Teaching's Third Dimension

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Pitzer's article ("University integrity," Science, 11, Oct., p. 228) focuses in part on the critical dimension of student-faculty relationships. The faculty role is depicted as composed of two factors – teaching and research, not necessarily in that order of importance. I would like to emphasize a third equally important charge of the faculty member – that is, the role of personal and educational counselor and adviser to the student. Any professor who is reasonably accessible personally and geographically will attest to the frequent, almost continuous, and apparently very important student-to-professor counseling sessions on every subject from personal problems to specialized career planning.

This third dimension is so much a part of the professional job that it is hard to question its appropriateness. Those who do, even in the glaring light of the present student unrest, should be reminded that advocates of good educational practices have long stressed the importance of interpersonal relationships as the basis for meaningful behavioral change – a basic goal of education. Even some of the more ardent proponents of technological aids to instruction (for example, Skinner[1]), support their positions with the observation that these aids will free the teacher to increase the personal component which no device, save the human, can accomplish. These interpersonal relationships have the greatest impact on the emotional concerns of the student and also support the cognitive or intellectual change we expect. Even the most formal method of instruction, the lecture, has been considered most effective when it serves this emotional component[2]. The professor as counselor and adviser serves this emotional factor even more, it seems, in the many spontaneous sessions that occur as an informal part of his job.

In meeting the exhausting demands of this third personal factor, the crux of the problem of higher education becomes not the integrity of the university, but the integrity of the professor. Even in his reluctance to recognize and label this dimension to his role, he will quickly note that there is little if any official reward for his counseling activity, either by his colleagues as they rate him as a professional and scholar, or by his institution as it defines his task. However, one observation is clear – the students' conception of education recognizes this, as evidenced by its frequent use, as a useful and necessary component of that experience.

REFERENCES
1. B. F. Skinner, The Technology of Teaching (Appleton-Century-Crofts, New York, 1968).
2. L. Bragg, Science 154, 93 (1966).

Computerized Hydrologic Data Acquisition System – A Facility For Upgrading Instruction In Watershed Management

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INTRODUCTION

Technological explosion, population expansion, urban sprawl, changing patterns of land and water use and increasing emphasis on environmental quality control are presenting vast new challenges to natural resource scientists and land managers. To successfully meet these challenges, colleges and universities need to produce graduates with new kinds of training and skills. Land managers of the future must have a wide understanding and have a technical training much better than ever before. Familiarity with the computer, for example, is no longer so much an advantage as a necessity. Similarly, skill in interpreting remote satellite data for land management purposes may be required in the very near future. Accordingly, the Department of Watershed Management in the College of Agriculture of the University of Arizona has an extensive program of upgrading its curriculum and improving teaching methods. The purpose of this paper is to describe a teaching-research facility which provides an innovation in instruction techniques for one facet of the program.

THE FACILITY

The facility is a completely interfaced hydrologic data acquisition processing system. It goes somewhat beyond the definition of SCI and CDI as described by Borden.[1] In addition to a small, laboratory computer and the services of a remote time shared terminal to the large CDC 6400 computer, the facility also includes both software and hardware for working with live telemetered data. Provisions are also made for the rapid recall of past data from a magnetic tape library.

The complete facility consists of a forested mountain watershed about 55 kilometers and three desert watersheds about 75 kilometers from campus which are instrumented with electronic sensors for measuring a large variety of hydrologic and meteorological variables. Measurement data are multiplexed over the Bell Telephone system to a laboratory on campus. The laboratory computer which is incorporated into the system, processes the raw data on-line, producing finished answers in any format desired. It also affords the user total control of the data taking process – varying the sample rate in relation to input changes, real time, etc. All output is recorded on tape but may also be displayed on strip charts or teleprinter.

The facility including data reduction schemes, operational computer programs and laboratory exercises is about 75 percent complete at present. Because it is open ended to allow addition or deletion of developments in instruction techniques, its full capacity will probably not be realized. It is being tested in several courses this spring and will go into full time operations next fall semester.

Experimental watersheds associated with a teaching and research program of a college is not a new idea. However, those schools with such facilities still depend largely upon time consuming traditional methods of data collection and compilation. The compilations which are usually made to facilitate specific types of analysis lack versatility. At best the traditional watersheds serve the student for occasional fair weather trips when significant hydrologic events are not occurring. They may also provide historic records from