches*. Allyn and Bacon, Boston.
- Ninpanit, S. (2007). Move analysis of conference proceedings abstracts across disciplines among Thai researchers: A case of education and health sciences. *RMUTSB Academic Journal (Humanities and Social Sciences)*, 2(1), 109-115.
- Nkemleke, D. (2010). Cameroonian and foreign scholars' discourse: the rhetoric of conference abstracts. *World Englishes*, 29(2), 173-191.
- Omidia, T., Shahriari, H., & Siyanova-Chanturia, A. (2018). A cross-disciplinary investigation of multi-word expressions in the moves of research article abstracts. *Journal of English for Academic Purposes*, 36, 1-14.
- Pho, P. D. (2008) Research article abstracts in applied linguistics and educational technology: A study of linguistic realizations of rhetorical structure and authorial stance. *Discourse Studies*, 10(2): 231-250.
- Pho, P. D. (2009). Linguistic realizations of rhetorical structure: A corpus-based study of research article abstracts and introductions in applied linguistics and educational technology. *Language and Computers*, 71(1), 135-152.
- Punch, K. F. (2005). *Introduction to social research: quantitative and qualitative approaches*. London: Sage Publications Ltd.

- 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, 162–166.
- Sadighi, F., & Bavali, M. (2008). Chomsky's universal grammar and Halliday's systemic functional linguistics: An appraisal and a compromise. *Journal of Association of Applied Linguistics*, 12(1), 11-28.
- Salager-Meyer, F. (1990). Discoursal flaws in medical English abstracts: A gene analysis per research and text type. *Text*, 10, 365-384.
- Salar, S. G., & Behzad (2016). A comparative analysis of metadiscourse features in knowledge management research articles written in English and Persian. *International Journal of Research Studies in Language Learning*, 5(1): 15 -27.
- Samraj, B. (2005). An exploration of a genre set: Research article abstracts and introductions in two disciplines. *English for Specific Purposes*, 24(2), 141-156.
- Schreier, M. (2012). *Qualitative content analysis in practice*. London: Sage.
- Sidek, H. M., Saad, N. S. M., Baharun, H., & Idris, M. M. (2016). An analysis of rhetorical moves in abstracts for conference proceedings. *IJASOS-International E-journal of Advances in Social Sciences*, 2(4), 24-31.
- Stoller, F. L., & Robinson, M. S. (2013). Chemistry journal article abstracts: an interdisciplinary approach to move analysis with pedagogical aims. *English for Specific Purposes*, 32: 45-57.
- Suntara, W., & Usaha, S. (2013). Research article abstracts in two related disciplines: Rhetorical variation between linguistics and applied linguistics. *English Language Teaching*, 6(2), 84.

- Swales, J. (1981). *Aspects of article introductions*. Birmingham: The University of Aston, Language Studies Unit.
- Swales, J. (1990). *Genre analysis*. Cambridge: Cambridge University Press, UK
- Swales, J. M. (2004). *Research genres: Explorations and applications*. New York: Cambridge University Press.
- Swales, J. M. & Feak C.K. (2009). *Abstracts and writing of abstracts*. Ann Arbor: University of Michigan Press.
- The Science Council (2019). <https://sciencecouncil.org/about-science/our-definition-of-science/> (Assessed on 6th July, 2019)
- Tseng, F. (2011). Analyses of move structure and verb tense of research article abstracts in applied linguistics journals. *International Journal of English Linguistics*, 1(2), 27-39.
- Uysal, H. H. (2014). A cross-cultural study of indirectness and hedging in the conference proposals of English NS and NNS scholars. In *Occupying Niches: Interculturality, Cross-culturality and Aculturality in Academic Research* (pp. 179-195). Springer, Cham.
- Yağiz, O. D. & Demir, C. (2015). A Comparative Study of Boosting in Academic Texts: A Contrastive Rhetoric. *International Journal of English Linguistics*, 5(4): 12-28.
- Zand-Moghadam, A. (2016). A rhetorical move analysis of TEFL thesis abstracts: The case of Allameh Tabataba'i University. *Issues in Language Teaching*, 5(1), 23-31.

APPENDICES

Appendix A: Soft sciences abstracts

S1

This study sought to identify the factors contributing to job satisfaction of staff of the University of Cape Coast (UCC). Factor analysis with principal component analysis was used for extracting and determining the latent factors that account for job satisfaction of staff of UCC. A sample of 180 respondents were randomly selected. Data was collected with the use of a structured questionnaire. Evidence from the study indicated that salary and promotion, supportive staff and general satisfaction were the major factors that contribute to job satisfaction of staff of UCC. It is expected that future studies would consider job satisfaction of staff in other tertiary institutions across the country in order to gain a broader understanding about job satisfaction of staff in tertiary institutions.

S2

Leadership is an important phenomenon in organizations because the extent to which an organization contribute in harnessing resources depends on how well the managers understand and adopt the appropriate leadership style in performing their roles as managers and leaders. The study examined the effect of leadership style on organizational performance, using the case study design. Questionnaires were administered to a randomly selected sample of 121 respondents. Findings established the transformational style of leadership was employed by managers in the bank. The results of the study further indicated that transformational leadership style significantly influenced financial performance, innovation and employee turnover, suggesting that leadership style affect organizational performance. The study therefore recommended that transformational leadership training should be provided to managers to enhance organizational performance in Ghana.

S3

The Farmer Business School (FBS) was introduced by the Ghana COCOBOD as a training module in Ghana and other cocoa growing countries to enhance the market orientation of cocoa farmers in the past five years. The study ascertained the extent to which COCOBOD is achieving the objective of promoting market orientation of cocoa farmers in Ghana through the FBS. A descriptive survey of 370 sampled cocoa farmers in the six cocoa regions of Ghana, namely Ashanti, Brong-Ahafo, Central, Eastern, Western and Volta Regions were used in the study. The results showed no significant association between the level of knowledge received by cocoa farmers and their level of market orientation ($p>0.05$). It however, found a significant association between the level of attitude received at the training by the cocoa farmers and their level of market orientation ($p<0.05$). There is also significant association between the level of skills received at the training by the cocoa farmers and their level of market orientation ($p<0.05$). Based on the findings, the study recommends that the COCOBOD should upSSAle the FBS to build knowledge systems of cocoa farmers in Ghana to enhance their market orientation.

S4

In illuminating the indispensability of placement of employees as a significant human resource development practice that ought to be taken seriously by organisations, this paper explored how graduates of the Institute for Educational Planning and Administration (IEPA) from the University of Cape Coast, were placed by their employers in their organisations. The study adopted the concurrent mixed methods design. A sample of 423 participants which comprised 16 ‘employers’ of IEPA’s graduates and 407 IEPA graduates was obtained. The IEPA graduates were selected using the snowball sampling technique for self-administered questionnaires and the data was analysed using SPSS. The employers were selected purposively for semi-structured open ended in-depth interviews which was analysed thematically. The study revealed that, 93.9% of the IEPA graduates were engaged in Ghana’s educational sector, and their degree specialisation, educational preparation and training, and work experiences were the three topmost factors that informed employers in determining their job placement. The findings suggests that the training and certification graduates received from IEPA, to a large extent, remains relevant to their job placement. Therefore, it is recommended that, the IEPA should intensify its collaborative efforts with the Ministry of Education especially the Ghana Education Service towards its continual provision of the needed education and training aimed at improving planning, leadership and management capabilities of personnel in the education sector.

S5

The Colleges’ Education Act (2012), Harmonized Statutes (2012), mandate that students who form the major stakeholder group should be part of their colleges’ governance through participation in decision-making, with the Students’ Representative Councils being their mouthpiece. This is re-enforced by the National Youth Policy (2010). However, students are often not afforded the full opportunity to participate in decisions by adult members of their colleges, directly or indirectly. Limited knowledge exists regarding how token involvement in decision-making by students at the college level manifests a total disregard for student’s non-involvement in decision-making communicate to them gross disregard of their human rights. Hermeneutic phenomenological analysis of was employed to understand everyday lived-experiences of students. Observation, individual interviews, and focus group discussion were used. Thematic statements were selected, grouped, and analysed through reflexive and interpretive activities. Findings reveal that students were labelled as “children”; thus they are not recognized as mature individuals who can contribute meaningfully to discourse. Their genuine involvement in decision-making will, however, expose them to democratic principles which is one way social justice reveals itself. Thus, there will be a great potential for students’ voice to be heard. Silencing the voice of learners implicitly or explicitly means that the issues of social justice and democracy are not taken into consideration in the governance of colleges.

S6

In the field of penology, very few studies have paid attention to the role of religion in prison. The sparse scholarly studies are largely focused on the advanced countries, and rarely on prisons in Africa. In addition, the findings of the impact of religion on inmates have yielded mixed results. In this thesis I argue that the outright lack of alternative forms of collective and individual development leaves majority of inmates with limited options: religion or isolation. And that inmates' religiosity is nothing other than an organizing principle in prison. The social constructionist theory of reality and some functionalists' perspectives on religion underpinned the study. The mixed method approach to data collection was used. The questionnaire survey data were analysed using the Statistical Package for Social Sciences software. The transcripts of the in-depth interviews were analyzed thematically using the google doc word search tool. The study found that while Ankaful Maximum Security Prison (AMSP) has been successful in its mandate of imprisoning convicts, the institution has failed in the rehabilitation and resocialization of inmates. These shortcomings, unwittingly, have given way to the various certified Civil Society Organizations (CSOs) to operate supportive and religious functions in the prison. Evidently, not all inmates who participated in religious activities did so necessarily for redemption, but for materialism. In addition, religion was seen as means by which inmates were restoring their spoiled identities, and conducting their impression management.

S7

The study used a design-based research approach with a case study design to examine the extent to which simulation-supported lessons improve teaching and enhance learning of high school physics in Ghana. Eight pre-service physics teachers from the University of Cape Coast, Ghana were enrolled in a professional development arrangement to develop their competencies in using simulations for the creation of interactive teaching and learning atmosphere. Based on experiences gained through the professional development arrangement, the pre-service teachers collaborated to design simulation-based interventions in design teams and afterwards, enacted the intervention in two try-outs of micro-teaching among themselves and their peers. Questionnaires, interviews, focus group discussions, and lesson artefacts developed by the pre-service teachers were the data sources employed in this study. Findings herein revealed that a shift from a teacher-centred way of teaching to learner-centred approach of teaching is effectively realized in the physics classroom when simulation-based interventions are developed to position the teacher as a facilitator; provide students with minimal guidance in their exploration of the simulation environment; establish building blocks for knowledge construction; provoke ownership on the part of students through authentic tasks; and align the affordances of the simulation as an instructional tool with content-specific learning goals. The study also showed that simulation shapes learning by engaging students' attention and motivates students' interest in physics through exploratory activities.

