Trends

English

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Training Teachers to Teach Writing and Use Computers

Administrators and supervisors have welcomed recent emphases on teaching writing and using computers in the English curriculum. But if real advances are to be made in those areas, teachers must gain new understandings and apply their insights in the classroom. What approaches are being taken to inservice in composition and computers in English? Two staff members at the ERIC Clearinghouse on Reading and Communications Skills, Hilary Taylor Holbrook and Holly O'Donnell, recently examined inservice models and workshops in teaching writing and using computers.

Holbrook (1984) summarized ways in which writing teachers are learning about writing. She cited two inservice efforts based on process approaches to writing instruction. Casey's model (1979) involves 15 sessions in which teachers discuss each other's writing, as well as the conditions that encourage effective composition instruction. A Neshaminy School District (1980) inservice training program resulted in a K-12 curriculum guide based on the "conviction that teachers should write with students as often as possible."

Holbrook found further support for the teacher-as-writer concept in numerous National Writing Project programs (such as Newkirk, 1983, Goldberg, 1984). Characteristically, these programs use teachers to teach other teachers, casting all workshop participants in the roles of both teacher and student. The concept is that teachers can draw on inner resources—their own potential as writers—as well as peer support in programmatic ways to improve writing instruction.

Teachers are also learning about writing through inservice based on classroom research. The rationale for conducting "research-like inquiries" in classrooms, according to Barton and Zehm (1983), is that these inquiries result in more clearly focused, productive instruction. The teacher-researcher necessarily reflects on the content and method of teaching, closely observing students in the act of writing, and continually self-monitoring instructional practices.

O'Donnell (1985) examined teacher training programs using computers in English and language arts. She presented an adaptation of Mojkowski's (1984) instrument for discovering teachers' specific needs *before* planning a workshop. Mojowski's "Computer Competency Inventory" gathers advance information about teachers' levels of competency in several aspects of computer understanding and use.

According to O'Donnell, there are characteristic elements and sequences in computer inservice programs. Initial training involves orientation to hardware and running simple software. The second phase frequently deals with integrating computers into existing programs, while the third focuses on gaining sophistication in evaluating software (Hoover, 1983; Nordman, 1982). While some workshops include another level of competency—computer programming—teaching programming to teachers appears to be a diminishing priority.

O'Donnell identified workshops conducted according to a variety of schedules, such as weekend sessions, after school on weekdays, and summer camps. She also discovered programs of varied session lengths, space demands, and costs. Regarding program quality, she cited West's (1983) analysis of four computer staff development programs. West found the programs to be adequate in terms of planning and training but weak in implementation and maintenance. None of the programs made definite plans for computer use in day-to-day instruction. Moreover, long-range maintenance of teachers' computer skills was totally neglected.

Reviewing Holbrook's and O'Donnell's descriptions of inservice in teaching writing and using computers, one cannot escape the impression evident in that greater imagination and skill are inservice in composition than in computers and English. This is not surprising, given the long tradition of composition instruction and the recent surge of excellent research in composition pedagogy (Thaiss and Suhor, 1984). Moreover, the sweep of computer technology in American schools had its origins in science and math instruction, and language arts educators have only recently become excited about the potential of computers in instruction—especially in word processing (Standiford and others, 1983; Wresch, 1984).

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Inservice education, like preservice, is undergoing close scrutiny. By studying the pedagogy of inservice and sharing ideas about effective workshop content and structure, teacher educators can develop useful self-critical attitudes and become effective agents of change.□

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Science

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Qualitative Science, Quantitative Results

Science is a flickering light in our darkness. It is but the only one we have and woe to him who would put it out.

—Morris Cohen

You might disagree that science is our only light, but it is hard to disagree that it is fading fast in our schools.

"Science classes make me unhappy," said 53 percent of 17-year-olds and 57 percent of 13-year-olds on the 1981–82 National Assessment in Science. Fully 86 percent of those same 17-year-olds agreed that things learned in science had nothing to do with the real world.

