

MOVING INSTRUCTION INTO THE 21st CENTURY

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The theme of your conference suggests to me that the diverse colleges that make up the SACHEM Consortium are engaged, along with hundreds of other colleges across the nation this Spring, in taking a hard look at the quality of college teaching. As I sat down to think about the speech that would fit the title that I had proposed "Moving Instruction into the 21st Century," I thought it might have been more prudent to entitle these remarks, "Moving Instruction into the 20th Century.

If Sleeping Beauty had dozed off in class at the University of Bologna in the 12th Century and been awakened recently by all of the noise about educational excellence, she would have awakened to a classroom that was quite familiar. Although generations of students and teachers have come and gone; the printing press has made knowledge easily available to the masses; television producers have learned to disdain the "talking head," and computers offer new opportunities for interactive learning, the talking head continues to reign supreme in higher education. So far, "teaching as telling" has withstood the test of time. But the times they are a changing--or are they?

Collegiate education has been bombarded recently with reform reports, legislation, and threats of legislation to improve the

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quality of undergraduate education. Without exception, the reports have called for greater attention to teaching in language that is strong and uncompromising. "Central to the troubles and to the solution are the professors...." declare the authors of one report (Project on Redefining...1985). The professors are blamed for everything from "lifeless, stilted, pedestrian teaching" (Bennett, 1984) to "a misguided overemphasis on research and a corresponding neglect of teaching" (Project on Redefining..., 1985). Graduate schools are charged with the production of "too many narrow specialists" (Bennett, 1984) and "awarding the Ph.D. degree to generation after generation of potential professors professionally unprepared to teach" (Project on Redefining..., 1985). And academic administrators come in for their share of the blame too. They are urged to put into place a reward system that will recognize effective teaching (Study Group..., 1984; Project on Redefining..., 1985; Bennett, 1984) and "give it as much status and attention as research now receives" (SREB, 1985).

The message of the current batch of reform reports is clear. Good teaching is on the agenda in the 1980's call for excellence in education. True, it has been on the agenda before. One hundred fifty years ago, the Yale report faulted colleges for failing to bring the "minds of instructors to act directly and vigorously on the minds of pupils..." (Quoted in Levine, 1986). Is there any reason to think that the current campaign will make any real or lasting difference in college teaching?

My answer is a cautious "Maybe"--not so much because we in higher education mean business this time around as because forces external to higher education are coalescing to demand more atten-

tion to the quality of instruction.

If, as seems likely, we are about to take college teaching seriously, what would that mean?

First and foremost it would mean defining and identifying good teaching. Right now, the emphasis is on a definition of good teaching as that which results in good learning, and the most common way to measure student learning is by scores on academic achievement tests. But achievement tests that measure mastery of subject matter content represent only a part of education. In this era of the knowledge explosion, when scientific and technical information doubles every 5 1/2 years, what students know when they leave college will not be nearly as important as what they are capable of learning. Nevertheless, most teachers sincerely believe that knowledge of the subject matter that they work so hard to teach is important. Clearly, state legislators and the general public think it is important. What then do we know about how to teach for that admittedly important, but incomplete, goal of a college education?

Lecturing to students has long been decried, yet it is the overwhelming method of choice for college teachers. It is estimated that teachers in the average classroom spend about 80% of their time lecturing to students, who are attending to what is being said only about half of the time (Pollio, 1984). Added to the evidence of rather poor attention in the first place is the finding that the curve for forgetting course content is fairly steep. A generous estimate is that students forget 50% of the content within a few months (Brethower, 1977); a more devastating finding comes from a study that concluded that even under the

most favorable conditions, "students carry away in their heads and in their notebooks not more than 42% of the lecture content" (McLeisch, 1968, p.9). Those were the results when students were told that they would be tested immediately following the lecture; they were permitted to use their notes; and they were given a prepared summary of the lecture. The test for immediate understanding was bad enough, but when students were tested a week later, without the use of their notes, they could recall only 17% of the lecture material. There must be a better way to teach subject matter. And there is.

Research on mastery learning and its various offshoots is showing very positive results when the goal is the mastery of course content. Ben Bloom and his colleagues at the University of Chicago, after years of research on mastery learning, continue to show rather remarkable results, most recently that the average mastery learning student out-performs 84% of the students in control classes (Bloom, 1984).

Most promising for those of us working at the college level are the research findings on PSI (Personalized System of Instruction) which was introduced in this country twenty-two years ago by psychologist Fred Keller (1968) in a major address to the American Psychological Association. PSI uses the mastery learning concept through insisting that students learn the material to 80% mastery before proceeding to the next step, through providing immediate feedback on performance through frequent testing, and through permitting students to learn at their own pace, encouraging them to distribute their time according to their needs.

After completing a comprehensive review of the substantial

research that has been done on PSI over the past quarter of a century, James Kulik (1982) of the University of Michigan concluded that the average study showed that PSI was "remarkably effective." More than 80% of the studies found PSI significantly better than control classes when it comes to student achievement. When Kulik and his colleagues (1979) did a meta-analysis of 75 of the best studies, they found that PSI boosted average student achievement on final exams from the 50th to the 70th percentile. That is impressive, but equally persuasive are these findings:

1. PSI's superiority over control classes is especially clear in studies calling for integrative responses on final exams; there is less difference on exams calling for simple recall of information.
2. Achievement effects are clearest in studies using delayed measures of learning (i.e. exams weeks or months after completion of the course).
3. PSI is equally effective for high- and low-aptitude students.
4. Students consistently give PSI higher ratings.