S8

This study aimed to ascertain the perspectives of selected subject teachers about the components of the various curricula they implemented. A total number of 111 Accounting, Economics, Geography, Business Management and Social Studies teachers were surveyed and given an Innovation Configuration Checklist (ICC) to fill. Data obtained was analysed using frequencies and percentages. It was found out that teachers had mixed interpretations and descriptions of the components of the various subject curricula. Accordingly, teachers' degree of fidelity in implementing the subject curricula was suspicious. It is worthy of note that teachers' description of the curriculum is connected to their understanding and subsequent use of the curriculum. Therefore, if teachers failed to understand and interpret the components of the curriculum, as provided in the curriculum document, then they may have some genuine concerns in understanding and adopting the curriculum for use. It is recommended that the Ghana Education Service (GES) should increase the involvement of teachers in discussions and decisions relating to the curriculum and its implementation through the institution of suggestion boxes and similar other media for almost all teachers' concerns to be heard and addressed.

S9

This study set out to investigate how test anxiety influence academic performance of students in the Colleges of Education in Ashanti Region. In the quest of accomplishing this, quantitative method using descriptive survey design was employed. Data were obtained from of 339 respondents in the Colleges of Education in Ashanti Region. Multi-stage sampling procedure was adopted and questionnaire were the main instrument for the data collection with overall all reliability coefficient of 0.783. The quantitative data were coded and analysed using the Statistical Package for Social Sciences (SPSS) version 22.0 to produce descriptive statistics (means and standard deviation) and inferential of Pearson product moment correlation and independent samples t-test. The study established a strong but negative correlation existed between test anxiety and academic performance. This brings to bare the relationship between test anxiety and academic performance which is an enlightenment on what literature seems to suggest that high stakes of test anxiety account for low academic performance. The findings again suggest that students who experience high stakes of test anxiety are more likely to perform academically low. Finally, it was revealed in the results that females were more prone to test anxiety than males. This implies, suggest that females suffer test anxiety more than males. Therefore, school psychologists and counsellors must mentally prepare students to appreciate the connection between test anxiety and academic performance to help them grasp and subdue challenges towards examination or test and much attention should be given to the female students.

S10

A sheep and goat husbandry technology intervention was introduced to farmers, majority being female, in the Upper West Region, by the Tumu Deanery Rural Integrated Development Programme. It aimed at increasing women's knowledge for sustainable livestock rearing, ownership of livestock assets and income. Considering most interventions target males, this study was undertaken to explore the gender dynamics in small ruminant husbandry technology adoption among female and male farmers. The study specifically sought to determine the levels of adoption of the technologies and explore the contribution of gender division of labour to the adoption of the interventions. A mixed methods approach was used for data collection, and a structured interview schedule was used to gather quantitative data from 118 respondents (79 females and 39 males); and semi-structured interview guides for qualitative data collection. Descriptive and inferential statistics were used to analyse quantitative data, whereas qualitative data was analysed through interpretive explanation building. Results showed a clear-cut division of labour for sheep and goat production and marketing. Whereas men build animal pens, take care of sick animals, purchase and sell sheep and goats; women sweep and clean pens, provide drinking water, prepare and administer supplementary feed. Although there were no significant differences in the overall perceptions and adoption levels of the technologies between female and male farmers, there were differences in certain individual components in adoption levels. These included routine cleaning of animal pens and patronizing the services of community livestock workers. These differences were explained by the division of labour. It is suggested that gender analysis be undertaken to guide interventions and the appropriate strategies to use when introducing such technologies to farmers.

S11

The objective of the study was to examine the incidence of time delay in engagement schedules on campus. The researcher studied past records of time delays from three colleges at the University of Cape Coast. These colleges are College of Education Studies, College of Agriculture and Natural Sciences, and College of Health and Allied Sciences. The study relied on secondary data (i.e. minutes file) to extract its relevant information. The study made use of stratified sampling technique. The Minitab package and Microsoft Spreadsheet were used to analyse the data. The statistical techniques used in the study were the Regression Analysis, Time Series Analysis and Stochastic Process. The College of Education Studies had the highest average of delays (18.92 minutes) to starting a meeting. There was a significant difference in the means of the delays among these colleges: College of Education Studies and College of Agriculture and Natural Sciences, and College of Health and Allied Sciences, and College of Education Studies. The College of Agriculture and Natural Sciences had the highest probability (80.70%) of always starting their meetings early at the long-run. The College of Education had the highest probability (82.60%) of starting their meetings with a large delay at the long-run. It would be recommended that the colleges with higher possibility of starting their meetings after ten (10) minutes should encourage its board or committee members to be prompt when attending meetings.

S12

This research employed qualitative method to study how parents-school partnership influences pupils' academic performance in South Tongu District. Two schools were purposively selected based on their performance in the Basic Education Certificate Examination. Variables such as parents-school partnership and how it influences academic performance of pupils, barrier to parent-school partnership and how parent-school partnership can be improved were the focus of the study. The main research instruments employed were interview and note-taking. Sixteen participants were purposively selected and interviewed. The key findings were that parent-school partnership in the area of provision of learning resources (textbooks, mathematical sets, and exercise books etc.), visiting the school, monitoring pupils' school work and attending PTA meetings could greatly have impact on pupils' academic performance. Again, the study revealed that the educational background, economic activities of parents, nature of school climate, and poverty can pose barriers to parent-school partnership. Finally, it was indicated that education, attendance at PTA meetings, reduction of pupils' workload, organisation of school events such as open-days, speech and prize-giving day and establishment of rapport with teachers could help improve parent-school partnership. The study therefore recommends that for partnership to be strengthened parents have to be properly empowered economically to enable them provide for the educational needs of their children. Also, schools should establish rapport with parents so that they (parents) can easily approach teachers to discuss children's school matters. Finally, parents should be sensitized on the need to be actively involved in the educational matters of their children.

S13

Despite decades of efforts to grow the economy, the Ghanaian economy is yet to realize the anticipated structural industrialised and thriving economy. This is coupled with soaring rate of unemployment as most graduates are unable to find jobs after years of graduating. This led to the introduction of Entrepreneurship education into tertiary institutions in Ghana to augment employment rate. The study investigated the influence of entrepreneurship education on entrepreneurial intentions of students, adopting a randomly surveyed sample of two hundred and fifty students from the department of Publishing Studies. The results of the study indicated that entrepreneurial intentions of students were low. Religion, family support, age and gender were found to be significant predictors of entrepreneurial intention. Also, feasibility perception and risk-taking propensity was found to have a significant negative correlation with intention to start a business. Social support and opportunities were identified as strong positive predictors of entrepreneurial intentions. The results further revealed a significant association between entrepreneurship education and entrepreneurial intention. The study concluded that the gap between intention to set-up business and entrepreneurship education is a crucial case for policy efforts to introduce programs which can elicit entrepreneurial activities among students.

S14

Despite the efforts of the Ghana COCOBOD in providing innovative and competitive marketing services to cocoa farmers in Ghana, substantial percentage of them, who are mainly small-holder farmers continue to produce the crop at a subsistence level with very little market orientation. The study sought to provide an understanding of the factors that influence the market orientation of the cocoa farmers in Ghana. A descriptive survey design and 370 cocoa farmers sampled from the six cocoa regions of Ghana were used. The regions were the Ashanti, Brong-Ahafo, Central, Eastern, Western and Volta. Entrepreneurial proclivity, the innovation characteristics of Farmer Business School (FBS), farmer characteristics (gender, age, tribe, religion) and farm characteristics (farm size, yield, source of labour and training of workers) were identified as the factors that can influence the market orientation of cocoa farmers. To improve market orientation of cocoa farmers in Ghana, the study recommends the need to promote activities that will enhance the entrepreneurial proclivity of cocoa farmers. There is also the need for the revision of the FBS model to make it more visible, more triable, less complex in usage, and compatible with the rural cultural systems, to improve its adoption by cocoa farmers in Ghana.

S15

Emerging trends such as internationalisation, globalisation, marketisation and commodification, taking centre stage in higher education, have often motivated the use of webpages as vital marketing tools for resource mobilisation. While few studies have compared some universities' homepages, the graduate webpages, particularly, of African and Ghanaian universities have often stayed absent in such discourses. Using the multimodality approach and Kress and van Leeuwen's (2006) visual grammar model, this paper reflects on how, particularly, the Graduate Schools of Ghanaian universities utilise the hypermodal semiotic resources on their webpages to globally market their identities so as to earn competitive advantage, attract 'customers', and access available funding opportunities. Preliminary analysis reveals that, although the Graduate Schools promote their communities as rigorous academic spaces, they fail to emphasise the "real world relevance" of their activities. Consequently, it is recommended that Graduate Schools in Ghana must endeavour to promote how they meet the demands of community engagement in order to facilitate resource mobilisation for postgraduate education.

S16

The major goal of most higher education institutions is to build capacities and develop competencies of students to become future leaders who can serve the nation and the global community in diverse ways. Therefore, developing students as leaders continue to be a central goal of higher education institutions, this is because student leadership is a critical area of work that can no longer be ignored by higher education institutions worldwide and Ghanaian higher education institutions are no exception. Even though research on leadership, student leadership and student leadership development policy are vast, little studies have examined the perception of students on

the development of student leadership policy in the Ghanaian higher education intuitions context. The present study examined the perception of students on the development of leadership policy to enhance and improve leadership in higher education institutions. The main objective of the study was to examine whether the development of the leadership policy and practices and how these have improved students leadership capabilities. The study adopted both quantitative and qualitative approaches to elicit information from the participants. The study revealed that the leadership development policy is of considerable value to the personal growth of the student. The study also revealed that provision of leadership training was valuable for the participating students. It is therefore recommended that leadership development policy as well as leadership training programmes should be developed to improve student leadership in higher education institutions.

S17

This study explored the various stages of concern teachers operated in implementing selected senior high school subject curricula. Employing a descriptive survey design, 111 Accounting, Economics, Geography, Business Management and Social Studies teachers to respond to an adapted version of Hall, Hord and George's (1979) 35-item Stages of Concern Questionnaire (SoCQ). Data obtained was analysed using frequencies and percentages, and ANOVA. It was found that, teachers were largely unconcerned about the subject curricula they implemented. The ANOVA results indicated no statistically significant difference among the concerns of the various subject teachers at each of the stages of concern. It concluded that teachers' unconcerned attitudes toward the various subject curricula could have a negative consequence on the faithful implementation of the various SHS subject curricula. It was, therefore, recommended that Ghana Education Service in collaboration with school heads should organize workshops for teachers to increase their awareness of the curriculum.

S18

This article reports on how students of the University of Cape Coast (UCC) perceive cost-sharing and quality tertiary education. Cost-sharing is a mechanism through which stakeholders of education in Ghana share the costs of public tertiary education. Students are one of the key stakeholders who are affected by cost-sharing therefore their views about cost-sharing must be explored in relation to quality tertiary education. The cross-sectional survey design was used to design and guide the study. Data was collected with a structured questionnaire. Data was coded and analysed using means and standard deviation. The findings suggest that the respondents disagreed that cost-sharing could affect the seriousness that students put into their academic work. Furthermore, the respondents agreed with the statements that cost-sharing may have negative effect on their academic performance. Also, the findings indicate that the respondents agreed with the statement that cost-sharing has made higher education expensive. The article concludes that challenges identified in this study by students suggest that from the perspective of students, cost-sharing affects quality tertiary education negatively.

