A contextualised writing programme for biological scientists

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Abstract

Any discipline has specialised writing conventions over and above more general aspects of good practice. We have developed a range of activities for students following our biological sciences programmes with a view to helping them improve their generic and subject-specific writing skills. These include essay writing (in a variety of guises), report writing and summary work. Many of the activities, such as an exercise on plagiarism and analysis of real exam answers written by a previous cohort, would be readily adaptable for practitioners in other fields.

Introduction

The writing exercises described here represent a significant portion of two 10-credit Key Skills modules for first year undergraduates on the Medical Biochemistry and Medical Genetics programmes at the University of Leicester, a total cohort of between 75 and 80 students in a given year. The Key Skills units also include activities to develop both the oral presentation skills and the data handling abilities of the students, which are outside the remit of this present paper.

In the course of their academic lives, biological science students are asked to write in diverse contexts and for a variety of reasons. The writing skills programme therefore employs a broad range of activities in order to develop proficiencies appropriate for these tasks (see Table 1). Since some of these exercises are not applicable to students pursuing other disciplines, this paper will focus on three components which it is felt are most likely to be adaptable for a wider audience, namely; correction of a ‘bad’ essay, developing an understanding of appropriate and inappropriate uses of source materials, and writing essays in an exam context. Colleagues for whom the writing of scientific reports is of relevance may wish to consult our paper on that subject, which is freely accessible online (Willmott et al., 2003).

Table 1: Writing exercises in the Key Skills programme

| Making the most of your lectures |
| Why do scientists write? The characteristics, conventions and purposes of scientific writing |
| Summarising an article |
| Correcting a ‘bad’ essay |
| Preparing a course essay, including referencing and plagiarism advice |
| Writing a scientific report |
| Writing an exam essay |

Correcting a ‘bad’ essay

We are all acutely aware that a significant number of contemporary undergraduates display fundamental deficiencies in their abilities to express themselves clearly in writing. This essay-correction exercise was therefore developed in order to address some recurrent errors of punctuation and grammar, as well as mistakes in the use of subject-specific terminology and conventions. My colleague Tim Harrison and I produced two essays that are riddled with common ‘howlers’. Students are presented with the first, a poor essay on cell structure,
during a plenary tutorial session and asked initially to work through the essay identifying ways in which it might be improved. Their suggestions are then fed in to the class tutor, who directs the synthesis of a better version.

Following on from this session, the second poor essay, on proteins, is e-mailed to the students and they are given a week to produce and submit, as a paper copy, a revised version upon which they subsequently receive one-to-one feedback from a tutor. This is a formative exercise throughout.

**Plagiarism**

A body of literature has been developed regarding the reasons why students plagiarise (see, for example, Chester, 2001). Whilst some plagiarists knowingly submit work that falls outside the boundaries of acceptable practice, there are certainly some students by whom the offence has unwittingly been perpetrated. This can be a manifestation of sloppy note taking or of poor time keeping, but for others it is uncertainty about the rules and conventions governing the use of source material.

My initial interest in this field was triggered by the observation that two students had included in an essay, text taken verbatim from a recommended book. When I challenged them about this, I was satisfied that they genuinely did not know they had committed an offence. After all, they reasoned, the book was listed in both of their bibliographies, so there was clearly no attempt to hide the source. As a result of this experience, I began to develop an exercise that has now been used with our students for the past four years and has been adopted more widely following publication (Willmott and Harrison, 2003).

**Which is plagiarised?**

In summary, students are presented with an original piece of text and seven derivative versions. They are asked to read through the pieces and decide, individually then in consultation with their neighbours, which versions are guilty of plagiarism. I subsequently lead a discussion on which I consider to be appropriate uses and which are inappropriate uses of the source material. The first derivative text is, in fact, an exact duplication of the original without any citation information and is clearly guilty of plagiarism; it is included in the exercise as a gentle introduction. The second text has the same wording with the addition of a citation. Once again, this is guilty of plagiarism; the point here being to stress that mention of a reference is an indication that this was the source of ideas mentioned, not the exact words that have been used.

