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There is a great deal of discussion on campuses today about students' ability to write. Whether this is a new problem, or just a new version of an old one, I don't know. But the fact of the matter is that many students don't write very well. This realization has caused much concern among faculty throughout the country.

While there seems to be a great desire to help students learn to write, there does not seem to be an overwhelming desire among faculty to volunteer to teach writing. As "writing across the curriculum" is discussed over and over, and supported by group after group, faculty in English and other areas who have traditionally taught writing skills are being very verbal about being overworked and tired of grading compositions (6). Many English teachers seem eager to pass around the wealth of students who need practice writing. While some seem content to pass along the work indiscriminately, others provide words of wisdom for those of us who are not professionally trained to evaluate composition (3).

Asking faculty about their efforts to help students learn to write often elicits the response, "I give essay tests," as if this were the ideal way for a student to learn to write. What situation could be less conducive to the development of good writing skills than the pressure packed testing environment? It seems if we are to help students learn to write we must provide an uninterrupted, unpressured setting in which to think and compose. While almost any time one writes, a certain amount of skill develops, a homework assignment with some time to plan, develop ideas, and organize one's thoughts would be a much more desirable framework in which to learn to write than the pressure filled, time restrained testing atmosphere. So, while the use of essay questions on tests may help a student improve his writing, it is certainly not the best method to use to teach writing skills.

Many of us assign laboratory reports to stimulate student writing. Most written laboratory reports are structured in such a way that the writer is forced to use a specific style. The compartmentalization of a laboratory report into an Introduction, Methods and Materials, Results, and Discussion causes the writer to consider specific ideas and report them in a specific sequence. This rigid outline format is actually a great help to a writer with little experience and may be one of the strongest arguments for using laboratory reports to help students learn to write.

This rigid structure can be of help to the instructor as well as the student. When grading a laboratory report the instructor can evaluate each part independently. By indicating the relative weights of each part of the paper on the grade the instructor can help the student concentrate on the most important parts (5). However, laboratory reports fall short of the ideal method to help students learn to write. Many laboratories are designed so that students work in groups of two or three. Having worked and collected data within a group, a student often finds it difficult to prepare a laboratory report independently. Each one in the group knows what he did, but is not likely to be aware of the details of the work of the others. This leads to preparing laboratory reports as a group, or working independently with incomplete information.

Laboratory reports are often so long they take a lot of time to grade. While most instructors struggle to return graded papers in a timely fashion and are able to return laboratory reports within a week, the length of a paper often extends the grading time. Immediate feedback with comments that can be used in the preparation of the next report is very beneficial to the student.

Term papers are even worse than laboratory reports with respect to turnaround time. To learn from a writing exercise it is necessary to complete it, and then to receive criticism of the work before beginning another. By definition, term papers take an entire term to complete, or at least a large portion of the term. Because of this, even if they are graded immediately, term papers are rarely returned in time for a student to learn from the first paper and apply it to subsequent papers in the same term.

Benjamin Franklin suggested that the best way to learn to write is to read material written by good writers and then to write regularly, imitating those writers (4).

Heeding this advice, we should encourage students to read the works of good writers and then to write brief reports about what they have read. By selecting and reading well written articles in the scientific literature students have examples of how to write. By writing complete annotated abstracts of these articles students develop their own writing skills.

An annotated abstract contains three main parts: the citation, the abstract, and the analysis. As many students are unfamiliar with methods of citing literature, it is helpful to take time to describe the appropriate method in detail. The *CBE Style Manual* (2) is a good source of information on all aspects of scientific writing, and is particularly useful to those learning to prepare proper citations. Many professional associations such as the American Society for Microbiology also provide detailed descriptions of how to cite a paper properly (1). Using a citation style that is commonly found in scientific literature is certainly helpful. Each paper read will provide examples of appropriate citations from which to learn.

After completing a proper citation, the student continues on to the abstract itself. The abstract is a brief, accurate summary of the article. It should contain no more than 200 words but, at the same time, should be complete. For students to compose such precise, succinct summaries of journal articles they must have read carefully, understood, and analyzed what was written.

Upon completion of the abstrct the student is called upon to review the article. This analysis of the article should be concise. It should be no more than a few sentences long. A single paragraph is almost always sufficient for this analytical critique of the article. The analysis often contains comments about the author's style and the audience for whom the article was written.

These three parts of an annotated abstract will easily fit on a single side of a double spaced, typed page. Requiring the written assignment to be less than one side of a page forces students to be brief and to the point.

Assigning annotated abstracts in science classes is a very good way to help students improve their writing skills. Requiring an abstract each week for a semester, or even for half a semester, will introduce students to the scientific literature and provide an opportunity for each one to write enough different papers to have developed some writing skills. Further, the abstracts are short enough that they can be graded quickly and returned within days. This rapid feedback helps students learn and improve their writing.

Even though one might assign abstracts to students for no other reason than to help them improve their writing skills, there are many other benefits. If students are permitted to select articles to be abstracted from a wide range of topics, they tend to follow their own interests. As a result of this, by the end of the term many students become somewhat expert on specific topics. As they become more knowledgeable and comfortable with the subject they are more inclined to enter into class discussion. This causes increased class interaction and an improvement in the quality of questions and comments. As the term progresses abstracts submitted become increasingly well done. Students combine their newly acquired knowledge from class with their improved writing skills and become quite proficient at preparing abstracts. This makes the evaluation easier and more enjoyable.

Essay test questions, laboratory reports, term papers, and annotated abstracts can all be used to stimulate the development of student writing skills. Of these, the use of abstracts to help students develop writing skills in science courses is particularly effective. While almost all of the methods commonly used to stimulate writing present at least some difficulties, abstracts have few. Each assignment takes a short time to complete, and a short time to grade. Yet, because of immediate feedback students learn from each abstract and are able to improve before preparing the next.

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