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Can I use headings in my essay? Section headings, macrostructures and genre families in the BAWE corpus of student writing

Introduction

Working in a university writing centre or a university EAP programme can be daunting when students appear for help in the hope that the tutor will have some idea about writing in their disciplines. Well-stocked centres will have local assignments on file from across disciplines, but many tutors find themselves relying on disciplinary norms they are familiar with, or contacting subject tutors for guidance. While some departments provide clear instructions in handbooks, in others there is greater variety, and asking three different subject tutors may yield three different answers.

Descriptions of writing across many disciplines, based on actual student assignments, are virtually non-existent. Our investigation of genres of assessed university student writing aims to make a contribution to this area. This project (ESRC 000-23-0800, 2004-7) includes the development of a corpus of 2,761 successful (i.e. awarded good marks) student assignments from across four disciplinary groups and years of study, which is now available to mine for descriptions of university student writing.

While the task of detailed genre analysis is a long-term ambition, we have begun by classifying all the assignment texts into genre families and noting this information in the assignment file headers. As part of our investigation of student

assignment disciplinary contexts, we used student reports, course documentation, student interviews (Gardner & Powell 2006) and tutor interviews (Nesi & Gardner 2006) to catalogue assignments across the disciplines. The various different assignment text types were grouped into thirteen genre families, or groups of assignment text types with similar purpose and staging (Gardner & Nesi 2008), to allow the comparison of assignment texts across disciplines. Genres such as product evaluation, policy critique and book review may be specific to different disciplines, but by grouping them together in genre families that share the same functional and structural properties (these are all critiques) we are able to carry out cross-disciplinary comparisons.

Building on earlier studies of macrostructure in graduate theses (e.g., Paltridge 2002, Thompson, P. 1999), we recognize that macrostructure can be identified through chapter or section headings, and have developed a classification of undergraduate assignment macrostructure (Gardner & Holmes 2006, forthcoming). Our interest in section headings follows from their metadiscourse role as interactive resources (Thompson, G. 2001) and frame markers (Hyland & Tse 2004). Understanding of metadiscourse has developed through earlier detailed studies of several texts, and corpus studies of lexicogrammatical items. With section headings XML tagged in our corpus, we are able to investigate their role in a large corpus of student writing (over 6.5 million words). By extracting headings for each assignment we can see their skeleton structure at a glance. This gives us a novel perspective on the assignments. These skeletons can be sorted by genre family and discipline to give us a good overview of the assignment macrostructures in the whole corpus and where headings are used in student writing.

In this chapter we focus on the section headings and assignment macrostructures they shape in the 13 genre families of the BAWE (British Academic Written English) corpus. Our aim is threefold. First, we aim to address the corpus-discourse interface theme in terms of the assignment macrostructure-genre interface, where macrostructures consist of section headings, and genres are social processes (Martin 1992) identified through their educational purpose and generic stages. Second, we aim to explore the extent to which macrostructure can be used to expedite genre identification in our large corpus of student writing. Here we examine the match between specific assignment macrostructures and the 13 genre families identified across disciplines. Such information is potentially of value to those teaching and learning writing at university, which reflects our third, pedagogical aim of answering questions such as ‘which good student essays use section headings?’

Genre and Macrostructure

Issues identified in the tension between discourse analysis and corpus linguistics are echoed in the different concerns of genre analysis and macrostructure analysis. Where genre analysis seeks to group texts with shared communicative purposes and to analyse them into stages which may overlap in their realisation, the analysis into macrostructures tends to be ‘somewhat formalistic’ (Starfield & Ravelli 2006), in that it tends to assume that chapter or section headings give accurate indications of the communicative purposes of the sections they govern, and that texts are thereby divided into parts which reflect their structure. We acknowledge that headings may sometimes mislead – a heading such as Conclusion may not always be followed by a concluding section. Equally, the same headings may govern sections with variations in moves or even purpose across disciplines. Thus further more detailed, more functional analysis is required for a full description of each genre. Nevertheless, we

find the analysis of macrostructure to be of value in itself as a means of describing university student writing. It not only shows us where section headings are included and where omitted and how texts are partitioned, but also provides a context for more detailed analysis of specific sections (e.g. conclusions) across years of study, genre families and disciplines. Its formal nature enables ready description of a large corpus of student assignments in a novel way.

Assignment Macrostructures

Earlier studies of macrostructure in student writing have examined graduate theses and dissertations (Dudley-Evans 1999, Ridley 2000, Thompson, P. 1999) and classified these primarily according to chapter headings. Building on such studies, Paltridge (2002) identifies three main classes of graduate thesis: the traditional IMRD type, topic-based, and compilations of research articles.

