

includes simple shapes and relationships. Money, measurements, some pictures, and more complex relationships are real for slightly older children. For progressively older students reality may include still more abstract entities. For all children, a certain amount of fantasy is real and can be used effectively. For generations teachers have known that slower students learn and remember mathematics better when it is related to their reality. But many of these same teachers believed that since quicker students *could* learn to perform calculations without reference to reality, they *should* do so. As a result, many bright students believe there are two distinct kinds of mathematics, the kind that applies to the real world and the kind they are taught in school. Such children tend not to be good mathematical problem solvers.

After abstracting the mathematics from reality and practicing it for awhile, students should apply it to many different situations that seem realistic to them. Properly constructed games can be a good source of problems and practice. Real-world activities such as finding best buys at grocery stores, synchronizing traffic lights to enhance traffic flow, or analyzing news articles provide excellent practice.

Well-constructed sets of textbook word problems can also provide good problem-solving experience. A variety of applications is important lest students get the impression that the mathematics they've learned works only with ice cream sticks, or fingers, or money, or some other limited number of situations. One of the great powers of mathematics is that the same mathematical system can be used as a model for a great variety of situations.

Problem solving, like bicycle riding, requires lots of practice. Students should have regular experience, work with others, and formulate and solve their own problems. A small amount of theory about problem solving (such as lists of procedures that sometimes help) can be useful after a lot of practice, but it is of little help before the practice and worse than useless without the practice.

Another characteristic of an effective program for teaching mathematical problem solving is a lot of direct two-way communication between teacher and student and multidirectional discussions with several students and perhaps the teacher. Long lectures are inappropriate even for older students; dull ditto sheets (or a textbook that is essentially hardbound ditto sheets)

cannot replace active, interactive teaching using materials, games, and the learners' natural curiosity.

Students should learn to communicate with others about mathematics. They should be able to receive information that is presented orally or in writing. They should be able to present answers orally or in writing so that others can understand them. Textbooks that delete verbs, use strange constructions, or otherwise damage the English language in order to lower the computed "reading level," and teachers who accept numerical answers without any words to provide context, do not help students learn to communicate with others about mathematics.

Mathematical problem solving involves using mathematical reasoning to achieve a desired goal in spite of obstacles. The most effective methods of teaching mathematical problem solving involve always relating the mathematics to the learner's reality and providing plenty of well-motivated practice in solving problems and communicating with others about mathematical problems. Superficial, cosmetic revisions of "back-to-basics" or 1960s "new math" programs will not provide effective means to teach problem solving.

Supervision

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Improving School-University Relationships

Seven years ago an ASCD working group on "Roles and Responsibilities of Supervisors" was commissioned to gather current data on the role of the instructional supervisor by reviewing literature and empirical research. Part of the data included five-question in-

terviews with executive directors and other representatives from nine national education associations.¹

The respondents agreed that interaction among all instructional personnel was central to learning and that clinical supervision is the main process by which instructional supervisors gain access to and understanding of

the quality of this interaction. Well over half of the respondents said that instructional supervision should include techniques and practices of clin-

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ical supervision, and that instructional supervisor preparation programs should include formal classwork involving clinical supervision. Specifically, they felt that such programs should include both knowledge base and skills in setting realistic, beneficial objectives with teachers; observing classroom teaching; analyzing teaching methods and procedures; and conducting evaluation conferences with teachers.

Few universities have digested study results such as these or reexamined and updated their supervisor preparation programs. In most cases, it appears, tradition is hard to change.

How, then, can universities keep pace with contemporary instructional supervision needs? How can they ensure that they don't lose their primary preparation role to the ever-increasing inservice workshops sponsored by professional organizations, intermediate agencies, and consulting groups? I suggest that the responsibility belongs to professors of instructional supervision; specifically, they need to be more active and creatively involved in meeting program development needs. Further, professors must form partnerships between themselves and other constituencies involved in selecting, evaluating, and rewarding educational supervisors.

I recently asked leaders of professional education administration and supervision organizations and practicing administrators and supervisors, "What are some of the impediments to effective relations between school administration and supervisors and professors of supervision?" and "What are some of the proactive measures professors can effect to improve the relationships?" They responded candidly with two critical observations and several proactive suggestions.

First, many practitioners feel supervision professors are outdated, too far removed from the realities of day-to-day instructional supervision challenges, and not in the schools long enough to do anything but sell. Professors, they suggest, need to address their image as perceived by practitioners and ask, "What do we do to bring about this image? Is this image accurate?" The key is communication, and professors must communicate with their constituencies, ask practitioners why they feel this way and what the supervision professors can do to improve their image. (On the other hand, organization leaders suggest that some practicing supervisors feel threatened by the demands of their positions and may blame others—such as professors—for their seeming lack of skills required for job effectiveness.)

