References Cited


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WRITING IN BIOLOGY: ONE WAY TO CONSIDER BIOETHICAL ISSUES

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Almost everyone, teachers and citizens alike, would agree that it is desirable, even necessary, that students express themselves cogently in writing. These same persons usually agree that it is desirable that there be ethical assessment of biological issues in the classroom. This article proposes to do both simultaneously - to write about bioethical issues.

Under the very real pressures of unmanageable class sizes and unmanageable classroom discipline of the past 2 decades, some adjustments in classroom teaching and management have become practical necessities. Common adjustments in biology have been to cut back on experiences both in laboratory-type activity and in writing and to expand lecture-type, self-directed, computerized and learning-packet activities. Objective tests are progressively becoming the norm and slowly but unmistakably, most written expression is moving out of biology classrooms. The English teacher, who has always been a teacher of writing has sometimes become the only teacher of writing in the school.

Within biology classrooms, there has been a healthy emphasis on acquisition of objective information. But along with this emphasis have been shifts away from the laboratory as the learning and activity center of science and a shift away from subjective evaluation of data or experience. Evaluation in biology has come to have the objective test as its norm. This article does not intend to suggest that the clock be run backwards on student evaluation. Many teachers have already mastered the art of writing excellent objective examinations; many more are learning how to do so. In my opinion the objective examination is not only efficient, it is also the best way to assess whether information has been mastered. What the objective examination fails to do well is to assess laboratory performance or to assess the student's ability to think, analyze and synthesize. Research paper writing and position paper writing allow the learner to demonstrate skill in all three. I submit that when there has been effective objective testing, the classroom teacher acquires a good sense of whether or not information has been mastered. This then need not be a primary objective in writing assignments in biology. Rather writing assignments can focus somewhat narrowly on an issue, idea, concept, or point of view of science. Especially effective, for me, has been student writing on issues that are simultaneously ethical and biological. Following are 2 sample assignments:

1. The synopsis that follows is a summary of one family's medical dilemma. Read the scenario, specify your position on it and prepare a written defense and discussion of that position. The defense/discussion should not exceed 2 pages in length.
1. Baby Girl S, the first born to her parents, had a high lumbar meningomyelecele, hydrocephalus, and paralysis and deformities of her legs. Mrs. S, a social worker who was acquainted with the condition from her work, refused to sign the operation permit for back closure. Her husband supported her position, but the physicians and hospital staff obtained a court order for a series of operations. The parents openly expressed their feelings to the staff, and in turn the staff was hostile to them. After surgery, complications were numerous and the child's brain was damaged severely, but Mr. and Mrs. S resolved to do their best for their baby. They took her home hoping that they had been wrong (as they knew they could have been) and that the best choice had been made. As complications arose, they brought the baby into the hospital several times for further treatment. Each time, they felt the hostility of the staff whom they would like to avoid but couldn't. When the baby died at 10 months of age, they were questioned by physicians and the police about whether they had deliberately delayed seeking treatment for "heavy breathing" (diagnosed at autopsy as pneumonia) until their baby was near death.

Subsequently, two healthy children were born, but Mrs. S had to work to help pay the large debt incurred in the care of the first baby. She was away from the children much of the time and was always tired when she was at home. Her husband felt neglected, and the children developed behavioral disorders. When one of the children was diagnosed as suffering from maternal deprivation, Mrs. S was hospitalized for treatment of severe depression. She later reported, "It was just more than I could take." She and Mr. S felt that their first baby should have been "helped to die." They considered that much of the suffering of their baby, themselves, and their other children was senseless and destructive. They doubted that they or their living children would ever fully recover from the court-ordered treatment of their first child.

2. Using a printed example from within the past 5 years, discuss a bioethical controversy/question of your own choosing. It must be an actual (not hypothetical) example or situation and both biology and ethics must be involved in it. Include your position on the situation summarized and list the reference(s) read. The assignment should not exceed 2 pages in length.