S19

Helminth infections are major public health problems especially in developing countries where socioeconomic development is poor and environmental conditions are also deplorable. The aim of this study was to assess the influence of socioeconomic and environmental factors on STHs infections in K.E.E.A and Mfantseman Municipalities of the Central region of Ghana. In this cross-sectional study, nine hundred and sixty (960) pupils from class 1 to 6 in 8 basic schools were sampled. This comprised 120 pupils from each school. Data were collected on age, gender, water, sanitation and hygiene (WASH), asset ownership, occupation status of parents and pupils using a structured questionnaire. Stool samples were collected and investigated for intestinal parasites larvae, eggs or cysts by formol-ether concentration techniques. The overall prevalence of helminth infection among the pupils was 10.5%. The highest infection rate was 10.2% and 10.8% in K.E.E.A and Mfantseman respectively. *ASSAris lumbricoides* was the predominant parasite of infection in all the schools included in the study. Total egg count of 764 was detected in the study location which were predominantly *ASSAris lumbricoides* (89.4%). Pupils of parents who reported having their last deworming exercise in the household less than 6 months ago had 58% [odds ratio (OR)=0.423; 95 CI:0.212, 0.846; P=0.015] decreased odds of contracting intestinal parasitic infections. Pupils with no knowledge on the importance of hand washing had 48% [odds ratio (OR)=0.516; 95 CI: 0.262, 1.016; P=0.050] decreased odds of contracting STHs infections. Based on the recorded prevalence, it is very clear to conclude that employment, income and the education index as well as WASH infrastructure management influenced the transmission of helminths in this study.

S20

This research unearthed challenges in the cashew value chain and developed an operational framework to overcome them and improve livelihoods of farmers in the Brong-Ahafo Region of Ghana. A descriptive cross-sectional survey and a mixed methods design were used. The quantitative and qualitative data were analysed with SPSS version 20 and content analysis respectively. The mean age of cashew farmers was found to be 55 years. They have cordial relations with cashew traders but not with input dealers, processors and researchers. Cashew farmers perceive extension not to have performed its roles adequately to help develop the value chain. Financial support (particularly loans) from banks is not available to cashew farmers and majority of them (90.3%) claim banks in the Brong-Ahafo are not cashew farmer friendly. Awareness-raising through radio, TV and the print media about the economic importance of cashew and capacity building of farmers are not pursued in the development of the cashew value chain. There is no Cashew Board in place and the range of policies currently offered in the cashew industry is not comprehensive. The average contribution of cashew to the livelihoods of cashew farmers and their households in the Brong-Ahafo Region is 55%. If an operational framework founded on six critical issues namely: an earnest commencement of cashew value chain; marketing; value chain financing (VCF); inputs/cultural practices; training/capacity building; and research with corresponding strategies for implementation is operationalised, cashew could contribute minimum 85% to cashew farmers' livelihoods to bring many of them permanently out of poverty.

S21

The UN decade of action and nutrition calls on all countries and stakeholders to end hunger and prevent all forms of malnutrition by 2030. Achieving these goals requires adoption of effective and efficient methodologies to empirically appraise food security phenomena. Several methodologies and techniques have been proposed and used by different individuals and organisations. The recent one is WFP's CARI Console which was argued to be rigorous and valid for assessing food security at household and national levels. This study sought to estimate food security levels of maize farming households in the Volta Region of Ghana using the consolidated approach to reporting food insecurity, with particular emphasis on food consumption score (FCS), food expenditure share (FES) and livelihood-based coping strategies (LCS). A quantitative approach of cross-sectional survey design was adopted where primary data were collected from 733 farmers through multiphase sampling techniques. The food security indices estimated revealed that less than a quarter (24.1%) of the households were food secure, 22.1 percent were marginally food secure, about half (49.7%) were moderately food insecure while 4.1 percent were severely food insecure. Maize farming households were most significantly food secure using LCS followed by the FES and then FCS. There were also statistical significant differences among the three geographical zones in the Volta Region. Besides, there were significant differences in the levels of contribution of the various indicators used for estimating the food security index. The study suggests the need to synchronise the various approaches to reduce the incongruences among food security domains.

S22

The study investigated the supervision of Social Studies teachers in public JHSs in the Kumasi Metropolis. The mixed methods approach was used with both quantitative and qualitative data collection and analysis. The population consisted of all Junior High School Social Studies teachers (346), 10 headteachers, and 10 circuit supervisors in all the Junior High Schools (JHSs) in the Kumasi Metropolis during the 2014/2015 academic year. All the teachers were included (census) in the study but the headteachers and the circuit supervisors were purposively selected. Questionnaire and a standardized open-ended (semi-structured) interview protocol were used to collect data. Percentages, frequencies, means and standard deviations were calculated and used. Factorial one-way analysis of variance was also employed to test the differences between respondents' socio-demographic characteristics and how they experience instructional supervision. A cross-case analysis procedure was used to analyse the interview data after transcription. To the respondents, the main practice that constitutes instructional supervision of Social Studies instruction is collaborative, although self-reflection is sometimes practiced. Although, clinical supervision is experienced by teachers, supervisors do not engage teachers in every aspect of it. The socio-demographic characteristics of respondents influence the way teachers experience instructional supervision. It is recommended that circuit supervisors should lay equal emphasis on both collaborative and self-reflective supervisory practices. Circuit supervisors should also engage teachers in all the components of clinical supervision.

S23

The study was undertaken to examine senior high school teachers' extent of use of selected senior high school subject curricula. Using the level of use dimension of the Concerns-Based Adoption Model, 111 senior high school teachers were studied. Cross sectional survey design was resorted to the studying of the 111 teachers who were selected at random from the pool of accounting, business management, economics, geography and social studies teachers teaching in schools in the Central Region. Questionnaires were administered to the respondents and retrieved within 3 weeks. Data generated were analysed using frequencies and percentages. Results showed that senior high school teachers teaching accounting, business management, economics, geography and social studies in the Region failed to use the official curriculum in teaching. Accordingly, it is recommended that Ghana Education Service should strengthen instructional supervision to ensure that teachers implement the official curriculum.

S24

This study aimed at exploring the adolescent students' perception of sex education and its effect on their social lives in the Wa Municipality. A descriptive survey design espousing the quantitative approach was used with a sample of 390 respondents out of a population of 8101. Respondents were selected using the multistage sampling procedure (simple random, proportional, quota and systematic). A research questionnaire developed by researcher was used in collecting the data and the data was analysed using one samples t-test, frequencies and percentages, means and standard deviations and independent samples t-test. The study found out that majority of the respondents possessed adequate knowledge about sex education and their knowledge level with a mean of 24.82 was high and above the average mean of 20.0. The results further established that respondents got information about sex education from teachers, parents, health personnel, media and school clubs/associations. With regard to management of sex education, respondents agreed that sex education should be part of the academic curricular and to be taught by qualified teachers. Parents should be involved and educated to allow the teaching of sex education at home. It was recommended that sex education should be included in the curriculum and counselling services should be encouraged in senior high schools to help adolescents manage their social lives (as in interacting with others towards relationship and marriage in later life).

S25

Observation shows that over 60 percent of graduates who come back for postgraduate programme in the Nigerian Universities are unemployed. The question then: is how they are able to sponsor their programme? It is usually through their parents or in few cases their guardians. This means that parents have to bear the brunt of sponsoring their children even up to PhD. This was not the case in those days because most postgraduate students already have paid jobs where a higher degree is required. In the face of this new development, this paper reports what University of Ibadan has been doing in the past years and critically examined how it can improve on these efforts for better service delivery and functional human society. The paper through random sampling collected data on the job status of newly admitted students for 2017/2018

session while key informant interviews of the principal officers of the post graduate school of the University provided information on efforts of the postgraduate school in ensuring employability during studies. It also analysed all the other avenues available for employability and how far past students used these channels to become employed during or after their programmes. The paper concludes that the efforts of the University administration are commendable but the dwindling resources to the University system especially with the new financial system leaves much more to be desired. It therefore recommends that industries, private sectors and government agencies should become more involved in sponsorship of researches that would solve societal problems.

S26

Despite the increasing importance of innovative behaviours of farmers in the literature, there is no agreement about its antecedents. This clearly makes it difficult and risky for cocoa farmers to choose suitable innovations to adopt, develop and promote to fit their farm situations. This study provides critical insights on the antecedents of innovative behaviour among cocoa farmers in Ghana. The study adopted the descriptive survey design based on the six Cocoa regions in Ghana; Ashanti, Brong-Ahafo, Central, Eastern, Western and Volta Regions. From a survey of 370 sampled cocoa farmers, the results showed that cocoa farmers had a relatively high level of entrepreneurial proclivity but low level of market orientation. The study also showed that market orientation and entrepreneurial proclivity are antecedents of innovation with the key factors being, customer emphasis, intelligence dissemination and market responsiveness. To improve innovative behaviour of cocoa farmers the study recommends the need for flexibility in the cocoa marketing system of the country giving credence to the systems of customer/export options available to cocoa farmers, the dissemination of improved innovations and cocoa farmers' responsiveness to market.

S27

This study explored areas of students' participation in decision-making at the University of Cape Coast. The descriptive survey design was adopted for the study. A sample size of 373 respondents was selected through the stratified and simple random (lottery method) sampling procedures from a population of 9,763 3rd and 4th year students from 4 colleges in the University of Cape Coast. This research was grounded on theory of participation advocated by Stewart and Taylor (1995). It also presents a conceptual framework showing students' participation in decision-making at the tertiary level of education. The findings of the study revealed that students' participation in decision-making at UCC is mainly centered on decisions on assessment of lecturers, hall administration, students' welfare, and preparation of time table. However, the overall level of students' participation in decision-making in these areas is low. Furthermore, the study discovered that, students have no participation in management decisions on teaching and learning materials, development of curriculum and course structure, formulation of university policy at the administrative level, selection of teaching staff, grading and certification, and admission of students. Based on the findings of this study, conclusions were drawn. It was recommended that students should be well represented on all university statutory committees including

academic board committees to enhance the management of teaching and learning in the university. It was also recommended that student leaders should be well trained and equipped by management with the necessary skills to be able to contribute effectively in the decision-making processes in the University.

S28

The Nursing Process is an evidenced-based tool that guides the sequence of clinical reasoning, and the delivery of quality nursing care. To improve its clinical use, a number of studies have been conducted into the nursing process in several countries. However, in Ghana, the nursing process has not been thoroughly examined. This study sought to assess the knowledge level, extent of use, as well as, barriers associated with the use of the nursing process at the Tamale Teaching Hospital. A quantitative cross-sectional survey of 286 registered nurses and midwives, chosen by stratified random sampling, was undertaken using a questionnaire with reliability of 0.83. Ethical approval was granted by UCC-IRB and TTH-R&D. Data analysis was done using frequencies, Kruskal-Wallis H Test of association (at $p < 0.05$) and Multiple Logistic Regression (at $p < 0.05$) through IBM SPSS version 23 computer software. Knowledge level of the nursing process was high (71.0%), while use of the nursing process was low (32.3%). Major barriers to the use of the nursing process were stressful work environment (96.8%), absence of nursing process policy (94.7%), lack of further nursing process training (91.5%), inadequate supply of consumables (81.2%), and lack of nursing process clinical skills (42.9%). Nursing process policy, clinical nursing process skills and supply of consumables were good predictors and significantly associated with the use of the nursing process. The hospital should, therefore, develop a ward level nursing process policy, supply adequate quantities of consumables and conduct periodic nursing process clinical skills re-training of all nurses.