In our work on text partitioning, we developed a comparable classification of undergraduate assignment macrostructures based on the structural complexity of the assignment and the functional nature of the section headings, as shown in Table 1. This more elaborate classification is described in detail in Gardner and Holmes (forthcoming). Basically, however, assignments with a simple macrostructure have one main text part; assignments with a complex macrostructure have one main text part divided into sections; while assignments with a compound macrostructure have parts which themselves are texts.

Table 1 A classification of Assignment Macrostructures

Types	Structure	Examples
1 Simple	FM ^ Text [1 section] ^ (BM)	Philosophy Essay, Sociology Ethnography
2 Complex	FM ^ Text [section a ^ section b (^ ... section n)] ^ (BM)	
2A Genre based	Complex with generic or 'textual' headings	Lab Report, SWOT Analysis *

2B Topic based	Complex with specific or 'ideational' headings	Long History Essay, Annotated Bibliography
2C Context based	Complex with contextual or 'interpersonal' headings	Exercise, Seminar Notes
2D Mixed	Complex with mixed headings	Biology Essay, Engineering Report
3 Compound (FM) ^ Text 1 ^Text 2 (^ ... Text N) ^ (BM)		
3A Colony	Parallel texts	Compilation of Lab Reports, or of Essays
3B Portfolio	Complementary Texts	Essay and Review, Literature Survey & Proposal
3C Mixed	Parallel and Complementary Texts	Compilation of Case Notes with one Reflection

FM = Front Matter; BM = Back Matter; ^ = followed by; () = optional; [] = realised as

*SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis headings are found in agriculture, business, engineering, hospitality management and publishing in our corpus.

Central to our approach is the distinction between assignments, which are submitted by students as one piece of work to be graded accordingly, and texts, which typically (i.e. for assignments with simple and complex macrostructures) correspond to assignments less front and back matter such as the name of the student, tutor, university and module, the date, plagiarism declarations, word counts, and end notes. Thus because each of the 93 compound assignments in the corpus are realised through two or more texts, we have fewer assignments (2761) in the corpus than texts (2897).

In our classification of the functions of section headings we were influenced by the systemic functional metafunctions (Halliday & Matthiessen 2004). We identified headings which foreground the textual organisation of their section and the organisation of the text as a whole (e.g. Introduction, Methods, Conclusion), headings which foreground the ideational-experiential content of their section (e.g. Martyrs to the nation, Secular religiosity?), and headings which foreground the interpersonal nature of their section as responses to tutor questions (e.g. Question 1). Section headings may also foreground logical connections between sections (e.g. Part 1, 3.2).

The scare quotes on ‘textual’, ‘ideational’ and ‘interpersonal’ indicate these terms are used as shorthand for ‘foreground textual meaning’ etc. All headings have all types of meaning, but in specific headings one or more will be salient or foregrounded.

Corpus-discourse interface issues arise not only in the relationship between macrostructures and genres, but also when functional categories such as interactive resources are investigated through lexically-based corpus searches.

Manual and automated analysis of frame markers and section headings

Where both corpus linguistics and systemic functional linguistics are concerned with naturally occurring language and with language as text, they tend to differ in their focus on frequency in formal contexts vs meaning in social context (Thompson, G. and Hunston 2006:4-5). Where corpus analysis tends to work well on formal lexicogrammatical features with large amounts of text, functional analysis favours more meaningful, contextual or socially embedded features of individual texts. Often corpus studies are inspired by discourse analytical studies, and it is usual to find shunting back and forth (e.g. Miller 2006) between automated and manual analyses, as understandings are mutually enhanced.

Hyland’s work on metadiscourse is a case in point. He develops a category of frame markers, which are interactive (following Thompson, G. 2001) in that they ‘help to guide the reader through the text’ and framing in that they ‘refer to discourse acts, sequences, or text stages’ (Hyland 2004:139). This category is inspired by examination of individual texts, and then explored using automated corpus tools, where it relies heavily on formal cues for discourse functions. This makes his methodology explicit, and therefore replicable, in ways which traditional discourse analysis may not be. He examines frame markers by searching for 74 specific items

such as the sequencing finally, the stage-labelling in conclusion, the goal-announcing in this chapter, and the topic-shifting digress (Hyland 2005:219-210).

Such clearly circumscribed corpus analysis allows for descriptions of large amounts of data, with minimal markup, but issues of coverage can arise - have all (substantial) formal types been identified? One feature that seems to have slipped through the corpus-informed approach to metadiscourse in academic writing (Hyland 2005) is section headings, though the description of frame markers as referring to 'text boundaries or elements of schematic text structure', which have four functions: 'to sequence, to label text stages, to announce discourse goals, and to indicate topic shifts' (Hyland and Tse 2004:186) could have been written about section headings. Because section headings can correspond in principle to any linguistic item, it is not possible to simply search for them all using basic concordancing tools in plain text. The automated identification of section headings in large amounts of text requires preparing the corpus prior to analysis so that such features can be extracted.