Students in my classes select medical and health sciences controversies approximately two-thirds of the time for their discussions. Sperm banks, abortion, amniocentesis testing, womb lending, euthanasia and test-tube fertilization are the most frequently used topics. The remaining third are divided more or less evenly among environment/conservation issues, recombinant DNA research, cloning, and agricultural/agronomy issues. I expect that the example provided by the first part of the assignment.molds the pattern for topic selection in the second part. I've never tested whether this is so, because I have liked the topics the students have chosen. But I've been suspicious that printing an article on say, depletion of the Ogallala aquifer, would elicit quite different controversies as student examples of bioethical issues for part 2 of the assignment.

It may cause anxiety in some instructors to move this far from a library and term paper focus with student writing. My bias has been to use testing as the means of evaluating mastery of information and thus to free up the writing process to demonstrate the student's capability to express himself; to think, to perceive sensitively, to analyze and to synthesize. While students do use the library to collect ideas for these biological writing assignments, much more could be done with this than I have chosen to do. Merely requiring a bibliography of a specified number of references would take students to the literature. Asking that a student research the historical
origins of the issue or topic would require a literature review also. But a decision to focus on scientific content or on library-search aspects of a problem is also a decision to defocus the student's original thinking, his/her analysis of the bioethical dilemma as well as his/her emotional involvement with the problem. There is of course merit in both kinds of writing, but each kind serves a different objective.

Some students are happily surprised to discover their ability to write. The two rules for student writing that I've found that lead to this discovery are:

1. Select a topic in which you feel sufficient interest that there is something you want to say about it.

2. Read the paper aloud (preferably to someone), as soon as the rough draft has been completed. Run on, and incomplete sentences as well as artificial or stilted expressions will be immediately exposed.

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CAN TEACHING BE REWARDING?
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Anyone who is in the teaching profession or who is contemplating entering the profession should be aware of an economic fact of life: teachers are not compensated for their efforts at a level equal to that of members of other professions requiring the same or a lesser formal education. In fact, although college and university teachers rank 35 in a list of 169 occupations ranked by weekly earnings, secondary and elementary teachers are listed 768 and 106 respectively with a significant number of occupations requiring no formal education listed ahead of them (1). The situation is not improving. There was a 10% drop in average salaries of teachers in the 10 years from 1972 to 1982 (2). A preliminary report by the Bureau of Placement at Indiana State University for December of 1984 groups employers into three categories: business, manufacturing and industry, and government and non-profit with educational institutions listed under the non-profit and showing lower monthly salaries for all types of bachelor's degrees (3). Most of society is well aware of this fact; parents suggest that their children go into fields of business, engineering, law, or medicine, but not into teaching, even though one or both of the parents may be in the teaching profession. Average salaries of 1984 college graduates show teaching at the bottom with such fields as statistics, chemistry, computer sciences, and engineering averaging 54% to 85% higher (4). Therefore, salary is a given negative and has been offered as one of the major factors explaining the decline in number of students entering the profession. Another factor is the degraded status of what ought to be a richly honored profession (5). The estimated supply of new teacher graduates has decreased from 313,000 in 1973 to 149,000 in 1985 (4). At our university, the number of graduates from the College of Arts and Sciences declaring teaching as their major has decreased from 49% in 1973 to 10% in 1984 (6). Nationwide this is evidenced by 2 in 5 students indicating an interest in teaching in 1970 as compared to 1 in 20 in 1984 (4). But still many do choose to enter the profession. Why? One reason given is that students who can't make it into better paying professions end up as teachers. It is correct that SAT scores of college-bound high-school seniors intending to major in education are about 80 points lower than the average for all seniors taking the test (4); but a significant number of declared education majors possess SAT scores which qualify them for entrance into any of the more "elite" majors. Another reason, and an important one, appears to be similar to that of workers in the other "helping