USING REAL WORLD EXPERIENCE TO TEACH SCIENCE AND ENVIRONMENTAL WRITING

Sharon M. Friedman

Asaistant Professor of Journaliam and Coordinator, Science and Environmental Writing Program, Lehigh University

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DOCUMENT RESUME

ED 163 504 CS 204 578

AUTHOR Friedman, Sharon M.
TITLE Using Real World Experience to Teach Science and Environmental Writing.
PUB DATE Aug 78
NOTE 22p.; Paper presented at the Annual Meeting of the Association for Education in Journalism (61st, Seattle, Washington, August 13-16, 1978)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Assignments; College Curriculum; *Course Descriptions; *Environmental Education; *Experiential Learning; *Expository Writing; Higher Education; Investigations; News Writing; Scientific Concepts; *Student Projects; Teaching Techniques; *Technical Writing
IDENTIFIERS *Science Writing

ABSTRACT

The use of interpretive reporting techniques and programs offering real world training to writers may provide solutions to the problems encountered in writing about science for the mass media. Both science and environmental writers have suggested that the problems they face would be decreased by the use of more interpretive and investigative reporting, and the use of interpretive reporting in science writing has in fact been on the rise. In recognition of the value to writers of personal or real world experience, some programs have been developed to offer such experience to science writers and to undergraduate students in science and environmental writing programs. At Lehigh University, students in one course write reports after attending meetings of local environmental groups, after visiting a local industrial or environmental site such as a steel plant, and after working in teams on three-month investigative studies of ongoing local environmental problems. In a second course, students work for environmental groups, preparing public relations materials. Courses in science writing require students to write interpretive magazine articles on controversial scientific issues and have enabled some students to attend and write about a meeting of a national scientific association. New experiential programs are planned for the future. (GW)

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Sharon M. Friedman

Assistant Professor and Coordinator,
Science and Environmental Writing Program
Division of Journalism
Lehigh University
Bethlehem, Pa. 18015

Presented to the Symposium on Teaching Science and Environmental Writing: The Journalism of Uncertainty, Association for Education in Journalism, Seattle, Washington, August 12, 1978.

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Problems in Science and Environmental Coverage

Writing about science for the mass media is a particular problem because acience writing is not <u>just</u> another form of specialty reporting, as some

journalists have claimed. Science writing is unique in that it often deals with phenomena such as black holes or transduction that are far removed from people and their daily lives (12). These phenomena and hundreds of others are difficult to explain and science writers must employ analogies and other tools to help get the information across. But this brings about conflict with scientists, on the one hand, who often believe the articles are not exact enough. On the other hand are the editors who believe the stories are not exciting enough. The science writer is the person caught in the middle.

Charges of distortion, sensationalism, inaccuracy, lack of historical perspective and oversimplification (11) often are brought against science writers by scientists and some readers. Science writers, in turn, pass many of these charges onto their editors and to general assignment reporters not trained in science writing. They declare the situation would improve with more interpretive and investigative reporting.

Donald Drake, medical writer for the Philadelphia Inquirer, maintains: "We've got to stop covering science as though it were a fire or shoot-out that is old news if it's a day late or played by the competition. The simplistic single-source story should be discouraged and the growing trend toward more comprehensive pieces encouraged (5)."

Several other science writers emphasized this point in this author's study of changes in science writing between 1965 and 1973. One noted that "traditional spot science reporting is misleading and hence a disservice." Another explained there is a "growing conviction that public understanding requires lucidity and interpretive explanation." Said a third, "The gee whiz story has taken a back seat to interpretive pieces that view science as a process (8)."

These feelings and problems are not unique to science writers, however.

One finds them crossing over to environmental writing, which has it own complexities and reporting difficulties.

As Schoenfeld (23) has noted, environmental reporting also involves explanation of technical data. But it has other difficulties as well including a high level of emotionalism that often surrounds an environmental controversy and long-term impacts that may be unforeseen at the time of the controversy.