In our project the XML tagging language was used to identify the beginning and end of each section heading, as well as its level and any font modifications. Section headings were identifiable by a combination of font (e.g. bold), layout (e.g. indent), and numbering (e.g. 3.2). This allows us to extract information about the prevalence of assignment texts with section headings across categories identified in the assignment files such as year of study, discipline, and genre family. It also allows us to extract the headings themselves and examine them in isolation for the meanings they convey and the different types of heading that occur in different disciplines and genres at different levels of embedding. In what follows we examine the nature of section headings in different years of study, genre family, discipline and level of embedding, with the aim of exploring the extent to which the formal properties of

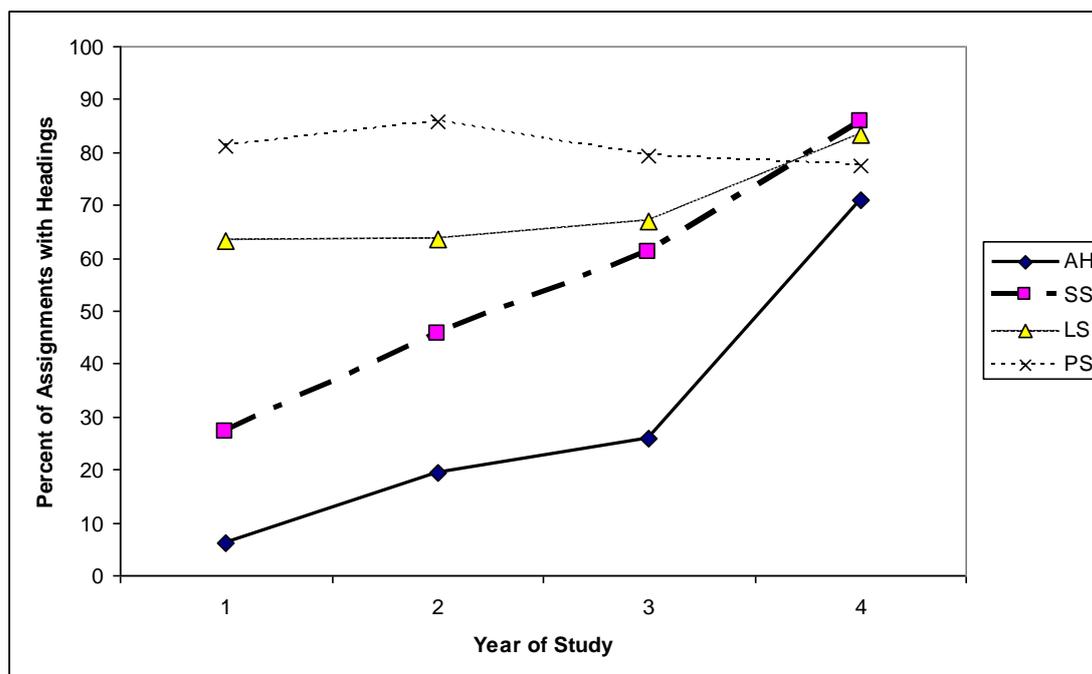
macrostructure can be used to expedite genre analysis. We conclude with an examination of the use of section headings in essays, which provides an answer to the question posed in our title.

Section headings, year of study and word count

Our growing familiarity with the student assignments indicated that while some assignments were required to have section headings, in others there was more room for student choice. We hypothesised that the longer an assignment, the more likely it was to have section headings. Word length data is readily available for all assignment texts; as is level of study. Basically year 1 refers to first year coursework written by first year students, year 2 to second year, year 3 to third year, and year four to taught masters. Exceptions are detailed in Alsop and Nesi (forthcoming). As expected, the average length of assignment texts (excluding front and back matter, formulae, tables, footnotes, references, appendices etc) increases steadily with year of study from 1788 words for Year 1 to 2324 for Year 2, 2637 for Year 3, and 2903 for Year 4.

As Figure 1 shows, the proportion of assignments with section headings also increases from first to fourth year in three of the four disciplinary groups.

Figure 1 Prevalence of assignments with headings by year and group



The greatest differences are between first year Arts and Humanities (AH), where just 6% of assignments have section headings, and all year 4 and Physical Sciences (PS) assignments at more than 70%. The four disciplinary groups are ranked from AH with relatively few section headings, through SS (Social Sciences) where the proportion with section headings increases most, to LS (Life Sciences) which is consistently in the sixties for Years 1-3, and PS where the proportion is highest overall at around 80%. In all disciplinary groups and years over 10% of assignments have no section headings. We assume that an examination of different assignment macrostructures will help explain these differences.

