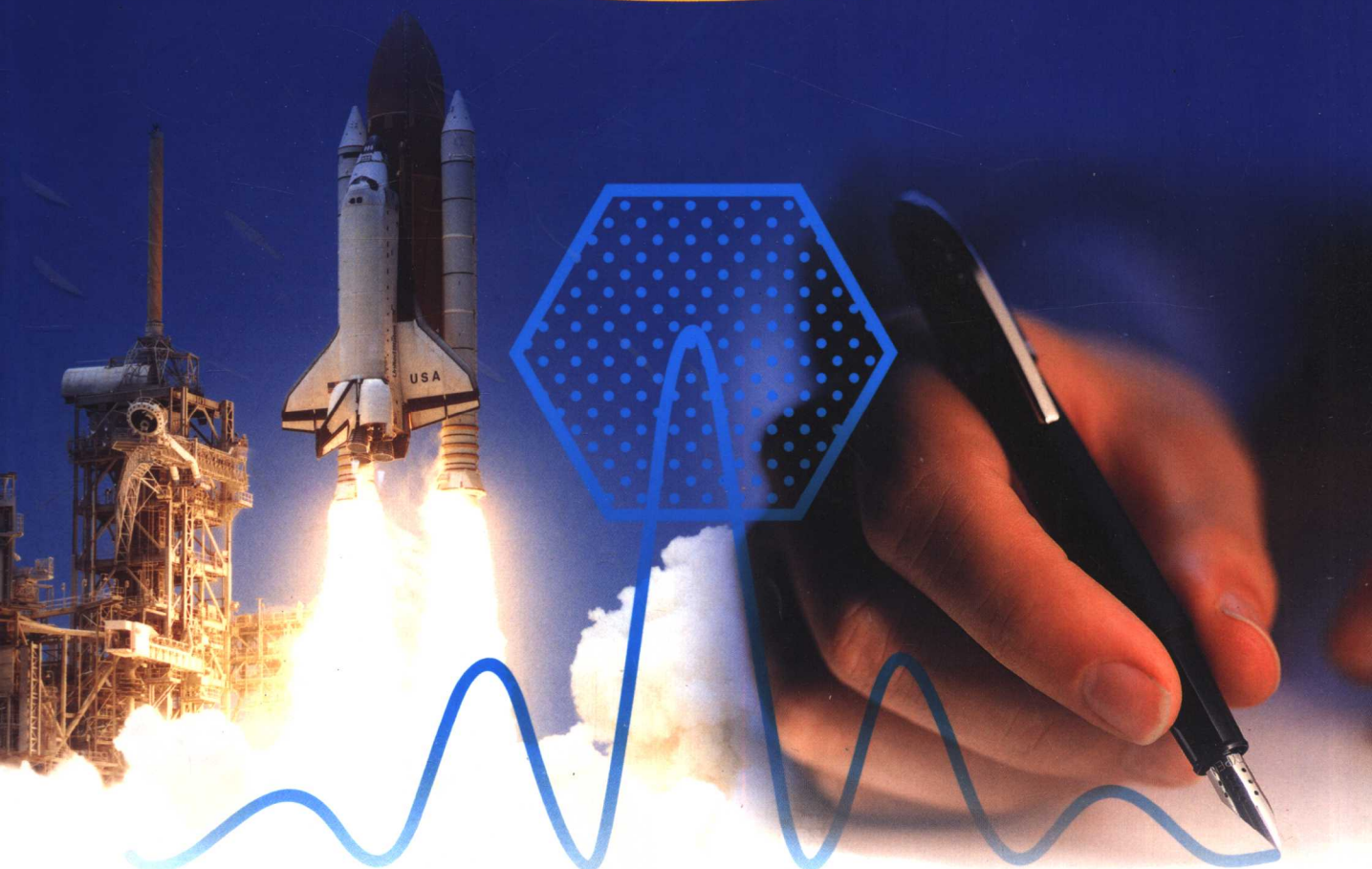


研究生英语科技论文写作

Technical English Writing for Graduate Students and Professionals

[美] Briant L. Davis 王梅英
编 著



高等教育出版社
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序

当今世界是一个国际化高科技时代,科技信息交流日益频繁,英语作为一门国际性语言,在传播科学知识、交流科技研究成果方面正在起到越来越重要的作用。近年来,随着我国对外交流增多,许多研究生和科技工作者因为英语运用能力较差,例如不能流利地与国外同行交流沟通,不懂学术论文的写作规范、格式,从而失去了向国际性权威刊物投稿和参加国际性学术会议的机会。随着研究生培养的日趋正规化,许多重点院校要求研究生毕业之前必须在国际期刊发表论文,这无疑对研究生科技英语写作水平提出了挑战。目前全国高等院校在读研究生规模庞大,其中大多数为理工科学生,很多人希望在国际期刊或国际会议上发表论文,科研院所中许多科技工作者希望参加重大国际科技合作和国际会议交流。研究工作的成果很大部分体现在论文的写作上,向国际知名期刊投稿,是让研究成果在国际上有比较高的知名度的重要途径。