S29

This paper outlines how graduates of the Institute for Educational Planning and Administration (IEPA) are placed and utilised by their employers and how efficient and effective they (i.e. the graduates) are, at their respective schedules and places of work as they offer their quota towards Ghana's developmental agenda. The paper adopts the concurrent mixed methods design in the form of qualitative and quantitative data analysis. In all, a sample of four hundred and twenty-three (423) participants made of two groups was obtained for the study. The first group selected purposively, comprised sixteen (16) 'employers' of IEPA's graduates. The second group consisted of four hundred and seven (407) IEPA graduates themselves. Data generated through, the self-completed questionnaires were entered into SPSS, for processing and analysis. Descriptive statistics in the form of frequency tables, bar charts and pie charts were used to present the quantitative data. The qualitative data via semi-structured interviews however, was first coded, transcribed manually, and thereafter categorised according to the five research questions posed and key issues, observations and lessons were drawn from the transcribed data. The study found that, largely, IEPA and her graduates have contributed, and still continues to contribute to the training of the country's human resources to take up useful roles in the education sector as well as other productive sectors of the Ghanaian economy suggesting that, IEPA indeed was/is chalking up

some modest gains in various sectors of the Ghanaian economy. The study thus, recommends that IEPA design short professional development courses for employees of her clientele to ensure that personnel in the various sectors of the economy and especially, in education are trained properly and wholly to acquire skills and knowledge needed to perform tasks they are assigned.

S30

The study aimed at finding out whether teachers in Junior High Schools in the Cape Coast Metropolis follow the basic laid down principles in their testing practices, with respect to test construction, administration and scoring of classroom or teacher made tests. The study adopted the quantitative method and descriptive survey design was used for the analysis. A total of 50 public Junior High Schools comprising 300 teachers were used for the study. Simple random and purposive sampling procedures were used to select the subject teachers at the Junior High Schools. The main instrument used for the study was questionnaire comprising 55 items with overall reliability coefficient of .873. The data was analysed using means and standard deviations, frequency, and percentages, One sample t-test and One-Way Analysis of Variance (ANOVA). The level of significance for all tests were at 0.05. The result from the study showed that, most teachers at the Junior High Schools did not follow the basic principles of test construction, and scoring of essay type test to an appropriate level, 7 out of 20 construction principles were often practice and 5 out of 13 scoring principles were followed. In test administration, most of the principles were followed, 7 out of 12 principles were often practiced. A statistically significant differences were found among teachers and their subject areas of specification (Mathematics, English, Social Studies, Science and Religious and Moral Education). It was recommended that regular in-service training in testing practices be organized for teachers in Junior High Schools by the Educational Directorate in Cape Coast Metro.

Appendix B: Hard Sciences Abstracts

H1

The research was designed to examine the influence of graded dose of aqueous seed extract of *Moringa oleifera* on testicular pathology, gonadal and extragonadal sperm reserves of Wistar rat experimentally infected with *Trypanosoma brucei*. The animals were randomly divided into five groups (A, B, C, D and E). Group E was the control. Group A to D were inoculated with 1×10^6 virulent *T. brucei* intra-peritoneal and allowed to exhibit clinical signs prior to treatment with *Moringa oleifera* seed extract. The rats were treated daily for five weeks with 75 mg, 100 mg, 125 mg and 150 mg of *Moringa oleifera* seed extract for group A, B, C and D respectively. Blood samples were collected every Monday between 10:00-11:00 AM for hematological indices. The rats were sacrificed and gonadal and extra-gonadal sperm reserves (GEGSR) were evaluated followed by histopathology. (GEGSR) (sperm $\times 10^6$) of the rats (Group A to E) post treatment revealed significant increased 213 ± 2.3 ; 221 ± 3.1 ; 250 ± 1.7 ; 259 ± 2.6 ; 295 ± 2.5 and 115 ± 1.1 ; 160 ± 2.1 ; 153 ± 0.0 ; 167 ± 1.7 ; 120 ± 1.2 respectively, compared to group E at $p < 0.05$ level. Sperm concentration of the right epididymis (sperm $\times 10^6$) 60 ± 0.6 ; 90.2 ± 1.1 ; 96.5 ± 0.0 ; 98.7 ± 0.9 ; 69.4 ± 0.6 were significantly higher compared to the left epididymis 5.0 ± 0.5 ; 69.8 ± 1.1 ; 56.5 ± 0.0 ; 68.3 ± 0.8 ; 50.6 ± 0.6 . The blood were evaluated for group A to E and the PCV (%) revealed progressive decreased in the PCV of group A, B and C 22.9 ± 4.89 ; 25.2 ± 2.17 ; 38.1 ± 1.5 ; 40.7 ± 8.1 ; 47.0 ± 2.2 compared to the group E post infection. Two weeks post infection, there was significantly decline on impact of trypanosomosis on the rats.

H2

IFN- γ release assays (IGRAs) often present false-negative or indeterminate results in children with tuberculosis. HIV co-infection may contribute to decreased sensitivity of IGRAs by impairing T-cell IFN- γ expression. Measurement of alternative cytokines in Quantiferon® (QFT) supernatants can circumvent the IFN- γ -dependency and may improve QFT sensitivity. We aimed to identify additional cytokines from QFT supernatants for detection of *M. tuberculosis* infection in children with tuberculosis and HIV co-infection from Ghana. Concentrations of 18 cytokines in QFT supernatants from children (0-16 years) with tuberculosis concomitantly infected with HIV ($n = 25$) or without HIV ($n = 24$) from Ghana were measured using cytometric bead array (CBA). Twenty nine percent (29%) of the children showed positive IFN- γ test results, and five cytokines, i.e. IL-6, IL-21, TNF- α , IL-1 α and IP-10, detected *M. tuberculosis* infection with comparable or, for IL-6, with significantly higher sensitivity (59%). Increased age and HIV co-infection were associated with decreased cytokine induction, and especially IL-21 and IP-10 were less prevalent in HIV co-infected children with tuberculosis. Combined cytokine analyses increased proportions of positive tests, and a four-cytokine subset (i.e. IL-6, IL-21, IFN- γ , IL-1 α) predicted 78% of the children with tuberculosis correctly. Combined evaluation of IFN- γ and alternative cytokines improved IGRA-sensitivity in children with tuberculosis.

H3

Alterations of serum electrolytes (Na^+ , K^+ , Ca^{2+} , Cl^- , PO_4^{3-} , and HCO_3^-) was studied in rats experimentally infected intraperitoneally with 10^6 *Trypanosoma congolense* and treated with a combination of diminazene aceturate (DA) and lactose-in-saline (LS). Five groups of five rats each were used for the study. All the groups except one were infected with *Trypanosoma congolense*. Groups I, II, and III were treated with DA alone (3.5mg/kg), DA with LS (0.2 ml of 10%) and LS alone (0.2 ml of 10%) respectively. Group IV was infected but untreated, while group V was not infected and administered 0.2 ml of distilled water. Sodium (Na^+) and Chloride (Cl^-) concentrations showed significant increase ($p < 0.05$) post infection during peak parasitaemia and declining packed cell volume (PCV). After treatment serum Na^+ and Cl^- remained normal in group administered treatment combination of DA with LS when compared to the groups administered DA and LS alone and also the infected untreated group. The variations of K^+ , Ca^{2+} , PO_4^{3-} , and HCO_3^- showed similar pattern in group given DA with LS as compared to the other groups. The values of all the electrolytes studied were relatively reduced post treatment more in the DA with LS group. The choice of a combination of DA with LS had positive effects on the rats electrolyte and acid-base level. This combination ameliorated serum electrolyte aberration associated with *T. congolense* infection. Therefore, since lactose is believed to be an incipient to trypanocides, its combination with diminazene aceturate may provide effective therapeutic efficacy against trypanosome infections in animals.

H4

Malaria is a major public health challenge in Ghana, with parasite diversity posing a major threat to the production of an efficient blood stage malaria vaccine. Capillary Electrophoresis (CE) has enhanced the accuracy of estimating parasite diversity and parasite population analysis. This study aimed at utilizing CE to determine parasite diversity in different transmission settings in southern Ghana using 12 unlinked microsatellite markers as well as *msp*-2 and Glutamate-Rich Protein (*glurp*) antigenic markers to determine parasite diversity. Genomic DNA was extracted from whole blood collected from asymptomatic volunteers living in Obom (hyper-endemic) and Asutuare (holoendemic) using the Quick DNA kit. The presence of *P. falciparum* was confirmed using species specific PCR. *P. falciparum* positive samples were subsequently genotyped using *msp*-2 and *glurp* family specific PCR. Samples predicted to be clonal were subjected to CE based microsatellite genotyping. Forty four (55%) and 24 (30%) samples were positive for N5 (3D7) and M5 (FC27) at Obom with average MOI of 1.30. N5 strain was prevalent at both study sites. Only 8 (10%) and 4 (5%) of N5 and M5 strains respectively were genotyped at Asutuare with an average MOI of 1.0. For *glurp* R II region 55 (68.5%) and 70 (87.5%) were genotyped for Obom and Asutuare sites respectively. Genetic diversity of microsatellites was low, He ranged from 0.00 to 0.577. Allelic discordance was observed between *msp*-2 and microsatellites markers. Parasite diversity was high with *msp*-2 marker compared to *glurp* gene, microsatellites had low genetic diversity of the parasites at both sides but the sensitivity and high resolution of CE based markers makes them the markers of choice for genotyping *P. falciparum*.

H5

Malaria remains endemic in Ghana, with the main causative agent being *Plasmodium falciparum*. However, the prevalence of other human malaria agents such as *Plasmodium ovale* and *Plasmodium malariae* are on the increase. This study aimed at determining the diversity of *P. falciparum* and the prevalence of *Plasmodium ovale* and *Plasmodium malariae* in asymptomatic school children attending 7 schools scattered in the Central Region of Ghana. Parasite prevalence was estimated using PfHRP2 RDT kits as well as microscopic evaluation of Giemsa stained thick blood smears. Genomic DNA was obtained from 633 dried blood spot filter paper samples obtained from school children aged 6-12 years using the Saponin-Chelex DNA extraction method. Nested species and family specific PCR was used to determine *Plasmodium* species and *P. falciparum* diversity respectively. The overall prevalence of *Plasmodium falciparum* was 22.1% (140/633), *Plasmodium malariae* was 1.1% (7/633) and *Plasmodium ovale* was 0.16% (1/633). There was no *Plasmodium vivax* identified within the study population. Children from 4 of the 7 schools were *P. falciparum* positive: Simiw, 87.5% (105/120); Kuful, 26.7% (24/90); Ntranoa, 11.4% (8/70) and Presbyterian school, 4.2% (3/70). *Plasmodium malariae* was found predominantly as mixed *P. malariae/P. falciparum* infections in children from Kuful 5.5% (5/90) and mono infections at Ntranoa 2.8% (2/70). One child attending the Kuful School had a *Plasmodium falciparum/malariae/ovale* mixed infection 1.1% (1/90). The *P. falciparum* 3D7/FC27 MSP2 allelic family ratio was highest in Kuful (1.33/1) and lowest in Ntranoa (1/1). Although the overall prevalence of *P. falciparum* and *P. malariae* in the study sites were only 22% and 1% respectively, one school had a prevalence of almost 90% *P. falciparum* and 6% of *P. malariae*. Suggesting the need for more communities to be involved in national screening programs. *P. falciparum* diversity was seemingly minimal in the study area.