Frequent section headings

Having established the spread of headings across our corpus, it is useful to find out more about the headings themselves. This was done by extracting the 18,493 section headings into WordSmith Tools 4.0 (Scott 2004) and creating a list to search for frequent words and strings of words (ngrams). As Table 2 shows, Introduction and Conclusion are the most frequent content words in headings, occurring in around two

thirds of the 1,579 assignments with headings. These are followed by Results and Analysis which occur in approximately one third of assignments with headers and, with Methods, and Discussion, are associated with experimental report macrostructures found particularly in the science disciplines. This must largely explain the differences between disciplinary groups seen in Figure 1.

Table 2 Ten most frequent content words in all section headings

Word	Freq	Word	Freq	Word	Freq
<u>Introduction</u>	1020	<u>Results</u>	569	<u>History</u>	472
<u>Conclusion(s)</u>	951	<u>Analysis/es</u>	527	<u>Problem</u>	328
		<u>Method(/s/ology)</u>	473	<u>Management</u>	319
		<u>Discussion(s)</u>	396	<u>Issues</u>	305

Perhaps surprising are the remaining four items, History, Problem, Management and Issues. Further investigation shows that these are all used in medical case studies.

Extract 1: Partial macrostructure of Medical case history (0065e)

Case Summary
Referral Information
History
Presenting Complaint:
History Presenting Complaint:
Past Medical History:
Drug History
Social History:
Analysis of history and examination
X-ray
Formulation of the patient's problem(s)
Ideas
Concerns
Expectations
Management
3.1
3.2
....
Outcome
Evidence based care and issues for research
Commentary
References

Impact on your learning

As shown in Extract 1, the word history occurs six times in headings in this one assignment. However, as history, problem, management, and issues also occur in non-medical assignments, we cannot assume that medical portfolio case histories are the next most frequent assignment type after experimental reports. In fact these section headings have such salience in the corpus because they are written using a proforma, so that all 66 medical case histories from 12 different modules have (almost) all of the headings shown above.

Using word frequency counts we have investigated the most frequent words in section headings and thus far arrived at a sense of three typical macrostructures: one with Introduction and Conclusion; one with an **experimental report** (IMRD) macrostructure; and one that of **medical case histories**. This evidence strengthens the link between section headings, macrostructures and specific genres.

Table 3 shows the 50 most frequent 2- and 3-grams in section headings. The most frequent (of the, in the, etc.) represent common syntactic patterns that are also frequent outside section headings as evidenced with reference to the whole corpus.

Table 3 50 most frequent 2- and 3-grams in section headings

<u>Ngram</u>	N ¹	Freq. in h'ings ²	Freq. in corpus ³	<u>Ngram</u>	N	Freq. in h'ings
<u>of the</u>	630	0.79	0.96	<u>a new</u>	32	0.04
<u>in the</u>	181	0.23	0.46	<u>and results</u>	32	0.04
<u>on the</u>	106	0.13	0.17	<u>to be</u>	32	0.04
<u>to the</u>	97	0.12	0.33	<u>discussion of results</u>	31	0.04
<u>of a</u>	95	0.12	0.12	<u>observations and</u>	31	0.04
<u>and the</u>	89	0.11	0.21	<u>the project</u>	31	0.04
<u>analysis of</u>	83	0.10		<u>the role</u>	31	0.04
<u>as a</u>	78	0.10	0.12	<u>apparatus and</u>	30	0.04

<u>for the</u>	78	0.10	0.15	<u>development of</u>	29	0.04
<u>what is</u>	65	0.08		<u>Impact of</u>	29	0.04
<u>and discussion</u>	63	0.08		<u>part b</u>	29	0.04
<u>of results</u>	58	0.07		<u>the role of</u>	29	0.04
<u>and methods</u>	50	0.06		<u>analysis and discussion</u>	28	0.04
<u>Results and</u>	50	0.06		<u>Effect of</u>	27	0.03
<u>is the</u>	48	0.06	0.09	<u>part a</u>	27	0.03
<u>evaluation of</u>	45	0.06		<u>in a</u>	26	0.03
<u>role of</u>	44	0.06		<u>materials and methods</u>	26	0.03
<u>discussion of</u>	43	0.05		<u>observations and results</u>	26	0.03
<u>use of</u>	43	0.05		<u>structure of</u>	26	0.03
<u>analysis and</u>	41	0.05		<u>the uk</u>	26	0.03
<u>from the</u>	40	0.05		<u>literature review</u>	25	0.03
<u>description of</u>	39	0.05		<u>what are</u>	25	0.03
<u>materials and</u>	35	0.04		<u>Control of</u>	24	0.03
<u>with the</u>	35	0.04		<u>discussion and</u>	24	0.03
<u>determination of</u>	33	0.04		<u>into the</u>	24	0.03

1 = number (N); 2 = frequencies per 100 words in headings; 3 = frequencies per 100 words for the top 50 2- and 3-grams in the whole corpus.