《研究生英语科技论文写作》(*Technical English Writing for Graduate Students and Professionals*)包括了英文科技论文写作的语言技巧、基本格式、科技论文类型和结构分析,它同时也指出科技论文应遵守的学术道德,例如尊重同行和前人的工作,避免抄袭等。书中特别举例说明中国人在英语论文写作过程中的某些习惯性错误,此外本书还介绍了许多国际刊物发表论文过程中应注意的事项。《研究生英语科技论文写作》有三个特点:1) 拓宽科技英语知识面。书中使用了大量通俗易懂的科技英语范例,涉及地质、生物、化学、化工、材料、物理、矿业、气象等多种学科,这为学生了解和熟悉科技英语词汇奠定了基础。(2) 错误分析对提高英语写作水平意义重大。在教学过程中,作者积累了大量的学生写作素材,通过对素材进行归纳和总结,列出中国学生的常见错误,如语法错误、措辞不当、段落结构不合理等,另外对逻辑错误和中国式思维习惯的错误也有分析,书中配有大量练习帮助学生识别错误,提高写作水平。(3) 适合读者群广。高等院校的高年级本科生、研究生和科技工作者中,凡希望参加国际会议和在国际期刊上发表论文的读者都会受益。

作者Briant L. Davis是加州大学洛杉矶分校的地质学博士,南达科他州矿业大学的地质学教授、X光分形实验室主任和大气物理实验室主任,曾任该学校研究生院院长8年,获美国国家自然科学基金、美国环境保护局和美国贸易部等科研资助100万美元以上,在国际期刊上发表论文86篇,有*Science*等世界知名期刊发表文章的经历。Davis教授在中国担任外籍专家7年多,教学工作包含研究生英语写作。Davis教授知识渊博,无论是英语科技论文写作还是英语教学的经验都十分丰富。王梅英老师是英语语言文学硕士、北京化工大学副教授,从事英语教学17年,教学课程包括大学英语、英语专业和研究生英语教学,曾获省级教学成果奖二等奖,多次获得校级教学成果奖。在完成这本书的过程中作者征求了国内外学者、教师 and 大量研究生的意见,旨在能够达到既提高英语科技论文写作水平又扩展科技视野的双重目的。本教材的出版将为读者提高英语科技论文写作水平提供很大帮助,因此特向高等院校的研究生和科研院所的科技工作者推荐。

中国工程院院士、中国矿业大学教授

侯永昌

2006年3月15日

前言

科技英语不同于日常生活中的英语,它有自己的语言特色和写作规范,大部分中国学生对此还不够熟悉。虽然许多研究生和科技工作者拥有突出的科学研究成果,但是科技英语运用能力(特别是写作能力)较差:要么不懂学术论文的写作规范或格式,感到无从下手;要么写出的论文语言是中国式英语,只适合中国读者口味,而往往被英语为母语的审稿人员拒之千里;要么由于写作表达的原因,使得原本科学正确的研究成果难以理解甚至被读者或审稿人员误解;要么因为不懂得国际学术期刊的出版要求,不能流利地与国外同行交流沟通,为被拒绝的论文进行申诉。总之,很多时候仅仅因为英语运用能力的原因,而失去了国际性权威刊物中稿或参加国际性学术会议的机会。这本书的目的在于改进目前研究生阶段英语学习的不足之处,帮助广大的硕士生和博士生以及科技工作者尽快提高科技论文写作水平,完成高质量的英语科技论文。

The recent surge in economic development and the attention paid by the Chinese government to science and technology is well known. The laboratories and engineering facilities of China are rapidly becoming outfitted with modern equipment. Students in ever increasing numbers are concentrating their efforts in science and engineering fields. Chinese students are again going abroad in greater numbers, including in the United States, following the downturn in U.S. student visa issuance after the September 11, 2001 terrorist attacks in the U.S.