The third text is a development from the second, with the addition of quotation marks at the beginning and end of the paragraph. Surely this cannot be guilty of plagiarism, as both the ideas and the words have been identified to another source? Whilst this version is indeed free from that charge, it is included here as an example of poor practice. An essay constructed as a series of quoted chunks strung together like beads on a string would not fall foul of regulations on plagiarism but would nonetheless receive a low mark since it shows no effort to develop original thought. Students are therefore strongly urged not to do this.

Interestingly, colleagues within the Department have noted in recent years a rising occurrence of such essays. I was initially concerned that this may, in fact, be an unwelcome consequence of this teaching activity. I am, however, informed that staff at other institutions which have not used our exercise (e.g. Jill Pickard, University College Northampton, personal communication) are also reporting an increase in submission of this type of work, which I find vaguely reassuring (if one can be reassured by the discovery that a broader constituency of students are making the same mistake). It is, nonetheless, important that we convey to students that such ‘cut-and-shut’ essay production is not an appropriate resolution to their concerns about the penalties for plagiarism.
Of the remaining four texts, two are acceptable and two are not acceptable, though the latter are less blatant, are therefore more contentious, than the examples already described. One is a summary of the provided text, but is essentially a ‘thinning-out’ rather than a rewrite, with much of the original wording retained. The second is guilty of word-swapping; it keeps the same structure to the sentence and conveys the same points as the source document, but employs widespread use of synonyms. It is my view that neither of these is permissible, though I have heard advocates suggest that the latter reflects common practice in the writing of introductory sections to scientific papers! Without question, ‘thesaurusing’ of a source is a different offence to the wholesale importing of unaltered text from a book or website, but if we are seeking to establish good habits from the outset I argue that it is important to warn undergraduates that this is not an ideal way to proceed. For completion, the acceptable examples in the exercise are, firstly, a significantly re-drafted version and, secondly, a piece that takes and attributes a quote specifically to contrast it with a different viewpoint.

This session on plagiarism has always been very warmly appreciated in student feedback. ‘Before this session I had no idea about the rules on plagiarism’ wrote one. ‘The problem of plagiarism was made clear and we were taught how to avoid its use’ (sic) added another. The issue is placed in the wider context of researching and referencing a course essay. I feel that it is particularly important that conventions for citing sources are considered at the same time as plagiarism because the two matters are so closely interwoven; students who have mastered the identification and reporting of key references are unlikely, in my experience, to plagiarise. Our emphasis throughout is very much on prevention rather than detection of plagiarism, we therefore conclude the session with practical advice for avoiding accidental plagiarism, e.g. making clear distinction in note-taking between summary and actual quote, and closing of textbooks whilst synthesising original thought.

**Training for exam essays**

Evaluation of learning by the writing of essays under exam conditions is, in many ways, an unnatural procedure and, in the recent past, assessment at A level (for science subjects in particular) has tended to move away from this format in favour of more structured questions. Even where essay-based examinations do occur, the nature of the task means that it tends to occur at the end of a period of study and with the script anonymised to disguise the identity of the candidate. There is rarely, therefore, any dialogue between marker and student and thus little opportunity for meaningful feedback. If we are to use exam essays as a form of assessment, it is only reasonable that we offer not only general advice on good practice, but also, as far as possible, tailored suggestions of ways in which individual students might improve their essay writing.

Participants on the course are initially provided with a set of genuine, hand-written exam scripts written by a previous cohort (which is, in itself, a rare opportunity to see work produced by other students). They are asked to read through the essays and, working in groups, to rank the essays with the help of the formal Faculty marking criteria. A full hour is allowed for this process, after which each group reports back on their ranking order. Comparison with the ‘real’ order facilitates tutor-led discussion on the strengths and weaknesses of each essay. This, in turn, leads into more general advice on writing exam essays; e.g. taking time out to write a plan, including a proper introduction and conclusion, leaving spaces for late addition of extra points, and the importance of legibility.