More specific to section headings are those involving content words already identified as key in this context (analysis, discussion, results), often expanded (materials and methods, observations and results) or in combination with each other (analysis and discussion of results). There are more nominalised processes (e.g., evaluation of, description of, determination of) which provide useful indicators of the functions of the sections they govern. These also explain the overall frequency of of (second most frequent word [after the] occurring 3757 times in the headings), of the and of a, suggesting that '(the) x of (the/a) y' is a typical syntactic structure for section headings. This examination of ngrams strengthens the links between section headings, macrostructures and stages of genres in their indication of the functions of different sections.

Section headings and genre families

Before we turn to essays, we shall consider the other genre families in turn to develop a sense of where macrostructure points clearly to genre and where it does not. The prevalence of section headings in the different genre families is presented in two tables. Table 4 shows categories where more than 75% of the texts have headings. For example, 174 of the 191 case studies have headings; this amounts to 91% of all case study texts.

Table 4 Proportion of genre family texts with section headings (Part 1)

	research report	methodology recount	design specification	case study	problem question	proposal	exercise
N with headings	60	314	88	174	31	66	90
Total N	61	359	93	191	40	76	114
Total %	98	88	95	91	78	87	79

Most of the **research reports** and **methodology recounts** have the experimental report format with first level section headings of the Introduction Method Results Discussion (IMRD) type. The difference between the two genre families resides in their purpose: whether the student has developed the design themselves in the context of the literature and presented it in a format similar to published research (**research paper**, one type of **research report**), or whether they have been told what to do and the assignment is basically a write-up of an experiment conducted (**lab report**, one type of **methodological recount**). The differences were made explicit in tutor interviews, assignment rubrics and other contextual information. In the texts they are evidenced through assignment titles and most obviously through the word length and nature of Introduction, Theory, Discussion and Conclusion sections. Thus in our data IMRD type section headings point to a number of different genres, rather than one specific genre.

There is also disciplinary variation in IMRD headings, with Engineering and Computer Science generally including a Theory section, while Food Sciences generally includes a Calculation section. Typical macrostructures for six disciplines are presented in Table 5.

Table 5 IMRD variations across disciplines

Biological Science	Computer Science	Engineering	Food Sciences	Physics	Psychology
(Abstract) 32/52	(Abstract) 16/64	(Abstract) 44/83		(Abstract) 15/18	(Abstract) 5/10
Introduction	1. Introduction	Introduction	Objective	1. Introduction	Introduction
	2. Theory	Theory	Introduction		
Materials and Method	3. Design	Apparatus and Methods	Method	2. Experimental Details	Method
Results	4. Implementation	Observations and Results	Results	3. Results	Results
Discussion	5. Results and Analysis	Analysis of Results	Calculation	4. Discussion	Discussion
(Conclusion)	6. Conclusion	Discussion	Discussion		
(Future Work)		Conclusion			
(References) 22/52	(References) 29/64	(References) 63/83	(References) 53/69	(References) 15/18	(References) 8/10

() = optional

Further disciplinary variation is seen in the prevalence of optional sections. For instance, 15 of 18 Physics texts (83%) have Abstracts, compared with only 16 of 64 (25%) Computer Science texts.

Many assignments have a second level of textual headings under Method. For example, Psychology assignments have Participants, Materials, Procedure and Data Analysis. Some disciplines have second level ideational headings, such as Banana, Ketchup, and Peanuts in Food Sciences. Third and fourth level headings occur in all the sciences in Table 5.

Design specifications, common in Engineering and Computing, are also easily recognisable from their section headings: they include a design brief and design details under headings such as Objectives, User Requirements, System Specifications, Design Details, Performance and Cost Estimates, Implementation and Details.

There are two main types of **case study** in our corpus, medical and business, both of which also occur outside their eponymous disciplines. They involve analysing aspects of a case and making recommendations, as reflected in Extract 1 above and Extract 2:

Extract 2: Business case study headings (0253h)

Executive Summary
Introduction
1.1 Current situation of Glass Product Division
2. Evaluation of existing systems and practices
2.1. Control system
2.1.1 Planning and budgeting procedures
2.1.1.1 Sales Forecasting
2.1.1.2 Plant Manufacturing Budget
2.1.1.3 Comparison of Actual and Standard Performance
2.1.1.4 Planning procedures in general
2.1.2 Structure of accountability
2.1.2.1 Sales Unit as a Revenue Centre
2.1.2.2 Manufacturing Unit as a Profit Centre
2.1.3 Reward Structures
2.2 Customer focused approach
3. Recommendations for change
3.1 Planning and budgeting procedures
3.2 Kaizen Costing
3.3 Structure of Accountability
3.3.1 Sales unit as a profit centre
3.3.2 Plant Manufacturing unit as a pseudo-profit centre
3.4 Balanced Scorecard Framework
4. Conclusion
Appendix 1 : Sales Budgeting Procedures
References

From their macrostructure, case studies may be similar to **problem questions**. The differences reside in whether the case or scenario is real or fabricated, and whether it is given to the students or not. Problem questions occur across Law, Business, and Engineering, as in Extracts 3 and 4.