H6

The study was carried out to assess the hepato-renal dysfunction following chronic exposure to glyphosate-based herbicide with or without zinc pretreatment. Daily oral doses of 14.4-750 mg/kg of the herbicide and zinc pretreatment at 50 mg/kg and 100 mg/kg were administered for 36 weeks, after which serum samples were harvested from blood samples collected by jugular venipuncture after chloroform anaesthesia. Liver and kidney samples were fixed in 10% neutral buffered formalin and processed for histomorphological evaluation. The measured serum electrolytes were not reportably altered by the herbicides exposure except the calcium ion concentration which was relatively decreased following chronic exposure to the herbicide. Aspartate aminotransferase, alanine aminotransferase and alkaline phosphatase activities were significantly ($p < 0.05$) increased. The total protein, albumin and globulin concentrations decreased while urea and creatinine concentrations increased ($p < 0.05$). Moderate to severe coagulation necrosis of the hepatocytes with moderate to severe glomerular and renal tubular necrosis were observed. It was concluded that chronic glyphosate-based herbicide exposure in male Wistar rats caused hepato-renal functions impairment with poor ameliorative effects of zinc pretreatment histomorphologically.

H7

Leptospirosis is an emerging and re-emerging cosmopolitan bacterial infectious zoonotic disease of animals and humans. Leptospirosis is caused by a bacterium of the genus *Leptospira*. The disease affects fertility in animals including cattle, sheep and goats, causing early embryonic death, abortion, stillbirth and delivery of weak newborn in cattle and pigs. It is a serious economic and zoonotic disease. Cross sectional study was employed to determine the occurrence of *Leptospira* species in foetuses from slaughtered pregnant cows in old Kano abattoir, Kano State, Nigeria using Microscopic Agglutination Test (MAT). Out of 372 sera tested using microscopic agglutination test, 52 (13.98 %) were positive to one or more serovars at serum dilution of 1:10. Of the 52 sera that were positive for leptospiral antibodies, 10 (2.69 %), 10 (2.69%), 10 (2.69 %), 7 (1.88 %), 5 (1.34 %), 4 (1.08 %), 3 (0.81 %) and 3 (0.81 %) were positive to Hardjo, Pomona, Grippotyphosa, Canicola, Icterohaemorrhagiae, Australis, Tarassovi and Mini serovars respectively. There was significant difference ($p < 0.05$) observed between age groups and *Leptospira* infection. The presence of *Leptospira* species in these foetuses poses occupational risk to butchers, abattoir workers, and canivorous animals that handle or consume infected foetuses/placentas. Foetal wastage is a generic problem reported and observed in most Nigerian abattoirs. More so, the practice of consuming these foetuses and placenta encourages the slaughter of pregnant cows in the abattoir. This may hamper sustainable livestock development, production and food security in Nigeria. Therefore, knowing the public health consequences and zoonotic implications of this organism, government through relevant agencies should promulgate relevant and enforceable laws or regulations that will discourage and/or prevent this unwholesome practice in the abattoir.

H8

Human African trypanosomiasis is a neglected tropical disease caused by protozoan parasites belonging to the genus *Trypanosoma*. It is transmitted to humans by tsetse fly (*Glossina* genus) bites which have acquired their infection from human beings or from animals harboring human pathogenic parasites. It is associated with multifaceted clinical presentation, diagnosis, and challenging treatment. The available drugs for the treatment of trypanosomiasis are cost burden associated with severe adverse reactions and are limited by drug resistance. This condition highlights the urgent necessity for the development of new drugs for the treatment of trypanosomiasis. We have previously shown in vitro anti-trypanosome activities of three novel tetracyclic iridoids; ML-2-3, Molucidin and ML-F52, isolated from *Morinda lucida* with IC_{50} values of 3.75 μ M, 1.27 μ M and 0.43 μ M respectively. In this study, we analyzed the antitrypanosomal sensitivities of ML 2-3, Molucidin and MLF52 at low and high cell densities in *T. brucei* using alamar blue cell viabilities and cumulative growth curves. Growth of *T. brucei* was monitored in the absence or presence of compounds for a minimum of 10 days. Alamar blue cell viability assay was carried out at high cell density and low cell density for 72hours and 24 hours respectively. Preliminarily results that ML-2-3 and Molucidin are more stable than MLF52. Future studies will seek to determine the mechanism of action of the compounds using RNA interference target sequencing together with transcriptomics and proteomics studies.

H9

Synedrella nodiflora (SNE) has been used traditionally for many neurological conditions and some of these neuroactive effects have been scientifically substantiated. The usefulness of SNE in depression has however not been investigated despite the availability of data in other disease models indicating it may be useful. The present study therefore examined the effect of SNE in acute murine models of depression and the possible mechanisms mediating its activities in these models. Preliminary qualitative phytochemical and high performance liquid chromatography (HPLC) screenings were conducted on SNE. The behavioural effects of SNE (100, 300 and 1000 mg/kg) pre-treated mice were examined in the forced swimming (FST) and tail suspension (TST) tests. Behavioural events such as mobility (swimming, climbing, curling and climbing), and immobility, were scored. The possible involvement of monoamines in the effects of SNE was assessed in the TST by pre-treating mice with α -methyl dopa, reserpine and para-chlorophenylalanine (pCPA) in separate experiments. Flavonoids, tannins, saponins, alkaloids, cardiac glycosides, coumarins, triterpenes, sterols, anthraquinones and phenolic compounds were present in SNE. HPLC analysis revealed the presence of two major constituents observed at retention times 42.56 and 46.51 min, with percentage composition of 45.72% and 36.88% respectively. SNE significantly reduced immobility scores in both FST and TST, suggesting antidepressant effects. The antidepressant properties of SNE were reversed by the pre-treatment of α -methyl dopa, reserpine and pCPA, suggesting a possible involvement of monoamines (noradrenaline and serotonin) in its mechanism(s) of actions. SNE exhibits antidepressant effects, possibly mediated through interplay of enhancement of noradrenergic and serotonergic mechanisms.

H10

Liver disease has continued to be a major health problem in the world's population with drug-induced liver damage one of the causes. *Tecoma stans* is an example of a medicinal ornamental plant and almost all parts of this plant are of medicinal importance. It exhibits strong antioxidants, anti-inflammatory, antispasmodic, and wound healing activities. This study was conducted to assess the hepatoprotective effects of hydroethanolic extract of *Tecoma stans* (TSE) against acetaminophen- and CCl₄-induced liver damage in rats. CCl₄ (1ml/kg body weight) and acetaminophen (500 mg/kg body weight) was used to induce the hepatotoxicity in the animals. Animals were treated with TSE (dose: 100mg/mL and 250mg/mL) and standard drug, silymarin (100mg/ml), for 7 days. Biochemical parameters such as ALT, AST, ALP, total cholesterol and triglycerides, serum proteins, bilirubin, creatine and urea were evaluated. Also, liver histology was conducted. Serum levels of ALP, ALT, AST, bilirubin (total and indirect), cholesterol, serum proteins (total protein, album and globulin) significantly increased in the paracetamol and CCl₄ only groups when compared to the normal. Levels of these biochemical parameters were reduced after the administration TSE (250 mg/kg) and the silymarin (100 mg/kg). TSE has been shown to possess hepatoprotective properties because it was able to decrease the acetaminophen- and CCl₄-induced elevations in biochemical parameters. These observations were supported by histological observations.

H11

The menace of bacterial resistance to many known antibiotics has led to thorough search for the various mechanisms used by bacteria to resist small molecules and novel antimicrobial agents to combat this menace. *Pseudomonas aeruginosa* is an opportunistic, invasive and toxigenic human pathogen which primarily infect patients with immune deficiency, accelerates mortality in patients with cystic fibrosis lungs. Also, antimicrobial peptides have been investigated largely for their antimicrobial activity, but less is known about their anti-biofilm and virulence factor inhibition capacity. The goal of this work was to investigate the capacity of antimicrobial peptides from *Olivancillaria hiatula* to disrupt *P. aeruginosa* biofilms and inhibit the production of virulence factors. Agar diffusion and broth dilution techniques were used to evaluate bacterial susceptibility to the peptide extract. Glass-based crystal violet staining and light microscopy was used to evaluate biofilm forming capability of *Pseudomonas aeruginosa* ATCC 4853, as well as its eradication. 96-wellplate-based assays were also used to investigate time-dependent growth inhibition profiles of microbes in the presence of peptide, biofilm inhibition and the mechanism of biofilm inhibition by the peptides. Inhibition of Virulence factor (Pyoverdine, Pyocyanin and Proteases) production was evaluated using standard assays. We report herein that, *P. aeruginosa* was susceptible to the peptide extract at a minimum inhibitory concentration (MIC) of 39.0625 µg/mL and a minimum bactericidal concentration >2.5 mg/mL. Sub-MIC concentrations permitted bacterial growth and biofilm formation. Micrographs obtained indicated biofilm inhibition at 60 µg/mL. 2.5 mg/mL of the extract was required to degrade pre-formed biofilm. About twice the MIC was required to prevent 50% biofilm formation (BIC₅₀= 57.48 µg/mL). Pyoverdine and Pyocyanin were inhibited to 72% and 60% at ½ MIC and 42% and 20% at 1/32 MIC, respectively. Protease activity determined revealed approximately 70% inhibition of proteolytic activity at ½ MIC. The above result show that peptide extract from *O. hiatula* has promising biofilm disruption activity and inhibit the production of major virulence factors that promote pathogenicity in *P. aeruginosa*.

H12

Trunk mal-rotation rotation and anterior pelvic tilt are some of the morphological features associated with children with hemiplegia. Aim of this study is to determine whether there are structural and functional differences between the affected and non-affected sides of the abdominal muscles in children with hemiplegic spastic cerebral palsy. Muscle thickness was measured both on the affected and non-affected side during resting and active stages using ultrasonography. Muscle function was evaluated with an electromyograph. The abdominal muscles; rectus abdominis (RA), (external oblique (EO), internal oblique (IO) and transversus abdominis (TrA) on the affected side were thicker both at rest and during activity than the non-affected side ($p < 0.001$). The affected side showed a significant decrease in thickness between the rest and activity for the EO, IO and TrA muscles whereas these same group of muscles on the non-affected side increase significantly ($p < 0.001$) from rest to activity. The change in thickness between active and resting stages for the RA muscles on the affected side was similar to the non-affected side. The electromyography (EMG) findings correspond to the results muscle thickness on both the affected and non-

affected sides of the anterior abdominal wall. Abdominal muscles on the affected side were thicker and showed increased EMG activity during rest than the than the non-affected side. The anterolateral abdominal muscles (EO, IO and TrA) on the affected decreased change in thickness from rest to activity relating to weaker neuromuscular activity than the muscles on the non-affected side. The thin anterolateral abdominal muscles on the affected side appear to show increased tone during rest, lacking the ability to contract optimally during activity when compared to the non-affected side. Further investigations require on the ultrastructure of the abdominal muscles in individuals with hemiplegia for a better understanding of their trunk musculature and function.