One might therefore expect that such rapid technological development would demand that the results of research completed by Chinese scientists and engineers reach the scientific community through national and international journals. In nearly all international journals English is the language of choice. To prepare for this, English language training at the graduate student level and even beyond, will require special writing techniques and vocabulary that extends well beyond the undergraduate level.

We have observed over the many years' teaching English at the graduate level in China that writing professional style documents, such as theses, dissertations, and research papers requires jargon and style of presentation found nowhere else in society (a fact that is undoubtedly true for *any* society). The vast majority of Chinese students have very little exposure to technical writing, even at baccalaureate levels. However, English training begins in China at an early age, at primary school (grade 3, about age 8) in major cities, or at junior high school levels (at ages 12-13) in the rural regions of the country. Total classroom contact hours in English study (oral, or written) would be about 288 hours at college level only by the time the student completed a bachelor's degree. At the MS and PhD levels in the universities in China, English study varies significantly, and in some cases is optional, but most students enroll for about 72 class hours of oral and written English.

In the 5 years of experience of one of us (BLD) teaching English at the graduate level (MS and PhD students), observations are that from the hours of English study given above, most students are reasonably familiar with street talk, and a few idioms, but are lacking in the understanding of technical writing. By the time they have reached this point in their education

most graduate students are paying much more attention to their professional studies and research (engineering, science, economics, etc.) and have little time for continued regular English study.

This book is intended to assist graduate students in the preparation of sound technical English research documents, including enhancement of their technical vocabulary. Writing examples given herein call on many disciplines which will familiarize the student with fields other than his own specialty.

The writing of a good refereed research paper, acceptable by an international journal requires considerable work, often including several revisions. It is an ambitious goal. We trust that this book will aid the Chinese graduate student of scientific and engineering disciplines, as well as the serious research scientist working well beyond the completion of their graduate education to achieve this goal.

Briant L. Davis
Wang Meiyang
Beijing 2006

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We have had many students request help in preparing their research papers for publication; in turn they have graciously allowed us to incorporate examples of their technical material into this book. They have also provided comments that have made this book better. These students were both undergraduate and graduate students at Peking University (北京大学) and at the Beijing University of Chemical Technology (北京化工大学). We are also grateful to Dr. Qiao Wenxiao (乔文孝) and Dr. Guo Jixiang (郭继香) of the University of Petroleum, Changping (石油大学, 昌平), and Dr. Chi Shihong (迟世宏) of Harvard University (哈佛大学) for their helpful comments and suggestions. We gratefully acknowledge the assistance of Professor David G. Evans of the Key Laboratory for Controllable Chemical Reactions, Beijing University of Chemical Technology (北京化工大学可控化学与反应技术教育部重点实验室), in translation of several documents.

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Chapter One

This chapter expresses the need for study of technical writing at the graduate level, and how best to use this book. It also provides statistical data on common errors by Chinese students and a self-evaluation method to determine a writer's skill level. Exercises provide practice in recognizing common errors in English writing and in use of the skill-level diagram.

本章讲述研究生阶段学习科技写作的必要性以及如何使用好这本书。它也提供了中国学生常见错误的统计数据 and 论文写作者英语水平的自我检测方法。本章提供的练习旨在训练学生辨别英语写作常见错误,并能根据熟练程度图表确定自己的英语水平。

Chapter 1 Introduction

Chapter 2 Review of Basic Writing Skills

Chapter 3 Sentences

Chapter 4 Paragraphs

Chapter 5 The Technical Research Paper

Chapter 6 Section Development

Chapter 7 Special Precautions

Chapter 8 Publication

Chapter 9 Abstract Study and Language Translation

CHAPTER 1

Introduction

1.1 What Do We Need the Most?

Study of written English at the graduate level is justifiable from at least two standpoints: (1) International conferences and journals preferably, and often exclusively, require English, and (2) Personal communication with scientists worldwide relies heavily on English.

In China (as in many other non-English speaking countries), students entering their graduate studies have had to spend more time developing their professional skills within their own disciplines, conducting research, and often assisting faculty in special research projects, laboratory classes, and the grading of lower-division lab exercises and experiment reports. Time for English study had become a lower priority, or had been neglected entirely at some schools. Regeneration of English skills is therefore important to the future success of graduates with advanced degrees entering research institutions or beginning university teaching careers. As a result of this

“vacation” from English study, the average student has forgotten the basics of English grammar and sentence structure learned in middle- and high-school classes. Even at the MS and PhD levels of study many errors creep into the essays and exercises. We present here a brief study containing such errors.