Extracts 3 and 4: Business and Law problem questions (0169b, 0196a)

3 Business	4 Law
PROBLEM IDENTIFICATION	Introduction
ANALYSIS	The law on bias

ALTERNATIVES	Application to the case
RECOMMENDATIONS	Conclusion
PLAN OF ACTION	

Proposal section headings can be less uniform than the genres outlined so far.

Some resemble research reports with (Extract 5) or without (Extract 6) a heading to indicate they are proposals rather than completed studies:

Extracts 5 and 6: Computer Science and Hospitality, Leisure, and Tourism Management (HLT M) proposals (6169f, 3018a; Level 1 headings only)

5 Computer Science	6 HLT M
Abstract	Introduction
Aim	Service Style
Background	Menu
Critical review of relevant literature	Wine List
Objectives	Control Methods
Research Methods	Equipment
Project Plan	Conclusion
References	Bibliography

To differentiate these from research reports we have to look inside the sections for statements of intent.

Exercises tend to have interpersonal headings such as Question 1, Question 2 and Question 3. They may also have ideational or textual headings as in Extract 7 from Archaeology.

Extract 7 Archaeology exercise (6157c)

Exercise 1: Descriptive statistics (L1) Hypotheses
Exercise 2: Normality of data (L1) Hypotheses
Exercise 3: ANOVA (L1, L2) Hypotheses
Exercise 4: Chi-squared test (L1, L2) Hypotheses
Exercise 5: Correlation analysis (L1, L2) Hypotheses
Exercise 6: Regression (L2) Hypotheses

Table 6 shows those genre families that have a smaller proportion of texts with section headings, but it is noteworthy that headings are found across all families.

Table 6. Proportion of genre family texts with section headings (Part 2)

	literature survey	explanation	critique	empathy writing	narrative recount	essay
N with headings	25	134	187	17	30	363
Total N	35	214	319	35	72	1183
Total %	71	63	59	49	42	31

Four of the **literature surveys** have headings that are bibliographic details of books and journals, but most literature surveys cannot be recognised as such from their section headings. The same is true of explanations.

Extracts 8 and 9: Explanations in Physics and Meteorology (6129b, 1629a)

8 Physics Abstract How meniscus forms Molecular forces Conclusion References	9 Meteorology Solar radiation Effects of the atmosphere Effect of cloud cover Effect of latitude Effect of Land and sea Appendix
--	---

Some, like Extract 8 from Physics, invoke a question (how does meniscus form?) which an explanation could answer, but most, like Extract 9, are lists of ideational headings which could be the headings of a literature survey, an explanation, an essay, or a critique.

Indeed, headings in **critiques** seldom suggest their genre, but occasionally there are terms such as strengths, weaknesses, or critical review:

Extracts 10 and 11 Critiques in Engineering and Business (0021c, 0169f)

10 Engineering Abstract Introduction Strengths of the PRA technique Weaknesses of the PRA technique PRA in practice	11 Business 1. Critical Review of SSM Mode 1 2. Roles, Norms and Values in SSM Analysis 2 3. Politics, Power and SSM Analysis 3 4. Conclusion Bibliography
---	--

Conclusions	
References	

Empathy writing headings are recognisable from their register as non-academic writing, I've always been a bit on the plump side, but how can I tell if I'm really overweight or just a bit chubby? (Food Science, 6023b) and Dear Mr. Beswick, (Publishing, 3089d), while many **narrative recounts** are accounts of group work on projects, and headings such as those in Extract 12 can indicate this:

Extracts 12 and 13 Narrative recounts in Health and Medicine (3034e, 0065g)

12 Health	13 Medicine
What happened in the 'Forming' phase, and how I felt about it?	Cairo
What happened in the 'Storming' phase, and how I felt about it?	The Kasr El Aini Teaching Hospital
What happened in the 'Norming' stage and how I felt about it?	The atrocity of the 7th of April, 2005
What happened in the 'performing' stage and how I felt about it?	Conclusion
If the situation arose again what would you do?	
Conclusion	
Reference List	

Other recounts may also be suggested by headings, though, as in Extract 13, these headings could apply to most other genres in Table 6.

This overview of section headings in genre families suggests that although identification of assignment macrostructure is not sufficient for genre identification, some section headings and macrostructure elements point to specific groups of genres. This is summed up in Table 7.