How can this be? How can students in this technological age feel science has little to do with the real world or themselves? Could our curriculum or our approach to science instruction be at fault?

Although physics and chemistry are two science courses with possibly the most direct applications to our own lives, they enroll the fewest students. One reason may be that they are taught in a highly quantitative fashion requiring considerable knowledge of mathematics for success. In this country, fewer than 20 percent of all students complete physics, and slightly more study chemistry before graduation. Students avoid the physical sciences like the plague, presumably because of their own lack of mathematical skills as well as the perceived difficulty of the subjects.

Many schools are working diligently to overcome this. Some, unfortunately, are "solving" the problem by requiring more science, not different or better science. However, when we examine specific districts where more students are enrolled, we find that the most successful programs use a qualitative approach to physical science. Teachers in such programs help students learn to think quantitatively rather than merely teaching rote skills of simple mathematics. Teachers and curriculum developers setting this trend speak of teaching students to develop a feeling for percentages, rates, density, graphs, and parts-per-unit volume. Their aim is to teach students to deal with orders of magnitude and to use statistics intelligently.

Qualitative physical science programs emphasize experience with phenomena that includes designing, handling, measuring, and analyzing. Students compare phenomena with statistics, graphs, and other mathematical techniques. Generally laboratory-oriented, qualitative programs include long-range projects during which students must make decisions and deal with the consequences of their actions while engaging in real-world situations.

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Developers of these programs point out that most of their students will not pursue science as a career. They have been striving to make high school science meaningful, memorable, useful, and available to all. Rather than 20 percent of their graduates completing high school physics, these developers speak of 50, 60, or even 90 percent completing the course. Teachers welcome these kinds of enrollments because they are eager for their students to experience the value of science to their own lives.

Even future scientists, however, like learning through direct experience. In a recent study of highly successful space scientists (Scobee and Nash, 1983), 100 percent recommended hands-on, real experiences for students. They agreed that the least significant activity in school science for their own careers was "a strong emphasis on asking students to locate and memorize specific facts. . . ."

"Science in the Marketplace" (New Jersey) and "Household Chemistry and Physics" (South Carolina) offer students opportunities to study real applications of science. Students compare consumer goods and their claims, developing techniques for testing and evaluating. Rather than emphasizing the quantitative nature of science, they begin with qualitative evaluations and develop quantitative techniques as needs arise. In the end, students gain more qualitative understanding.

"Topics in Applied Science" (Colorado) includes many mathematical concepts as one type of learning outcome. While studying energy, students learn about "energy squares" rather than highly quantitative units of energy such as watts or joules. Once students learn to graph with energy squares, quantitative understanding is more easily taught. And, most important, students understand what they are doing while they are doing it.

Most exemplary physics programs offer a variety of courses for students of varying mathematical ability. Henry Gunn High School in Palo Alto, California, has three physics courses, including a qualitatively oriented course in which no written exams are given. In return for their flexibility of course offerings, more than 85 percent of graduating seniors complete a physics course at Gunn. These students are very successful on national physics exams, including advanced placement.

Omaha Northwest High School in Nebraska even offers physics for low-achieving students and for those with poor reading skills. They have reduced the daily time and increased the number of laboratory activities for these students. Now, with this qualitative emphasis, students fill 12 of these optional physical science sections, learning concepts they might not have encountered otherwise. Along with these concepts most teachers say they are teaching a lot of mathematics without students even noticing. What students do notice is their own success and interest.

School and student impact does not end with enrollment in the basic, qualitative courses. Schools offering more qualitative physical science are finding increased enrollments in advanced quantitative courses as students become more confident in their use of mathematics as a tool.

We've always known that many physics courses were advanced math courses in unfortunate disguise; perhaps we can be pleasantly surprised by seeing physical science as a vehicle for applying math while gaining science literacy. As this trend toward reducing mathematics requirements in introductory physical science classes gains momentum, we may also find more students going on to advanced courses and perhaps even taking more mathematics. More important, we will be encouraging students to use and understand concepts and skills from the physical sciences, which can only enhance science literacy and our country's position at home and abroad.□

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