At the same time that these students have had to relegate English study to a relatively low position in their scholastic pursuits, some universities have required PhD students to publish their research in English in international refereed journals. In the Departments of Chemistry and Chemical Engineering, School of Science, of the Beijing University of Chemical Technology, for example, the following set of statistics illustrates the sharp upward trend in such publication:

Year	Number of Research Papers Published in English in International Journals
2002	43
2003	64
2004	98
2005	113

Table 1.1 presents an analysis of the research writing of four Chinese science students or professionals whose training in English was received at three different major universities in large Chinese cities. All papers were written within the two-year period 2003–2004.

At the time of writing of the manuscript, Student 1 was in the first year of a PhD program. The topic of research of Student 1 was chemical corrosion of metallic archeological artifacts. Student 2 was nearing the final stage of PhD work and had submitted the manuscript to an international journal with subsequent acceptance for publication. The topic of the research for Student 2 was petroleum engineering numerical modeling. Student 3 was in his initial stage of the Master of Science program, and had prepared the manuscript from research in information systems management. The post-doctoral trainee had received the BS and MS degrees at two major universities in China and the PhD from a major U.S. university in Dec. 2003. By this time, this trainee had not yet received acceptance of a manuscript for major journal publication, but has had some experience writing two or three technical manuscripts and had received considerable editorial review assistance by colleagues.

Table 1.1 Error Analysis of Four Technical Research Papers

Error Type	Student 1 (PhD)	Student 2 (PhD)	Student 3 (MS)	Post Doctoral Trainee
1-Article Adj.	24 (11.2)	39 (23.4)	20 (21.1)	6 (16.7)
2-Preposition	16 (7.5)	14 (8.4)	5 (5.3)	1 (2.8)
3-Punctuation	18 (8.4)	18 (10.8)	14 (14.7)	1 (2.8)
4-Capitalization	17 (7.9)	1 (0.6)	2 (2.1)	0 (0)
5-Verb type/tense	24 (11.2)	10 (6.0)	5 (5.3)	6 (16.7)
6-Modifier	3 (1.4)	7 (4.2)	0 (0)	2 (5.6)
7-Plurality	27 (12.6)	20 (12.0)	4 (4.2)	8 (22.2)
8-Noun	4 (1.9)	5 (3.0)	4 (4.2)	0 (0)
9-Improper word	52 (24.3)	21 (12.6)	29 (30.5)	7 (19.4)
10-Long Sentence	4 (1.9)	3 (1.8)	3 (3.2)	0 (0)
11-Other	25 (11.7)	29 (17.4)	9 (9.5)	5 (13.9)
12-Unclear sent.	2	2	1	3
Total errors	214 (100)	167 (100)	95 (100)	36 (100)
Total text words	3,236	2,621	1,568	6,337
% errors in text	6.6	6.4	6.1	0.6

英语写作过程中有些错误常常出现, 错误分析对提高英语水平意义重大。表中列出了4名研究生在论文中所犯的 error, 如冠词、介词、标点、动词时态语态、措辞不当等, 数字表示他们所犯错误的次数, 最后表中列出了他们的错误率。前3名学生在大陆攻读博士和硕士学位, 最后一位在大陆完成学士和硕士学位后在美国著名大学完成博士学位, 可以明显看出, 第4人的错误率非常低, 已经接近英语国家的专业人士的写作水平。

The most significant difficulty experienced by all these advanced students was in using the proper English word suitable for the message given by the sentence (error type 9; 21.7% average error). The second most serious error was type 1, article adjective usage (18.1% average error), followed by plurality error (type 7, 12.8% average error). The three students' total error percentage was quite consistent at 6.1-6.6% for the entire text, whereas the post-doctoral trainee demonstrated remarkably low total error of 0.6%.

The value of an intensive 10-week, 6 hours/week formal English writing class to the advanced student can be illustrated in Figure 1.1 The initial evaluation was conducted on the first day of class and the second evaluation on the class-day before the final exam. Each student was given the same 100-word essays, both essays being of the

same level of difficulty. Of importance is the change in the value of the class mean \bar{x} as well as the lack of scores in the two largest error categories.