There are other methods of teaching that appear equally promising, but none, I think, with quite the extensive evaluation that has been done on PSI.

I contend then that we do know quite a bit about how to improve teaching for better learning of subject matter content. I also contend that anyone pursuing excellence in postsecondary education needs to think beyond the mastery of subject matter. As Alfred North Whitehead remarked more than a half century ago, "A merely well-informed man is the most useless bore on God's earth" (1929).

There is little disagreement that colleges intend to do more than stuff the mind with quickly outdated subject matter. Howard

Bowen's (1977) extensive review of the literature on the goals of higher education concluded that the single most consistent theme of the goals literature is that "Education should be directed toward the growth of the whole person through the cultivation not only of the intellect and of practical competence but also of the affective dispositions, including the moral, religious, emotional, social, and esthetic aspects of the personality" (p.33). That widely-accepted goal is what makes the assessment of higher education so difficult.

But even if we confine this particular discussion to the cognitive goals of higher education, we would do well to recognize that the needs of the 21st Century are for broadly educated people who can use their minds to invent new products or procedures and who can interpret trends and analyze problems. Peters and Waterman, the authors of In Search of Excellence call it "productivity through people." Much has been written on the importance of education to the economy of the post-industrial society. The general conclusion is that productivity will come from knowledge and people who know how to generate it and use it. A good idea can be worth millions today--so much that Rosabeth Kanter (1983, p.18) says "Idea power is the most important economic stimulus of all."

No wonder that employers, states, and the nation are so interested in an educational system that will result in people who have "idea power." Ideas are far more important to our world than information which has become both plentiful and cheap. "Running out of information is not a problem," says John Naisbitt, "but drowning in it is" (1982, p.24).

There is some danger that students in our classrooms are drowning in information now. Many bone-weary teachers, concentrating hard on putting something into student minds that will not leak out on the way to the next class, teach as they were taught. There is nothing in the preparation of college teachers to break the cycle of teaching as telling, and information is quite likely to flow from the notes of the professor into the notebooks of students without passing through the minds of either.

Despite the eloquence of those who appear on regular cycles to remind us that the questioning mind is closer to the ideal of the educated person than the well-stuffed mind, research shows that most teachers, in universities as well as in community colleges regard themselves as information disseminators (Axelrod, 1976; Richardson, et al. 1983). The response of many faculty members to the perceived poor quality of today's students is to reduce cognitive demands to the low-level skills of recall and comprehension rather than to require students to develop the higher level skills of analysis, synthesis, and evaluation. Dick Richardson and his colleagues (1983) call this "bitting," which refers to the dissemination of isolated bits of information, calling for little more than rote recall from students. Richardson claims that instructors and students may jointly "buy into" classes with low-level cognitive demands in an unspoken agreement to make education less demanding for both students and teachers.

But the abilities that become valuable in our kind of world are the skills of analysis, synthesis, and application. The

demand for these higher levels of cognitive development has an analogy in today's perception of physical fitness as a developmental process. Before machines replaced human muscle power, there was little need for physical fitness programs. People got more than enough exercise on the job. But the purpose of the exercise was to get the work done, not to develop the body or to keep it physically fit. When machinery replaced muscles on the job, people moved to a higher level of physical development. They became free to be more like a human and less like a machine. Instead of the over-developed forearms, for example, of yesterday's steel workers, today's more sedentary workers are likely to exhibit more balanced physical development, engaging in a program of exercise that promotes their human health and well being.

Perhaps the age of the computer will have a similar impact on cognitive development. Instead of performing the low level cognitive skills of memory and recall, which are handled better by a computer today, human beings are now free to concentrate on higher level development that includes the ability to use knowledge.

Following this line of reasoning, I asked myself how educators might go about developing a program of "Learning Fitness" comparable to the physical fitness movement that has so captured public fancy as the Industrial Revolution plays itself out. Let me give some examples of how the concepts behind physical fitness apply equally well to learning fitness.

1. The dissemination of research on physical fitness has been helpful, and the general public proved fairly easy to reach and to teach. Smoking has declined, jogging has increased,

knowledge about the cardiovascular system has spread, and many people know the difference between exercising to develop muscle strength and exercising to develop heart and lung capacity. If learning fitness came to be perceived as important as physical fitness, would not people be eager for more knowledge about how to attain it?

2. Fitness requires personal investment. It is clearly understood that no one can give people physical fitness--not Nautilus, not Adidas, not Jane Fonda, and not the national and local park and recreation system. People understand that it takes time and requires their own active involvement. Experts can diagnose, prescribe, and offer feedback, but in the final analysis, both physical fitness and learning fitness are qualities that people must attain for themselves. The best we can do is provide the environment, the equipment, and the support system to enable people to develop themselves.