H13

Malaria remains endemic in Ghana, with the main causative agent being *Plasmodium falciparum*. However, the prevalence of other human malaria agents such as *Plasmodium ovale* and *Plasmodium malariae* are on the increase. This study aimed at determining the diversity of *P. falciparum* and the prevalence of *Plasmodium ovale* and *Plasmodium malariae* in asymptomatic school children attending 7 schools scattered in the Central Region of Ghana. Parasite prevalence was estimated using PfHRP2 RDT kits as well as microscopic evaluation of Giemsa stained thick blood smears. Genomic DNA was obtained from 633 dried blood spot filter paper samples obtained from school children aged 6-12 years using the Saponin-Chelex DNA extraction method. Nested species and family specific PCR was used to determine *Plasmodium* species and *P. falciparum* diversity respectively. The overall prevalence of *Plasmodium falciparum* was 22.1% (140/633), *Plasmodium malariae* was 1.1% (7/633) and *Plasmodium ovale* was 0.16% (1/633). There was no *Plasmodium vivax* identified within the study population. Children from 4 of the 7 schools were *P. falciparum* positive: Simiw, 87.5% (105/120); Kuful, 26.7% (24/90); Ntranoa, 11.4% (8/70) and Presbyterian school, 4.2% (3/70). *Plasmodium malariae* was found predominantly as mixed *P. malariae/P. falciparum* infections in children from Kuful 5.5% (5/90) and mono infections at Ntranoa 2.8% (2/70). One child attending the Kuful School had a *Plasmodium falciparum/malariae/ovale* mixed infection 1.1% (1/90). The *P. falciparum* 3D7/FC27 MSP2 allelic family ratio was highest in Kuful (1.33/1) and lowest in Ntranoa (1/1). Although the overall prevalence of *P. falciparum* and *P. malariae* in the study sites were only 22% and 1% respectively, one school had a prevalence of almost 90% *P. falciparum* and 6% of *P. malariae*. Suggesting the need for more communities to be involved in national screening programs. *P. falciparum* diversity was seemingly minimal in the study area.

H14

Globally, it is known that enough intake of vitamin A provides an effective solution to its deficiency. Vitamin A supplementation is one of the best-proven and most cost-effective interventions to improve vitamin A status and save children's lives. Many developing countries have adopted the recommended strategy of supplementation to reduce vitamin A deficiency. This research was conducted to determine the uptake and completeness of Vitamin A supplementation in Keta municipality. A cross-sectional quantitative survey was adopted and data collected was

entered into EpiData version 3.1 and then exported to Stata version 14 for data analysis. Data was summarized using descriptive and analytic. Descriptive includes; frequency, mean and standard deviation while analytic include performing chi-square test to assess associations. A total of 390 respondents were contacted for the study, about 99% compliance level among the required respondents. The findings revealed that, 94.6% had an uptake of Vitamin A supplementation and this was associated with Child's age, marital status and status of caregiver ($\chi^2=9.736$; p-value=0.045, $\chi^2=17.466$; p-value<0.001 and $\chi^2=22.95$; p-value=0.013 respectively). The study also revealed that proportion of under 5 years children completeness of Vitamin A was associated to child's age ($\chi^2=117.911$; p-value< 0.00) age of caregiver ($\chi^2=127.769$; p-value< 0.00), marital status ($\chi^2=23.155$; p-value< 0.00), parity level ($\chi^2=6.818$; p-value=0.033) educational level ($\chi^2=13.37$; p-value< 0.001) and occupation ($\chi^2=12.14$; p-value=0.014). Notwithstanding, the completeness association with marital status and parity level of caregivers ($\chi^2=23.155$; p-value< 0.00 and $\chi^2=6.818$; p-value=0.033 respectively). The uptake of Vitamin A supplementation in Keta Municipality was quite encouraging however, there was a disparity with the completeness level among children under 5 years. In order to increase and maintain the uptake level, health promotion activities must be implemented in the Keta Municipality among caregivers since only 15% of the Caregivers with children under-5 years had a good knowledge of Vitamin A supplementation.

H15

The present study examined the anticonvulsant activity of the methanol stem bark extract of PK in mice and day old chicks against maximal electroshock (MES), pentylenetetrazole (PTZ), picrotoxin (PIC), and strychnine (STR) induced seizures. The CNS depressant ability of the extract was also investigated using diazepam-induced sleep test, and it was observed to significantly and dose dependently increase the sleep duration in the diazepam sleep test. The extract and fractions significantly and dose dependently increase the latency to onset of seizure in the PTZ and picrotoxin tests. In the strychnine test, the extract significantly increased the latency to seizure onset at the highest dose of 200 mg/kg, though none of the mice was protected from seizure as was the case with PTZ and PIC induced seizures. Considering the overall effect of PK, it may be concluded that the extract contains bioactive principles acting via enhancement of GABA inhibitory activity, and a second possibility via antagonism of the glutamate-NMDA receptors.

H16

Leishmaniasis is widely considered among neglected tropical disease and threatens about 350 million people globally. In spite of advances in drug discovery, high toxicity, and drug resistance limits current drugs. With current emphasizes on use of medicinal plants worldwide we previously identified three novel tetracyclic iridoids, Molucidin, ML-2-3 and ML-F52 from *Morinda lucida*, a medicinal plant, to have anti-trypanosomal activity. The activity of tetracyclic iridoids against *Leishmania donovani* and *L. major* was studied using promastigotes and intracellular amastigotes. Infectivity and cytotoxicity were performed with RAW 264.7 macrophage cells using Amphotericin as reference drug. The mechanisms of action were analyzed by performing Nexin Assay, Immunohistochemistry (IHC), and Cell cycle analysis. A

50% inhibitory concentration of compounds was determined by Alamar blue assay. Molucidin and ML-F52 showed activity against *Leishmania* spp, with ML-F52 being more active than Molucidin and less toxic than Amphotericin. Molucidin and ML-F52 induced apoptotic mechanism of cell death in *Leishmania*. No inhibition of kinetoplastid membrane protein was observed after treatment, however, iridoids inhibited cytokinesis and induced phenotypic changes in promastigotes. Molucidin induced significantly higher ‘‘nectomonad-like’’ forms; non-replicating forms, and loss of kDNA. ML-F52 triggered ‘cell-rounding’ with loss of flagellum. An enhanced peak at G₂-M phase in Molucidin-treated cells confirmed by accumulation of mid-mitotic forms. Iridoids induced an enhanced peak at sub-G₁, confirming apoptotic effect of compounds. Variations in cell cycle arrest, phenotypes and cytokinesis in *Leishmania* spp. was triggered by compounds suggesting differences in effects on parasites, hence further investigation could present potential leads against Leishmaniasis.

H17

Ziziphus abyssinica is an important African traditional medicinal plant used in the treatment of jaundice (irrespective of the cause). There is however no scientific report to justify this use in folk medicine hence the need for the current research. The study aimed at investigating the hepatoprotective effect of *Ziziphus abyssinica* leaf (ZAL) and root bark (ZARB) extracts in phenylhydrazine-induced jaundice model in rats. Experimental jaundice was induced by pretreating albino rats with phenylhydrazine (PHZ) (40 mg/kg, p.o.) on two alternate days. Afterwards, six out of the eight groups of rats (n=5) used were then treated orally with either ZAL (30, 100 and 300 mg/kg/day) or ZARB (30, 100 and 300 mg/kg/day) for seven days. Naïve control group rats received only normal saline without phenylhydrazine pretreatment whereas rats in the negative control group received phenylhydrazine pretreatment followed by normal saline. After one-week drug administration, the rats were sacrificed and their blood samples taken via cardiac puncture. The levels of bilirubin and other serum biochemical parameters were assessed. Sections of the liver, spleen and kidney of the rats were also examined histologically to evaluate any changes produced by the various treatments. The results obtained indicated that the total bilirubin levels and serum ALT (as well as other parameters) were significantly ($P < 0.001$) increased by PHZ. This increment was significantly reversed in the rats which received either ZAL or ZARB. Photomicrographs of the liver of rats which received ZAL and ZARB after PHZ showed recovery; evident in their sinusoidal spaces with very mild to no pyknotic nuclei present which was similar to naïve control rats. ZAL and ZARB were able to reduce jaundice caused by liver damage as well as the hepatotoxicity caused by the PHZ in the rats and this validates the plant’s folkloric use in jaundice treatment.

H18

Dental health issues affect individuals all over the globe with most common ones being dental plaque and decay. These are associated with *Streptococcus mutans* colonization of the enamel. *Streptococcus mutans* is a gram-positive facultative anaerobic bacterium which is commonly found in the oral cavity. Treatment of dental health problems in the mainstream practice has basically relied on orthodox

medications with its associated rising reports of antibiotics resistance. *Psidium guajava* (Guava), *Azadirachta indica* (Neem tree) and *Terminalia glaucescens* have traditionally been used to treat several diseases, including bacterial, dental and naso-pharyngeal infections, respectively. This study aimed at assessing and comparing the anti-*Streptococcus mutans* (ATCC 700610) activity of the different concentrations (200, 100, 50, 25 and 12.5 mg/mL) of aqueous, 70% ethanol and absolute ethanol extracts of *P. guajava* (leaves), *T. glaucescens* (stem bark) and *A. indica* (stem bark), using the agar well diffusion method (cork borer's diameter was 6 mm), while broth dilution procedure was employed to determine the minimum inhibition concentration (MIC). Commercial chlorhexidine (0.2%) and pure ciprofloxacin compound (15 µg/mL) were used as positive controls. The ethanol and aqueous extracts were prepared by cold and hot maceration, respectively, concentrated using a rotary evaporator and dried using a freeze dryer. The results showed that all the extracts have remarkable activities, in a dose-dependent manner. The highest activity was recorded for the aqueous, 70% ethanol and absolute ethanol extracts of *A. indica*, with zones of inhibition of 20.5, 18.8 and 19.0 mm (plus that of cork borer's diameter), respectively at 200 mg/mL. The two ethanolic extracts of *P. guajava* were significantly ($p < 0.05$) more active than its corresponding aqueous extract. The MIC value of 2.5 mg/mL, was recorded for the absolute ethanol extract of *T. glaucescens*. The results suggest that the use of *A. indica*, *T. glaucescens* and *P. guajava* might prevent oral infections, and encourage the continued use of the *A. indica* as chewing stick in many traditions across Africa.