Other suggestions were that professors should:

- Attend state meetings of practitioners and maintain active roles in their associations. Contact evinces professional concern and good public relations; most important, it allows professors to participate and make professional contributions to practitioners' associations.

- Occasionally visit schools to better understand the daily instructional challenges that teachers, supervisors, and principals face. Such interactions might lead to job sharing for agreed-upon time periods.

- Initiate monthly Issues Seminars with ten to 12 invited school supervisors and administrators, on a round table basis, to help groups understand each other better and promote supervision and leadership. Group membership may be rotated to ensure expanded participation.

Second, there seems to be a continuing gap between what is taught

and what is needed. Courses are taught for certification, but do they teach supervision skills to help students? Program standards are now based on courses, not competency. Courses fail to keep pace with contemporary needs; thus, they don't focus on real issues of instructional supervision.

The most critical issue to both leaders and practitioners seemed to be preparation programs. Researchers suggest that professors strike a balance between theory and practice in teaching their courses; try to speak from recent direct experience bases (school visits) to better balance theory with practice; and, as much as possible, test theory and practice against each other.

Additionally, professors should thoroughly examine the supervision skills essential to success and offer not only knowledge base content, but also the generic skills for problem analysis, instructional leadership, communication, and so forth. Practitioners need base line management skills—skills not often taught in the preparation programs.

I asked these same two questions of various supervision professor colleagues. Although their list of impediments (including professional image and preparation program content) was similar to that of professional organization leaders and practitioners, their rationale for each was less intense.

Some of their suggestions for improving both were that professors should:

- *Demonstrate* continuing awareness of contemporary theoretical, societal, and institutional developments that have implications for practicing supervisors. (Of course, that requires flexibility.)

- *Seek* cues from practicing supervisors as decisions about revising prepa-

ration programs are undertaken by higher education institutions.

• *Discuss* the problems confronted by practicing supervisors (especially in *informal* settings, which supervisors typically favor for such discussions). That really means moving to their turf!

• "Stop being so damned pompous and superior in contacts with practicing supervisors," an impression often projected unintentionally.

Perhaps professors try too hard to impress each other in formal university communication. Several weeks ago, for example, in a meeting discussing possible changing of program core

requirements, a professor listed this as a common experience item for a specific study area: "Secure an eminent advocate of educational reform and conduct a seminar session telephone interview of this individual." If the professor were to have said, instead, "Conduct a telephone interview with an eminent educational reform advocate," others would have understood the message and felt an interest to communicate—not impress.

Professors of supervision ought never allow anyone to doubt that they are competent. It is up to them to ensure that the preservice and inservice programs they conduct, the images they

project, the skills they foster in their students, and the ways they communicate are the best they can offer.

¹These associations were: American Association of Colleges of Teacher Education, American Association of School Administrators, American Federation of Teachers, Association for Supervision and Curriculum Development, National Association of Elementary School Principals, National Association of Secondary School Principals, National Education Association, presidents of Council of Professors of Instructional Supervision, and Professors of Curriculum.

Curriculum Abstracts

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Student Participation in Archaeological Digs Uncovers Success

Nothing seems to succeed better with students than practical, hands-on activities. For instance, students and teachers in the Morris, New York, schools have undertaken an archaeological dig as part of the curriculum. What began three years ago as a simulated dig for artifacts buried by teachers has now expanded into realistic settings.

The present dig is an ongoing project offered as a 20-week elective. A local citizen donated the rural site after consulting with an archaeologist. Students participate one afternoon each week and for single periods when feasible. Aside from specific dig skills, students can apply ideas from science, mathematics, history, art, and industrial arts. The speech and drama class has videotaped activities, and the art department is developing a pictorial record of the project. Cost to the

district has been negligible, and the greatest problem has been maintaining a balance between students' desire to spend time at the site and their commitments to other academic responsibilities.

This project is an example of continuing efforts by educators to inject life into the curriculum. One can easily imagine the enthusiasm and pride students experience as they unearth artifacts from their dig site. Urban schools might develop similar projects using city sites or nearby parks. Even a simulated dig offers possibilities for the kind of learnings reported here. Whichever the case, interdisciplinary, practical programs such as this would be worthwhile additions to any school's curriculum.

Source: Elmo B. Barden, "Digging," *Curriculum Review* (November/December 1984): 5-6.

Word Processing Facilitates Writing for 1st Graders

Twenty-one 1st graders in Mississauga, Ontario, recently participated in a six-week, word processing-based program designed to help develop their writing skills. While the novelty of the computer was motivational, its capacity to help children develop easily readable text greatly encouraged their efforts. The *Story Writer* program proved very user friendly with the 1st graders. Several students even asked to use the librarian's typewriter when they did not have access to the computer.

Case studies of individual children revealed earlier increases in story composition and transcribing skills. Students also grew markedly in their ability to develop and sequence ideas as they became comfortable in allowing their ideas to flow directly into print. Some students, however, continued to sound out the words of their

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