As homework for this session, the students are asked to plan an essay on a specified title which they duly write the following week, under exam conditions. The topic for the essay is chosen to fit with a concurrent Genetics module. In preparation for the essay, the students are asked to write a plan on one side of A4 paper (maximum) which is submitted at the start of the ‘examination’. In keeping with a real exam, the answers are written in formal booklets and individuals are identified only by candidate number. This latter detail facilitates the next
stage of the training, whereupon the essays are shared out to groups of students, read and ranked in exactly the same manner as with the genuine scripts in the earlier session. They are encouraged to write constructive criticisms (on a separate piece of paper) for the author of each essay, remembering that elsewhere in the room others are carrying out the same process on their work.

At the completion of this activity, the essays are collected in for summative assessment, with formative feedback given on the essay plans. It is felt important to offer this additional comment on the plans as comparison of the intended essay with the final version can reveal helpful information. If, for example, a poor essay was preceded by a poor plan then the issue lies, in part, at the inception of the work. In contrast, a good plan poorly executed suggests more work is needed to improve a later stage in the process.

**Using real essays – some tips for colleagues**

For those considering running a similar exercise, it is worth reviewing some of the practicalities which have been encountered in the use of real essays for the ranking activity. Firstly, whilst there would be undoubted value in the students carrying out an initial comparison of essays on any topic, there is particular benefit if they have some background knowledge on the subject. Secondly, the number of essays chosen for the exercise is important. At various times we have used six or ten essays. On balance, six essays seems an ideal number, with the use of double sets, if required. A greater number not only extends the time taken to read all the essays beyond the attention span of all but the most hardened participants, but also means that the distinction in marks awarded to the essays starts to depend upon rather subtle factors. This raises a third issue, that for the purpose of this exercise it is helpful if all of the work has been awarded different marks. Ideally, the essays used would include some that are short but pithy and some that are longer but less penetrating, thereby dispelling the view that more is automatically better.

A fourth matter concerns the legibility of the essays. As we can all testify, the poor handwriting of some students becomes even worse under the pressure of exam conditions. Should selection of essays be limited to those that are easy to read, or is there mileage in allowing students to see the difficulties faced by markers and to recognise that you can only get credit for answer that can be deciphered? For the purpose of this exercise, the emphasis must surely be on readability, not least because the essays are going to need to be photocopied once to allow for markers comments to be removed and then the sanitised script recopied a second time in larger numbers for distribution to the groups. To be intelligible at the end of this process they certainly needed to be legible at the outset.

Finally, there is the issue of permission to use real essays since they have *de facto* been written by a variety of students. When this activity was initially devised, the essays used had all been anonymised, effectively guaranteeing that the identities of the authors could not be deduced by the cohort using the material (who were actually three academic years removed from one another). It appears, however, that this was perhaps inadequate to fit with legislation concerning ownership of written work. In order not to violate anybody’s intellectual property rights, even if they were oblivious to the fact, we have moved in the last couple of years to a second set of essays for which permission for their use has been expressly sought prior to the graduation of the relevant students.

**Closing remarks**

This paper has outlined a number of student-centred activities designed to help first year undergraduates develop their writing skills. Particular attention has been given to three exercise which can most readily be adapted to other subject areas; correction of a poor essay, distinguishing between appropriate and inappropriate use of source documents, and the writing of exam essays. Colleagues interested in knowing more about these, or indeed
about activities mentioned here without elaboration, are invited to contact the author (cjr2@le.ac.uk).

References


Willmott C.J.R. and Harrison T.M. (2003) An exercise to teach bioscience students about plagiarism. Journal of Biological Education 37, 139-140. This article is mirrored, with permission from the publishers, at URL http://www.le.ac.uk/teaching/teaching/pdf/willmott.pdf


Author Summary

Chris Willmott is a Lecturer in Biochemistry at the University of Leicester. In addition to writing development, his academic interests are centred on the mode of action of antibiotics and the burgeoning field of bioethics. In January 2004 he led a workshop attended by one delegate, which has subsequently resulted in several articles in the national press, thus reinforcing the view that its not what you know that matters, but who you tell it to.

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