H19

Increasing trend of urbanization and lifestyle changes, especially a "Western-style" diet are projected to give astronomical leap in world prevalence of diabetes. *Senecio biafrae* is used to manage diabetes in African countries, including western-Nigeria and Ghana. Reports of hepatotoxic pyrrolizidine alkaloids in related species have raised some concern about its safety. Methanolic extract (100, 200, 400 mg/kg) of the whole plant was investigated for anti-hyperglycaemic activity, using normal, glucose-loaded and alloxan induced hyperglycaemic rats, while its in vitro antioxidant effects were evaluated using 1,1-diphenyl-2-dipicrylhydrazyl (DPPH) radical SSAvening, ferric reducing antioxidant power (FRAP), total antioxidant capacity (TAC) and hydroxyl radical SSAvening activity (HRSA) assays. Glibenclamide (5 mg/kg) and appropriate anti-oxidant standard drugs were used as positive controls. Also, using Lorke's method an $LD_{50} > 5,000$ mg/kg was determined for this extract and the plant had moderate anti-oxidant activity. Anti-hyperglycaemic activity-directed purification of the methanolic extract, using glucose-loaded rats, led to the isolation of a crystalline compound that was characterised as β -stigmasterol, by comparing its spectral data with those in the literature. Extract (100-400 mg/kg) gave significantly ($p < 0.05$) lower hypoglycaemic activity than glibenclamide (5 mg/kg) in normal rats, comparable ($p > 0.05$) time and dose dependent activity in glucose-loaded rats and a significantly higher activity than glibenclamide in sub chronic alloxanised rats. Anti-hyperglycaemic activity of isolated β -stigmasterol, extract and glibenclamide were comparable, indicating that β -stigmasterol is one of its anti-hyperglycaemic constituents. *Senecio biafrae* demonstrated significant anti-hyperglycaemic activity and has additional anti-oxidant property, thereby justifying its antidiabetic ethnomedicinal use, is non-toxic and therefore may be safe for human use, β -stigmasterol, operating

through both extrapancreatic and insulin stimulating mechanisms of action, is one of its anti-hyperglycaemic constituents, while an additional insulinotropic mechanism of action was suggested for β -stigmaterol. As Ghana, and indeed the whole world, canvases for the beginning of a New Era of Bio-Research and Development in Africa that would lead to increased availability of drugs and food-drugs, both conventional and herbal, to the African citizens, there is the need for the regional scientists to embrace more activity-directed investigations of plants used ethnomedicinally to treat diseases. Therefore, there must be a paradigm shift from non-specific phytochemical screening to achieve this. Hence, the false positive and negative results that demerits non-specific phytochemical screening will be presented as well as activity-directed isolation of β -stigmaterol, whose pharmacological properties could explain the results and mechanism of actions of *S. bialfrae* methanolic extract

H20

Cardiovascular disease is responsible for the majority of mortality cases in in Ghana and in sub-Saharan Africa. The disease is associated with oxidative stress. In oxidative stress state, there is an imbalance between free radicals generation and its consumption by the antioxidant system which results in tissue damage, injury to endothelial cells and platelet dysfunctions. In this study patients with cardiovascular diseases. Ninety participants were recruited; 45 were patients clinically diagnosed with hypertension and other 45 participants were also apparently healthy controls. Full blood count (FBC) and superoxide dismutase activity (SOD) of the study participants' were determined. Statistical correlations were determined between the FBC parameters and SOD. The mean age of patients was 54.0 ± 11.9 years and that of controls 42.9 ± 9.4 . The mean age was statistically significant, $p = 0.0001$. Body mass index (BMI) was however higher in patients (27.44 ± 5.42) than in controls (25.51 ± 3.99). The clinical parameters; systolic blood pressure were higher in the patients (137) than in controls (127) and also the diastolic blood pressure (DBP) were higher in the patients (82) than in controls (79). Mean SOD activity for cases and controls were 18.42 ± 2.21 and 29.99 ± 4.03 respectively. The SOD activity positively correlated with white blood cells (WBC) ($r = 0.239$, $p = 0.023$), red blood cells (RBC) ($r = 0.229$, $p = 0.030$), haemoglobin (HGB) ($r = 0.180$, $p = 0.002$), and haematocrit (HCT) ($r = 0.114$, $p = 0.002$) and were statistically significant, respectively but negatively correlated with lymphocytes ($r = -0.215$, $p = 0.042$) and was significant. In conclusion, significant high oxidative stress levels as measured by SOD activity was found in the patients with cardiovascular disease.

H21

Transmission of *Toxoplasma gondii* can occur during pregnancy. The outcome of which is fatal, leading to neurological, brain and ophthalmic disorders subsequently in life. Other studies in Ghana reveal prevalence of 83.6% and 58.0% in pregnant women and children respectively. This study aims at determining the endemicity and associated risk factors of toxoplasmosis in three villages among children and pregnant women in Ghana. 110 pregnant women aged between 16-45 years with a mean age of 28.6 who consented and 38 children aged from 8 months-14 years, of mean age 5.9 whose parents gave their consent were included in the study. Venous blood samples were taken into EDTA-anticoagulant tubes and Toxo IgG/IgM rapid diagnostic test kit

was used to test for the presence of anti-*T. gondii* immunoglobulins G and M. Forty microliters (40 μ L) of each blood sample was blotted onto whattman filter paper for PCR. Overall prevalence of 56.4% (62/110) was observed for the pregnant women. Out of these, 18/62 (29.0%) were in their first trimester and 22/62 (35.5%) in both second and third trimesters were seropositive. No pregnant woman was positive for IgM. Overall prevalence of 8/38 (21.1%) was observed for children, of which 2/38 (5.3%) were under 5 years, 2/38 (5.3%) from 5 to 10 years and 4/38 (10.5%) from 11 to 14 were seropositive for *T. gondii* IgG and IgM. A child, 1/38 (2.6%) was seropositive to IgM. P-values >0.05 was obtained for being a child, pregnancy and seropositivity. Ownership of cat and contact with cat litter with p values < 0.05 have been associated with infection. Seropositive results for pregnant women in second and third trimester indicates infection early in pregnancy. There is therefore a 70.1% chance of transmission to the foetus. Further studies will include CSF and HIV patient to ascertain active infection

H22

Gastric cancer is seen as the fourth most common cancer and second most common cause of cancer death worldwide. The cancer is mostly caused by *Helicobacter pylori*, which has two main virulent factors, *cagA* and *vacA* genes. *cagA* gene is known to be more virulent and associated with pathogenesis of gastric cancer. It encodes *cagA* protein which elicits enhanced inflammation, atrophic gastritis, gastric metaplasia and finally gastric cancer. In this study we determined the presence of *vacA* and *cagA* genes in paraffin embedded malignant gastric biopsies of patient with gastric cancer in Korle-Bu Teaching Hospital, Accra, Ghana. Sixty archived infected gastric cancer paraffin embedded blocks diagnosed between 2008 and 2012 at a tertiary facility in Accra, Ghana were investigated. The samples (paraffin embedded blocks) were sectioned and stained using haematoxylin and eosin (H&E), followed by DNA extraction for *vacA* and *cagA* gene detection using nested polymerase chain reaction analysis and the amplified products analyzed by agarose gel electrophoresis. The study sample size was sixty comprising of thirty-five (58%) males and twenty-five (42%) females. The ages ranged from twenty-two years to eighty-four years. The mean age for males was 56.66 ± 15.02 years and that of females was 58.70 ± 14.71 years. Staining using H&E confirmed all 60 samples as gastric adenocarcinoma, out of which 47 (78.3%) were diagnosed as intestinal type of gastric adenocarcinoma and 13 (21.7%) as diffuse type of adenocarcinoma. Nested PCR analysis detected *H. pylori vacA* gene in two out of sixty samples. The gene detected was in the *vacA* (m2) gene region and for *cagA* (8.3 %) of samples worked on. *Helicobacter pylori vacA* m2 region (3.3%) and *cagA* gene (8.3 %) was detected in paraffin embedded tissues from the patients with gastric cancer.

H23

Biomarkers of oxidative stress and lipid profile were studied in male Wistar rats following chronic exposure to glyphosate-based herbicide and the role played by zinc administration in mitigating the effects were assessed. Daily oral doses of 14.4-750

mg/kg and zinc at 50 and 750 mg/kg were administered for 36 weeks, after which serum samples were harvested from blood samples taken from the jugular veins under chloroform anaesthesia. Commercial kits were used to determine the biomarkers of oxidative stress and lipid parameters. Chronic glyphosate exposure caused significant ($p < 0.05$) increase in superoxide dismutase activity and decrease in the activity of glutathione peroxidase but a relative increase ($p > 0.05$) in the catalase activity. Relatively increased total cholesterol (-%), low density lipoprotein (-%) and triglyceride (-%) with relatively decreased high density lipoprotein(-%) were observed in the study. The effects due to the exposure were nullified by zinc pretreatment. It was deduced that chronic glyphosate-based herbicide exposure in male Wistar rats tended to cause disruption of enzyme activities associated with oxidative stress which was mitigated following zinc pretreatment.

H24

The study determined the impact of advanced male ageing (≥ 50 years) on sperm integrity and early embryo development in ICSI cycles. Six hundred subfertile men were age-grouped; X₁ (50 to 59 years), X₂ (60 to 69), and X₃ (≥ 70), and compared with 600 fertile males of known fertility (Y, age 25 – 35 years). Oocytes from 254 women, aged ≤ 30 years, were included. Sperm were analysed using acridine orange fluorescence test (AOT) and categorised: ‘low’, ‘intermediate’ and ‘high’ damage. After ICSI, embryos were evaluated and categorized as ‘good’, ‘fair’ or ‘poor’ quality. Embryonic morphological development was assessed at three stages: fertilization, early and late paternal effect. The AOT results were: X₁: low = 29, intermediate = 53 and high = 118; X₂: low = 11, intermediate = 42 and high = 147; X₃: low = 8, intermediate = 24 and high = 168; Y: Low = 486, intermediate = 71 and high = 43. The fertilization rate was: X₁, 329/350 (93.7%); X₂, 298/350 (85.1%); X₃, 225/350 (64.1%) and, Y, 350/350 (100%). Associations between increasing age and sperm chromatin damage ($\chi^2(723.249, 6) p < 0.0001$), increasing age and inability to fertilise (210.990,3) $p < 0.0001$) were observed. Associated with increasing age was the significant proportion of morphologically poor quality embryos over the five days after fertilisation. Male age ≥ 50 years, is highly associated with abnormal sperm chromatin organisation, an inability to adequately fertilise with ICSI, an increase in the number of poor quality embryos and, a corresponding decrease in good quality embryos five after fertilization.