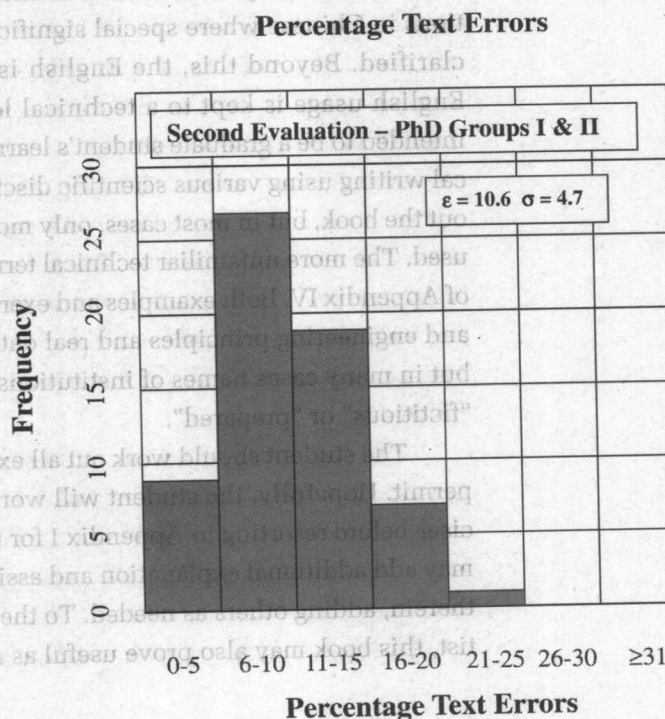
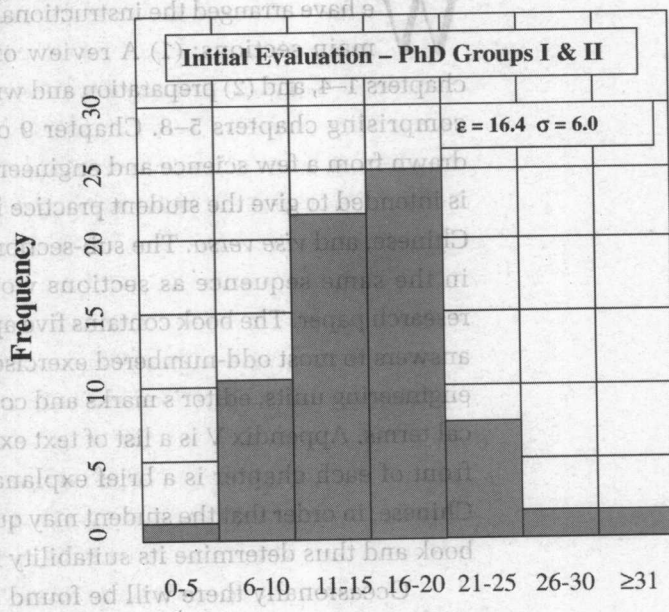


Figure. 1.1 100-Word English essay skill evaluations, Beijing University of Chemical Technology, Fall, 2005. Data for 70 first-year PhD students.

1.2 How Best to Use This Book

We have arranged the instructional material of the book into two main sections: (1) A review of fundamentals, comprising chapters 1–4, and (2) preparation and writing of a research document, comprising chapters 5–8. Chapter 9 contains a number of essays drawn from a few science and engineering disciplines. This chapter is intended to give the student practice in translation from English to Chinese, and *vice versa*. The sub-sections of Chapter 6 are presented in the same sequence as sections would be written for a formal research paper. The book contains five appendices. The first provides answers to most odd-numbered exercises. Appendices II–IV provide engineering units, editor's marks and codes, and a glossary of technical terms. Appendix V is a list of text examples and exercises. At the front of each chapter is a brief explanation of chapter contents in Chinese, in order that the student may quickly review the scope of the book and thus determine its suitability for his or her use.

Occasionally there will be found brief comments or explanations in Chinese where special significance or meaning needs to be clarified. Beyond this, the English is dominant, but the level of English usage is kept to a technical level appropriate to material intended to be a graduate student's learning tool. Examples of technical writing using various scientific disciplines are provided throughout the book, but in most cases, only moderately technical "jargon" is used. The more unfamiliar technical terms are defined in the glossary of Appendix IV. Both examples and exercises make use of real science and engineering principles and real data (unless specifically noted), but in many cases names of institutions and people are identified as "fictitious" or "prepared".

The student should work out all exercises that their time would permit. Hopefully, the student will work out the results of the exercises before resorting to Appendix I for the solutions. The instructor may add additional explanation and assist the student with exercises therein, adding others as needed. To the professional research scientist, this book may also prove useful as a resource for private study.