Witt (28) has pointed out that "environmental problems and solutions are typically long range. This requires in-depth treatment, with careful attention over time to the developing story." Environmental reporters surveyed by Witt charged newspapers with "too much emotion, 'crisis' reporting, hysteria and sensationalism."

Other problems in environmental reporting can be linked to lack of investigative reporting because few reporters are encouraged, trained or have the time to do it. Rubin and Sachs (21) list ten pressures that can affect the quality of environmental reporting and among these are dependence on hard news pegs, lack of expertise, time and space pressures. All of these work against solving problems in environmental reporting.

Like the science writers, some environmental reporters suggest using interpretive stories to improve the situation. An environmental reporter for the Los Angeles Times (20) said that interpretive reporting is ideally suited for environmental writing because it provides a "comprehensive style for a complicated topic."

Interpretive Reporting

In both science and environmental writing, the use of interpretive reporting has been on the rise. Krieghbaum (13) pointed out in 1974 that some marked changes had taken place in what science writers were writing about and how they presented the information. He added: "Like other reporters in

recent years, science writers have turned increasingly toward interpretation of what the news meant."

The author found in her national study of science writers (8) that half of the writers answering the survey said they wrote more interpretive than straight news articles on science. About half also said interpretive stories received more space in their publications than straight news stories. More than two-thirds believed that interpretive news got the most science across to their readers and had the most influence on reader attitudes toward science.

Along with the increased use of interpretive articles has come an emphasis on different topics. Both Krieghbaum (13) and the author (8) found increased emphasis being placed on covering the social relevance and impact of science and technology as well as a shift in content away from space exploits to the environment and the life and health sciences.

According to Victor Cohn, science writer for the Washington Post, "These days it is not enough for us to report the new discoveries and gadgetries; we must delve deeper into their effects on people and public policy...be a public watchdog (11)."

Another prominent science writer, David Perlman of the San Francisco Chronicle, adds to this (18) by calling for several changes including fuller coverage of science to show that it is a continuing step-by-step process, more reporting on the full significance of technological developments, and more thorough reporting on the political institutions of science and technology and the ebb and flow of power among the scientists who advise the White House and government agencies.

To do this requires in-depth interpretive reporting and to be able to do this reporters must have personal experience and skill in the field. Most

new reporters need seasoning and greater depth of knowledge before they can attempt to do much interpretive reporting about science or the environment.

Personal Experience

One environmentalist has said that "to create environmental-mindedness, it is necessary to stress personal experience and develop perception through all the senses (4)."

This observation is not new. Personal or "real world" experience long has been recognized as a valuable teaching tool in environmental studies (25) and public affairs reporting classes (27). One journalism professor has even suggested using press conferences as a real world final exam in a beginning reporting class (24).

Personal experience provides students with depth and understanding of events far beyond what books and lectures can do. It is this depth that is needed for interpretive reporting.

A small number of programs have been offered over the past 17 years, primarily in the science writing field, which have offered personal or real world experience to writers. Most have been sponsored by the Council for the Advancement of Science Writing (CASW).

From 1961-1965, CASW ran an annual program with ten cooperating institutions to encourage science writers to spend between six and eight weeks at a research institution (7). CASW believed "that if a science writer gets his hands dirty in the laboratory and his mind challenged by the strict requirements of research design, it will make him better able to interpret the 'feel' and 'flavor' of science to the public." This program was discontinued for lack of funds.

In 1974, CASW proposed to revive the earlier program to provide stays at labs of either two week or one full year. The two-week program was

designed to familiarize the writer with one scientific project or institution. The year-long residency was to be modeled after the writer in residence program at many universities (2). The following year CASW announced a science writer in residence program supported by the National Institutes of Health. According to CASW: "...the experience of working directly on a research project would have several advantages for a reporter. It would give him a deeper understanding of the scientific method in action and the day-to-day problems encountered by research scientists. This experience might increase his ability to assess the rigor of procedures used in a particular piece of research and therefore be in a better position to evaluate the validity of the conclusions (3)."