H25

Group A rotavirus (RVA) is the most important cause of acute gastroenteritis in children < 5 years old. Rotavirus with the P[8] genotype accounts for 74% of the global prevalence of human VP4 rotavirus infections and hence its importance as an effective vaccine candidate. Recent phylogenetic studies have described the emergence of a genetically distinct subtype (OP354-like P[8] or P[8]b) of the P[8] genotype in several countries with very few studies characterizing their whole genome. In this study, partially characterized archived Ghanaian RVA samples bearing a rare P[8]b subtype from a previous study were used. The study sought to describe the full genomes of three G9P[8]b RVA strains (M0094, GHPML716 and GHDC949) to elucidate their evolution and transmission dynamics. Genomic viral RNAs were extracted and each

gene segment amplified by one step RT-PCR using validated gene/genotype-specific primers. Primer walking method was employed and the genes were subsequently sequenced using BigDye Terminator v3.1 cycle sequencing kit. Genotypes were determined using the Virus Pathogen Database and Analysis Resource (ViPR) (an online RVA genotyping tool) and genotype constellations established. The Ghanaian G9P[8]b strains M0094 and GHPML716 possessed a Wa-like genotype constellation (G9-P[8]-I1-Rx-C1-Mx-A1-N1-T1-E1-H1). The phylogeny of their VP4 genes confirmed the recent suggestion that certain P[8]b strains originated in Asia and subsequently migrated to Europe, from where they were seeded to the Middle East, and then sub-Saharan Africa. On the other hand, the Ghanaian G9P[8]b strain GHDC949 possessed a mixed Wa-like x DS1-like genotype constellation (G9-P[8]-I2-Rx-Cx-Mx-Ax-N1-Tx-E1-Hx), indicative of at least a single, previous reassortment event between circulating Wa-like and DS-1-like strains. This highlights the contribution of gene reassortment to the evolution of RVA strains. The findings reported add to the growing body of evidence supporting naturally occurring reassortment events as a driver of rotavirus evolution. This warrants further monitoring of rotavirus strains in Ghana, especially in this post-vaccine era.

H26

Yam is one of the commonly consumed carbohydrate staples. The objective of this work was to investigate the effect of boiling, roasting and frying on the glycemic index of white yam (*Dioscorea rotundata*), yellow yam (*Dioscorea cayenensis*) and water yam (*Dioscorea alata*). Yam tubers were obtained (peeled, sliced, washed) deep fried in vegetable oil for 35-40 min, boiled in water for 35-45 min. Sliced unpeeled tubers were also roasted at 120°C for 40-45 min. The cooked yam samples were fed to 10 healthy subjects aged between 20–50 years. A glucometer was used to measure the blood glucose concentrations of the test individuals before consuming the yam diets and after the 30th, 45th, 60th, 90th and 120th min of consumption. The average incremental area under the curves (IAUC) obtained from the recorded blood glucose concentrations were used to calculate the glycemic indices (GI) of various yam diets. The glycemic indices ranged from 50.62 ± 19.81 % in the white yam to 70.62 ± 20.80 % in the yellow yam for roasted samples, 59.13 ± 10.32 % in white yam to 69.16 ± 24.33 % in water yam for fried samples and 44.26 ± 12.67 % in white yam to 75.18 ± 22.19 % in yellow yam for boiled samples. White yam diets relatively had lower GI compared to yellow yam and water yam. Fried yellow yam diets recorded relatively higher GI. Boiling was found to give generally lower GI in the white and water yams, and could therefore be applied in the preparation of diets with lower GI for diabetics.

H27

Aflatoxins are toxic secondary metabolites of fungal origin and contaminate agricultural commodities before or under post-harvest conditions. The resulting implications of the ingestion of aflatoxins include immuno-suppression, impaired growth, various cancers and death depending on the type, period and amount of exposure. A total of fifty-three 53 different cereal based foods (27 Rice brands, 20 maize-based food brands and 6 spaghetti brands) were obtained randomly on the market and assessed for their different aflatoxin constitution (AFB1, AFB2, AFG1 and AFG2)

as well as the total levels of the aflatoxins using the High Performance Liquid Chromatography (HPLC) method of analysis. Their occurrence and toxicity were generally in the order AFB1>AFB2>AFG1>AFG2. For the rice grain category, Cereal Plus (Blessed Child Foods) recorded the highest aflatoxin quantities of 65.77, 19.27, 1.02 and 0 µg/kg (Not detected) for AFB1, AFB2, AFG1 and AFG2 respectively and a total of 86.06 µg/kg which significantly differed ($p<0.05$) from the other brands of foods. A minority of the food samples recorded non detectable (N.D) quantities for all aflatoxin types. For the maize cereal category, Tom brown (milled roast corn) (Doll Bell breakfast 2) recorded the highest with quantities of 35.46, 4.92, 3.39 and 0.32 µg/kg for B1, B2, G1 and G2 respectively and a total of 45.1 µg/kg. A minority of the food samples recorded non detectable (N.D) quantities for all aflatoxin types. For the macaroni and spaghetti category, Macaroni (Delicio's 1) recorded the highest quantities of 0.94 and 0.85 µg/kg for B1 and B2 respectively. Other aflatoxin types were not detected in the rest of the brands. It can be surmised from our results that samples had 1/27 (3.7%), 9/20 (45%) and no aflatoxins levels respectively for rice, maize based foods and spaghetti with aflatoxin levels above permitted levels (E.U) (≤ 10 µg/kg) which makes them unsafe and dangerous for human consumption.

H28

Preeclampsia (PE) is a leading cause of maternal mortality worldwide, and evidence suggests impaired endothelial function in PE. Magnesium sulphate (MgSO₄) is the treatment of choice for severe PE and eclampsia in Ghana. This study assessed the effect of MgSO₄ treatment on the levels of soluble markers secreted by endothelial cells with the aim of influencing prevention and management of PE. This case-control study recruited 150 pregnant women comprising 50 mild PE patients, 50 severe PE patients and 50 normotensive pregnant women visiting Sampa Government Hospital in Ghana between November 2014 and February 2016. Structured questionnaire was administered. Blood sample was obtained before and after MgSO₄ administration and 48-hours postpartum for estimation of Adrenomedullin (AM), Soluble Intercellular Adhesion Molecule-1 (sICAM-1), Calcitonin Gene-Related Peptide (CGRP) using ELISA. Electrolytes were assessed spectrophotometrically. Mean (AM); (sICAM-1) was significantly higher before MgSO₄ treatment (75.16±5.0; 107.4±8.9); (470.8±18.5; 524.5±21.7) compared to after MgSO₄ treatment (64.0±4.7, $p=0.001$; 61.5±4.6 $p<0.0001$); (372.3±14.1, $p<0.0001$; 392.2±27.7 $p<0.0001$) and 48-hours postpartum (61.2±5.5, $p=0.001$; 59.4±4.6, $p<0.0001$); (369.4±14.4, $p<0.0001$; 389.1±28.2, $p<0.0001$) in both mild and severe PE respectively. CGRP was significantly lower before MgSO₄ treatment (21.5±2.1; 31.6±4.5) compared to after MgSO₄ treatment (49.5±7.3, $p<0.0001$; 44.8±5.0, $p<0.0001$) and 48-hours postpartum (52.7±3.5, $p<0.0001$; 46.4±5.0, $p<0.0001$) in both PE subgroups. In severe PE, sodium was significantly lower 48-hours postpartum (148.9±2.3) compared to before MgSO₄ treatment (150.3.5±2.1, $p=0.003$) and after MgSO₄ treatment (150.3±2.2, $p=0.004$). There was significant difference in magnesium before MgSO₄ treatment, after MgSO₄ treatment and after 48-hours post-partum ($p<0.0001$) among subjects with severe PE. Potassium did not differ in both PE groups before and after MgSO₄ administration. Altered AM, sICAM-1, CGRP, Na and Mg are associated with PE and are modulated by MgSO₄ therapy. Combined measurements of AM, CGRP, sICAM-1 and electrolytes are vital for prevention, early diagnosis and management of PE.

H29

The detection of HRP2 from *Plasmodium falciparum* malaria parasites is evidence of active or recent infection, and has been used for both the diagnosis and surveillance of malaria. A total of 200 paired whole blood and filter paper dried blood spot (DBS) samples were collected from Obom (high transmission) and Asutsuare (low transmission) and used for DNA extraction and antigen detection respectively. Photo-induced electron transfer PCR (PET-PCR) as well as nested PCR were used to determine *P. falciparum* parasite prevalence. A bead-based Luminex immunoassay capable of detecting HRP2 at sub-picogram level was used to screen all the DBS samples. A total of 63 out of the 105 samples screened (60%) and 5/95 (5.26%) were found to be positive by PET-PCR (mean CT value of 30.5 and 30.8) for Obom and Asutsuare respectively. However, the nested PCR analysis increased parasite prevalence in the samples to 69/97 (71.11%) and 39/85 (45.9%) in Obom and Asutsuare, respectively. Analysis of the HRP2 antigen identified 53/63 (84.1%) and 4/5 (80%) samples from Obom and Asutsuare respectively as positive. MOI genotyping analysis confirmed 26/63 (41.3%) and 1/5 (20%) positivity for Obom and Asutsuare. The exon 2 of the *pfhrp2* gene was deleted in 11/26 (42.3%) of MOI confirmed for Obom and no deletion in Asutsuare. The exon 2 of the *pfhrp3* gene was deleted in 2/26 (7.69%) of MOI confirmed for Obom and no deletion in Asutsuare. A high number of *P. falciparum* parasites, which lack *pfhrp2* exon 2 gene have been identified in a community with malaria transmission intensity in Ghana. Continuous nationwide monitoring of the prevalence of *pfhrp2* deletant parasites would be essential to malaria control. Although nested PCR identified more positive samples than PET-PCR, the extra nested PCR positive samples were all negative by MSP1/MSP2 genotyping. Given the ease of use and lower cost of the PET-PCR compared to nested PCR, PET-PCR provides an alternative assay for the rapid screening of a large number of samples in laboratory settings.

H30

Malaria remains a global health issue due to the continuous presence of the vectors and parasites. In spite of increasing efforts to control malaria, the disease possess danger to public health and economic development of both the tropical and subtropical regions in the world. The purpose of this study was to investigate the anti-plasmodial properties of the Molucidin compound, together with other compounds (ML-2-3 and ML-F52) isolated from Ghanaian Medicinal Plants, *Morinda lucida* in-vitro and in-vivo. In-vitro anti-plasmodial assay was performed using 3D7, Dd2 and field isolates (MISA011) sampled from the Greater Accra region of Ghana. Molucidin, ML-F52, and ML-2-3 had activity with IC_{50s} values of $3.5\mu M$, $1.5\mu M$ and $2.5\mu M$ against 3D7 strain, $27.6\mu M$, $15.7\mu M$, and $23.2\mu M$ against Dd2 and $8.9\mu M$, $12.2\mu M$ and $6.6\mu M$ against the field isolate respectively. Also Molucidin, ML-F52 and ML-2-3 showed significant inhibition on the schizont rupture of 3D7 strain with IC_{50s} of $0.12\mu M$, $0.069\mu M$ and $0.1\mu M$, respectively. Phenotypic study of Molucidin treated schizont stage of parasites revealed that Molucidin inhibited the maturity process of schizont stage with intact inner and outer membranes. In vivo efficacy of the anti-plasmodial properties of the Molucidin was determined using *P. yoelli* and ICR mice. Although Molucidin was found to suppress parasitaemia significantly, it failed to show

100% cure with 5 days of 30mg/kg daily shot. Our study showed that Molucidin can be a potential lead compound for the development of new chemotherapy.