Table 7 From section heading to genre

Headings	Genres
IMRD headings	→ research papers and lab reports
literature review	→ research report or proposal

executive summary	→	business case study
multiple <u>history</u> headings	→	medical case study
ideational headings + bibliography	→	essay, explanation, critique
non-academic register in headings	→	empathy writing
first person references (<i>I, me</i>)	→	narrative recount
interpersonal headings (specific list)	→	exercise

Section headings in essays

Finally we discuss essays. There are essays with headings across all disciplinary groups and most disciplines, though the numbers in Life and Physical Sciences are small; the smaller the essay pool, the less reliable are any inferences drawn from the data presented here. Overall, 31% of the 1,183 essays in our corpus have section headings.

Table 8: Prevalence of essays with headings by discipline

Disciplines	Essays	Essays with Headings	
	N	N	%
Archaeology	49	23	47
Linguistics/ Applied Linguistics	75	33	44
Classics	78	12	15
Philosophy	98	15	15
English	89	6	7
Comparative American Studies	71	2	3
History	94	3	3
Total AH	554	94	14
Agriculture	27	18	67
Medicine	10	6	60
Biological Sciences	11	6	55
Health	15	7	47
Food Sciences	7	2	29
Psychology	57	2	4
Total LS	127	41	32
Cybernetics & Electronics	2	2	100
Physics	12	10	83
Architecture	4	3	75
Mathematics	4	3	75
Planning	12	8	67

Computer Science	9	4	44
Engineering	16	7	44
Chemistry	6	1	17
Meteorology	0	NA	NA
Total PS	65	38	58
Publishing	4	4	100
Law	85	58	68
Business	49	33	67
Politics	97	36	37
Anthropology	27	8	30
Economics	55	16	29
Hospitality, Leisure & Tourism Management	29	8	28
Sociology	91	18	20
Total SS	437	181	41
TOTAL	1183	363	31

While essays account for only 65 (11%) PS texts, Table 8 shows 58% of these have headings. In contrast, essays account for 554 (82%) AH texts, of which only 14% have headings. This suggests that where students are used to writing assignments with headings, such as reports and case studies, this will carry over into their essay writing. Indeed multiple levels of headings are found in essays (e.g., 1.2.1 Homology Groups [Mathematics] and 2.1.1 Negation Effects on Vegetation [Biology]), though numbering to three levels is rare across all genres (occurring in only 42 texts) and numbering to four or five levels is extremely rare.

Functions of section headings in essays

Essays tend to have headings which organize the ideational meaning or content (Field) of the essay, but tell us very little if anything about the rhetorical organisation or the genre (discussion, exposition, challenge etc). In addition to the ideational headings, many essays have an Introduction and Conclusion. Thus the typical macrostructure of essays with headings is (Introduction)^Ideational Heading 1-n^(Conclusion) (Bibliography/References) as illustrated in Extracts 13 to 16. Extract 13 has both Introduction and Conclusion; 14 has no Introduction; 15 has no Conclusion; and 16 has neither.

Extracts 13 and 14: Comparative American Studies and History essays (0003k, 0012d)

13 Comparative American Studies	14 History
Introduction Argentina: 'a land of exiles' Brazil: 'All hail! This samba's going to end in jail' Mexico: 'A dark Indian, grateful to the party' Conclusion Bibliography	i- Environmental Differences ii- Technology iii- Attitudes Conclusion Bibliography

Extracts 15 and 16: Philosophy and Cybernetics essays (0057b, 6101c)

15 Philosophy	16 Cybernetics
Introduction Quine's case against a complete 'theory of knowledge' Naturalized epistemology Is naturalized epistemology a subject matter of philosophy? Bibliography	Open Source Software Open Source Hardware Patenting Feedback

While most essays have ideational headings at level 1, there are a few in Mathematics, Business and Applied Linguistics which do not:

Extracts 17 and 18: Mathematics and Business Essays (0049a, 0072a)

17 Maths	18 Business
Section 1	I. Introduction
Section 2	II. Main part
Section 3	A. The Efficient Market Hypothesis (EMH)
Section 4	B. Questioning the EMH - the concept of "Noise Trader Risk"
Section 5	C. Exploiting market inefficiency - setting up a portfolio strategy
Section 6	III. Conclusion
Section 7	Directory List of Sources
Section 8	1. Books
Section 9	2. Journals and newspapers
	3. Internet sources

Sections 1-9 of Extract 17 have level two headings (not shown here) of Proof and Hypothesis which foreground textual information but also have little ideational content. This is unusual. More often when the first level headings are not ideational,

there are headings which foreground ideational meaning at the second or third level, as in Extract 18.