The CASW programs, however, were not the only real world experiences offered to science writers. Among those discussed in newsletters of the National Association of Science writers since 1973, have been science writing tours to the Antarctic sponsored by the National Science Foundation (9), to the Soviet Union (10) and to Israel (15) and opportunities to work with laboratory groups at the National Institutes of Health (16). Many science writers (22) including Perlman (19) and Cohn (1) have advocated real world or research experience for science writers.

If such experience is recommended for practicing writers because it will give them deeper understanding and increase their ability to write more informative articles, then why shouldn't students in science and environmental writing classes also have similar training?

Real World Experience for Students

Providing real world experience for science and environmental writing students is both easier and harder than it is for practicing journalists. It is easier in the sense that one does not have to convince editors to

release reporters from daily writing chores to go work in a research lab or take a trip to Antarctica. It is more difficult because the students have other courses to contend with and good real world experiences frequently are not available or are costly.

Nonetheless, in the science and environmental writing program that has been in full operation about one and one-half years at Lehigh University, real world experiences are emphasized. (Lehigh offers an undergraduate program with a major in journalism/science writing, a minor in science writing and an area concentration in environmental writing. Seven science and environmental writing courses are available.)

The range of real world experiences for Lehigh students is as diverse as possible and includes meetings, field trips, investigative reporting on current regional problems and public relations tasks for real clients.

Most of this experience is spread over two semesters' each of environmental and science writing classes. Students who major or minor in science writing usually encounter all of these experiences. Others--and they include majors in journalism, environmental studies, the physical, life and social sciences, and engineering--will participate in one or two experiences in a selected course or two.

The goals of the real world experiences are simple: to help the students understand and analyze the complexity of scientific and environmental issues and then to help them write about these complexities in a probing, perceptive and accurate manner. Interpretive reporting is emphasized at all times and real world experience is used to help make the students better interpreters of what they see.

Real World Experience in Environmental Writing

A course entitled "Environment, the Public and the Mass Media" provides

the greatest opportunity for real world experience at Lehigh. This course has been taught for the past two years to mixed classes of journalism, science writing and environmental studies students. Its purpose is to evaluate how public perceptions about environmental issues are formed and to trace the roles of industry, government, the mass media and environmental groups in the formation of these perceptions. To do that, the course focuses on two main study areas: 1) the complexity of environmental issues and environmental politics and 2) the tactics used in environmental information campaigns by various publics.

Five writing assignments are given in the course, three of which involve real world experience. Two real world assignments are relatively brief, with students attending meetings of a local environmental group and taking a field trip to local industrial or environmental sites. The more involved third experiential project is an investigative study of an on-going environmental problem in the Lehigh Valley. (The other two assignments are a book review and a "creative" paper, which is adapted from a concept by Peter Sandman of Rutgers University.) In student critiques of the course, all three real world assignments have proved popular, with the field trip rating particularly high.

The short meeting assignment is designed to introduce the students to the reality of environmental groups. After attending the meetings, students must write a short paper that snalyzes the group's effectiveness and its message. While most journalism or science writing students in the class have attended meetings of campus groups and perhaps a city council, very few have attended meetings of environmental groups. Accordingly, a myth seems to prevail about the potency of such local organizations. Students envison them to be mighty Sierra Clubs--powerful, well organized, on the ball.

The meeting assignment changes the students' approach to evaluating the impact of these groups because they see for themselves the poor attendance, lack of funds and organization and the minimal cooperation between groups. Students begin to understand why local environmental groups frequently lack clout and accomplish so little. And the myth begins to weaken.

The second brief real world experience, the field trips, has three purposes. The first is to get the students out to experience the physical settings themselves. The second is to have them evaluate the effectiveness of environmental messages projected by the various groups they visit. The third is to show them that all groups involved in environmental matters will attempt to manipulate them and that they have to learn to recognize and deal with "propaganda" in all forms. Papers evaluating the medium and the message are required for all trips.

These trips have proved to be a very exciting teaching tool because the students get to see new horizons under guided supervision. The most successful one is a tour of the Bethlehem Steel plant, which is located only four blocks from Lehigh's campus. From the moment students arrive on campus, they hear about the steel company but few know what actually goes on inside its gates.

They hear about its vast air and water pollution problems, how it has partially cleaned up and the millions of dollars it has cost, but they have no idea of the magnitude of clesnup involved in a very old and very large steel mill.

Bethlehem Steel has been extremely cooperative about providing tours, guides knowledgeable in environmental matters and high-level public relations spokesmen to discuas pollution with the class. The tour itself has a marked

effect, particularly on the avid environmentalists in the class who never imagined the steel plant was "that dirty or that complex."

The guides and speakers have varying degrees of success dealing with the students, many of whom distrust what the company and "big business" in general have to say. However, during these discussions the students get to hear the views of at least one member of the industrial public and this provides them with more perspective than perhaps a book on environmental economics could.

Other field trips (17) serve to place students in an environmentalist atmosphere where they listen to guides explain organizational purposes and needs. The most successful of these trips are those that place students in physical settings that are novel for them such as a salt marsh or a bog.

These first two real-world experiences are done early in the semester to "get the students' feet wet" for the longer and more complex third assignment, the investigative project. This three-month effort, which is a major part of a student's grade, involves both library and field research. In the first year the assignment was given, students were allowed to select different environmental topics to work on, while in the second year, the assignment was revised so that they worked on various aspects of one major environmental problem. Both methods have advantages and drawbacks.

With the first year's design of different topics, five teams of five students each were allowed to choose a current environmental problem in the Lehigh Valley. The topics they chose included studies of sewage treatment and sludge disposal in Allentown (the Lehigh Valley encompasses the cities of Allentown, Bethlehem, and Easton); a nearby township's loss of water due to mining operations; urban growth and loss of agricultural land and open space in the Lehigh Valley; use of the Lehigh Canal as a recreation resource;

and problems in preserving the famous Appalachian Trail, which borders the Lehigh Valley to the north.

Each team divided up the investigative tasks to tackle legal, ecological, political, economic and other aspects of the topics. They reviewed available literature, toured sites and interviewed scores of involved people, including practicing reporters working on the same stories.

The advantages of the first year's investigative assignment were many, but its prime asset was that the students experienced and became deeply interested and involved in their projects. As a result, the oral and written reports they prepared for class were thorough, incisive and innovative. Most teams used visual as well as written materials including maps, slides and even samples of sludge. The sewage study group went as far as to tape record shoppers in a nearby mall answering questions about what happened to the waste they flushed down their toilets. Some interviewees thought the waste went "into the river," "just down the pipes," or "out to the ground." Very few mentioned anything about a sewage treatment plant.

And while one might think a report on a canal recreation resource could be boring, the Philadelphia Regional Office of the Department of the Interior's Heritage Conservation and Recreation Service (formerly the Bureau of Outdoor Recreation) found "the investigative approach and the interviewing of resource persons refreshingly different from the standard undergraduate 'research' papers...the students have seen quite clearly what the situation is and their analysis...is on target as to what needs to be done." The Service will use the students' canal study in a report of its own.

The study on water loss caused by mining brought with it another type of advantage, which showed far better than the author could have that investigative reporting takes a lot of digging and it is not easy, especially when

sources will not cooperate.

Team members, despite many attempts, could get no cooperation from mining company officials. All requests for information fell on deaf ears. Finally, they became aggressive and camped out in the lobby of the company's headquarters where they corralled one of its officers. Unfortunately, their inexperience hurt them because he was able to put them off with the old trick of "put it in writing and then I'll answer it." No answers ever came forth, of course.