If we examine References and Appendices, we see that most (over two thirds) essays have a Bibliography or Reference Section, while very few have Appendices. The term Bibliography (737, 36%) is used across all disciplines; References (241, 12%) is also used across disciplines, with the exception of English and History which use Primary and Secondary Sources/Texts, or Works Cited. Other general terms used include Books, Articles, Essays, Journals, Websites, Internet Sources, Electronic Resources, E-books, E-journals, Lecture Notes, Newspapers, Magazines, and the more specialized Cases, Treaties, Legislation and Filmography.

This examination of section heading and macrostructure in essays in the BAWE corpus provides evidence about the prevalence of section headings in university student writing, and differences across disciplines. Although this does not allow us to distinguish essays from critiques or explanations, or to identify types of essay, it does enable us to group potential essays. We could then analyse their introductions and conclusions further, which should provide strong evidence for genre identification. Following such analysis, we could return to the macrostructure and look for evidence of whether there is a link between specific essay genres (e.g. discussion) and the use of section headings.

Discussion and Conclusions

In our development of the notion of assignment macrostructure, and our unique corpus techniques for extracting these from our corpus, we have been able to display, sort and compare the macrostructure of the large number of texts in our corpus in a meaningful way. Our classification of macrostructures (Table 1) developed earlier (Gardner & Holmes forthcoming) has been enhanced in its ability to

account for all the texts in the BAWE corpus. It differs importantly from those of Paltridge (2002) and others who studied small numbers of graduate dissertations and theses manually, not only in its additional categories, but also in its claim to be descriptively adequate.

With the notable exception of the small scale studies on thesis macrostructure, section headings have been largely ignored in research, whether using manual or automated techniques. Yet section headings function as interactive resources (Thompson, G. 2001) in very similar ways to frame markers (Hyland 2005), with their explicit partitioning of text, their marking of sequences, of levels of embedding of ideas, and groupings within text, their functions of predicting the content of sections, making links with earlier sections, and providing the macrostructure of the assignment as a whole.

In Hyland's study, frame markers in dissertations showed little variation across six disciplines (2.3 per thousand words in Biology to 3.5 in Computer Science, Hyland 2004:146), especially when compared with other metalinguistic categories; in contrast our comparison of section headings in assignments by discipline and year (Figure 1) suggests greater differentiation in undergraduate student writing. A similar upwards trend to that found here for year of assignment is observed in Hyland's data for frame markers (from 2.1 per thousand words in Masters to 3.0 in Doctoral dissertations written by Hong Kong EFL students) (Hyland 2004:140, 2005:55). Future research could usefully examine how the presence or absence of section headings interacts with the prevalence of other frame markers across disciplines and years of study.

We suggest that the reason earlier corpus-based studies have not included section headings resides in their diversity of linguistic realisation coupled with the

difficulties of searching for headings in text that has not been marked up with this aim in mind. We addressed these difficulties in two ways, by examining the wording in section headings, and by examining the headings themselves by year, discipline and genre.

To examine the words and phrases in headings, we extracted them from the corpus, and then, using frequency counts, were able to identify key indicators of prevalent genres (Tables 2 and 3) and typical syntactic structures in headings. We also learned from this that Introduction is more frequent than Conclusion, that Bibliography is more frequently used than References, and how both vary with discipline and genre.

To explore the macrostructure-genre interface we examined the prevalence and functions of section headings across disciplines, years of study and genre families and have seen how section headings can point to specific genres (Table 6). Headings which foreground textual meanings can point to genres such as **lab report**. Those which foreground ideational meaning are found throughout the corpus, but when they are central, they point to genres such as **explanation**, **critique** and **essay**; further automated analysis, perhaps of key words in the assignments themselves rather than just the headings, might enable us to identify the genre more precisely. Headings which foreground logical meanings, as well as those which foreground interpersonal meanings, are indicative of **exercises**. We also found specific section headings, such as Executive Summary, which are good indicators of their genre (**case study**). We have thus understood better the potential and limitations of using macrostructure to expedite genre analysis.

Our third aim was pedagogical. We exemplified macrostructures across all genre families and disciplinary groups, noting clear disciplinary norms within genres

(Table 5). We provided information on prevalence of headings across genre families (Tables 4 and 6) and found that assignments typically have one or two levels of headings, with headings of four and five levels being sufficiently rare to suggest they are not advisable in most genres and disciplines. To answer the question about essays in our title, we have to know which discipline, genre and year of study it refers to. Essays in first and second year English and History seldom have headings; unlike other years (Figure 1) and disciplines (Table 8). In general, the smaller the proportion of essays written in the discipline, and the longer the essay, the more likely they are to have headings. When essays do have headings, they seldom have Abstract, often have Introduction and Conclusion, usually have one or two levels of ideational headings, and often have Bibliography or References. Similar accounts of other genres could usefully be developed in further studies.

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