A practicing reporter also had this refusal problem and finally had to write to the president of the conglomerate that owned the mining company before receiving any information. This enterprising reporter, Tom Roberts of the Bethlehem Globe-Times, eventually won the coveted Stokes award for his 22-part series on the water issue.

But the students also were enterprising and used every possible source to fill in the information gap caused by the mining company including getting financial reports from Wall Street and other sources not usually thought of in the region. They even turned up a few facts the local reporter missed. The team's account of its experiences with the mining company underacored for the entire class the problems encountered in investigative reporting in a way that was more effective than any professor's lecture.

Balancing off all of these advantages were two prime drawbacks to the assignment: first, not everyone on the teams pulled his or her own weight and second, class membera were not able to effectively evaluate a particular team's work because of their lack of specific knowledge about the iasue.

To try to counteract these problems, the investigative assignment was revised in its second year to focus on one major environmental problem, a raging battle over building a dam in one of the most beautiful and fertile

farmland regions of the Lehigh Valley. Trexler Dam, to be built by the Army Corps of Engineers at the request of the Delaware River Basin Commission, was supposed to provide three major resources for Lehigh County--flood control, water and recreation. In doing so it would gobble up hundreds of acres of prime farmland, inundate historical sites dating back to the 1700s, and provide prospects for secondary land development that would mean the loss of more open space. Many more issues including design safety, pesticide use, the water needs of electric and nuclear power plants and eutrophication were involved in this very complex and fiercely fought battle.

As in the previous year, students divided into teams, this time six teams of two students each. Smaller teams were used to try to keep everyone on the team working and to not have just a few students do most of the assignment. The areas of the Trexler Dam issue they tackled included economics, impact on residents and on the terrestrial and aquatic ecosystems, development and growth, local government response and water and recreation resources.

Students were required to do library research including review of five versions of the environmental impact statement, updates and revisions, thousands of pages of transcribed public testimony and hundreds of newspaper articles. They also conducted field interviews and toured the Trexler Dam site. Written and oral reports were required and arguments for and against the dam had to be considered by each team.

The advantage of this type of assignment as opposed to the multiple-topic format of the previous year was that the whole class worked on one particular issue and everyone was familiar with the same facts. This provided a good basis for class discussion and evaluation. Delving into the issue through background and field research got the students personally involved and, as one

of them said, "put them on a different wave length as far as approaching the problem and putting themselves into it."

The drawbacks with the one-topic format in this case centered on the complexity of the Trexler Dam issue, the depth required to understand it and the inexperience of students. Their oral and written reports did not match those of the first year's class.

An interesting outcome of this assignment was that most of the students could come to no clear conclusion concerning the worth of the dam at the end of their investigation. Many said they would have voted against the dam in the county referendum that occurred, but this was because of their own emotional attitudes rather than the facts they had uncovered. Here was another valuable lesson learned concerning the emotional aspects of environmental issues.

The meetings, field trips and investigative papers of "Environment, the Public and the Mass Media" offer one type of real world experience to Lehigh students. Real world experience of another type--that of an employer-employee relationship--is found in a second environmental course, "Writing about the Environment." This course is for people who would like to learn public relations techniques for environmental, public service or governmental groups.

In the course, students work for environmental groups without pay preparing public relations materials that meet the groups' needs and budgets. In the two years this course has been taught, five clients--all environmental groups with few dollars and many needs--have been assisted. Services provided by the students have included writing press releases, pamphlets, newsletter articles and radio public service announcements, running a press room and preparing press kits for a conference.

Although case studies from texts have been used both years at the beginning of the semester, students consistently say they learn more from and feel better about their assignments when they work for real people. The employer-employee approach also gives some students the opportunity to have their work published. Other advantages including personal involvement and increased interest are similar to those discussed with "Environment, the Public and the Mass Media."

Real World Experience in Science Writing

Achieving real world experience for students in science writing classes is far more difficult than for environmental writing classes. Science is a continuous process that does not lend itself to distinct events or topics that are easy to "package" so students can handle them. How does one assign real world experience with subatomic particles or recombinant DNA? These are terribly complex subjects that even scientists outside the specific field of study may not understand. It is rare that discrete science topics come along that students can understand and work on.

Despite this problem students in Lehigh's basic science writing courses do get some exposure to real world experience by visiting campus labs, interviewing researchers and attending departmental colloquia.

Campus visits and seminars, however, are not enough experience for serious science writing students and two other opportunities have recently been developed at Lehigh to help improve their training. The first is an advanced course called "Special Topics in Science Writing," which emphasizes in-depth investigation and balanced reporting by requiring three interpretive magazine articles on controversial scientific issues. At least one of the articles must be on a regional controversy so students have the chance to get off campus and into the field.

Far better than this classroom method, though, is the second real world experience available. Last February, eight science writing majors and minors went to Washington, D.C. for four days to cover as full-fledged reporters the annual meeting of the American Association for the Advancement of Science (AAAS). During this trip the students were totally immersed in the atmosphere of this huge and important meeting and they were able to talk with scientists and science writers alike.

Incidentally, many more students signed up to go to the AAAS meeting than could be accommodated even though they had to pay part of their way (partial support was provided by Lehigh and a Scripps-Howard Enrichment Grant), had to write articles at the meeting and received no credit for attending.

The students attended scientific sessions and press conferences and learned by watching the professional science writers in action. They also became familiar with press room operations, how to evaluate whether to go to a scientific session or a press conference and how to try to cope with deadline pressures.

The experience was purposely kept unstructured, with the students able to choose the sessions or press conferences they wished to attend and write about. The idea behind the unstructured format was to give them time to get acclimated to the hundreds of activities at the meeting and let them slowly learn the routines involved in covering them.

However, all were required to attend a daily discussion session where prominent science writers talked with the students about the day's events and science writing in general. In these discussions, the Lehigh group was joined by science writing students from Massachusetts Institute of Technology and Suffolk University, who also were there to cover the AAAS meeting.

When the Lehigh students returned from the meeting they were extremely

enthusiastic about their experience. They also displayed such increased zest for their work that it surprised other professors in the department. Most of these students are working this summer to save money for next year's AAAS meeting in Houston, a further indication of the success of this venture. The author hopes this trip will become a permanent part of Lehigh's science writing program.

While the new course and the AAAS meeting have indeed added more real world experience for Lehigh students, efforts will be made next year to increase this even further by arranging for several science writing students to be "writers in residence" in a university research lab for a semester or year. Like the CASW programs, the students will do research as well as write. Details for this new program are still being worked out.

Conclusions

Becoming a skilled science or environmental writer is not an easy task because great demands are put on members of the profession by scientists, editors and readers alike. Translating and interpreting complex material provides many stumbling blocks as does the need for being accurate and yet exciting. New demands to provide social relevance and assess and interpret the impact of scientific developments increase the pressure on would-be science or environmental writers. They have to know not only how to write but also how to understand and analyze.

It is evident from the literature and from the experiences of science and environmental writing students at Lehigh that real world experience is a valuable tool for learning how to understand and analyze, and how to write in-depth interpretive stories. Real world experience not only reinforces materials learned from texts and lectures but it also encourages students to learn on their own--something they must do once they are on the job. It

allows the students to feel early in their careers the drudgery and the excitement of investigation and it makes them more confident about interviewing and attending press conferences and scientific seminars.

Real world experience in science and environmental writing, in particular, is a valuable preparation for the hard task that lies ahead for these future writers--communicating the news about science and technology clearly and accurately and assessing and interpreting that news so readers can understand the impact it will have on their daily lives. With science and technology so pervasive in today's society, an informed readership must be developed and it can be done by trained, concerned and experienced science and environmental writers.

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