3. We cannot modify the rules of physical fitness to take account of the life circumstances of the aspirant. We can't, for example, suggest that adults invest less time in the process because they have job and family responsibilities--although we can certainly make jogging tracks available, put exercise rooms and swimming pools in hotels, make the hours of Nautilus consistent with adult schedules, deliver inspiration, information, and yes, even images of fellow fitness buffs dancing to the beat of aerobic music on television.

4. We can't make everyone equal in physical fitness. Everyone can improve, and everyone can do something--even if from a wheelchair or in homes for the elderly. But the challenge must be

consistent with the ability and condition of the learner. Today's concept of physical fitness is basically non-competitive. Sure, there are a few super stars who win the Boston Marathon, but for most people the companionship of running together and the feeling that they are doing something good for themselves is enough.

5. Fitness must have some payoff; it has to work. People need the reinforcing feedback of feeling better, looking better, and in general taking pride in their accomplishment. One of the interesting things about physical fitness is that people are willing to wait for long-term results. Joggers do have to see improvement, but it does not need to be today or tomorrow. Indeed, the current advice seems to be that intermittent exercise is better than constant pushing and that muscles need time to recover and time to grow and develop.

6. Fitness is never finished. We cannot participate in a rigorous well-balanced program as young people and hope to remain fit for the rest of our lives. We will all slip out of shape from time to time, but we should learn early in life what being in shape feels like and we should know how to get in shape.

7. Fitness is for amateurs. There is no mystique about it, and experts do not intimidate. Although body builders and marathon athletes may know everything there is to know and do everything there is to do in developing their own expertise, they do not deter the rest of us from knowing what works for us.

8. Fitness does not require large expenditures of money. Wearing the right shoes will surely help, but stylish jogging outfits and fancy equipment are incidental, and lack of funds is rarely heard as an excuse for doing nothing.

9. Fitness is active. No one ever became fit by watching someone else or listening to descriptions of fitness. People who are models of fitness can inspire; experts can demonstrate exercises and skills; and reading assignments can inform and develop appreciations; but in the final analysis, the only way to develop fitness is to engage actively in the activities that are known or thought to lead to that goal.

If the goal of a good college is to develop learning fitness, what do we know about the activities that are thought to produce that outcome? What do we know from research and experience about the processes of teaching and learning and how to improve them?

One of the better applications of research knowledge on teaching and learning in higher education is found in the recent educational reform entitled, Involvement in Learning (Study Group on the Conditions of Excellence in American Higher Education, 1984). The committee of educational researchers who prepared the report conclude that "The quality of undergraduate education could be significantly improved if American colleges and universities would apply existing knowledge about three critical conditions of excellence--(1) student involvement, (2) high expectations, and (3) assessment and feedback"(p.17).

They define student involvement as the amount of "time, energy and effort students devote to the learning process" (p.17). It doesn't take research to convince any teacher that involvement in learning is critical; our own learning experiences and those of our students offer ample testimony. But the two fundamental principles derived from research by the authors of the NIE Report bear highlighting:

1. The amount of student learning and personal development associated with any educational program is directly proportional to the quality and quantity of student involvement in that program, and,

2. The effectiveness of any educational policy or practice is directly related to the capacity of the policy or practice to improve student involvement in learning (Study Group, 1984, p.19).

Those two principles reflect some twenty years of research on college students, much of it distilled in Sandy Astin's (1985) new book, Achieving Educational Excellence. His contention, adopted by the NIE panel, is that students who are involved in almost anything on the campus, are more likely to learn and less likely to drop out than students who remain on the periphery. Students who live on campus are significantly more likely to graduate than commuters. This positive effect occurs in all types of institutions and among all types of students regardless of race, gender, ability, or family background. Holding a part-time job on campus, participating in athletics, student government, honors programs and almost anything else that brings the student into closer contact with faculty and fellow students seems to result in a closer identification with the college with the attendant positive effects on student retention.

The problem for commuter colleges is that it is extraordinarily difficult to get students involved in the life of the college. Because residential living and student activities are not significant aspects of the commuter college environment, the burden of involving students falls heavily on classroom teachers.

But the typical college classroom doesn't demand much involvement on the part of students. Charles Gragg (1940) observed some 45 years ago, that "No one can learn in any basic sense from another except by subjecting what that other has to offer to a process of creative thinking; that is unless the learner is actively and imaginatively receptive, he will emerge from the teaching experience with nothing more than a catalogue of facts and other people's notions" (p.31). The question for teachers is what they can do to encourage students to put forth the exertion that is required for learning.

It is quite clear now that the tendency of overworked teachers to reduce the student writing assignments in the 1960s and 70s was a step in the wrong direction. Although I would be the first to admit that student writing makes enormous time demands on conscientious teachers trying to provide useful feedback, I am convinced that writing assignments are one powerful way to involve students in their own learning. True, some students seem to have developed an uncanny ability to write without thinking, but at least the words are there to analyze, and truly effective teachers can provide the second requirement for good learning identified by the NIE researchers, namely feedback on student performance. Such feedback leads to learning, of course, only if it incorporates the NIE Report's third critical element for learning, high expectations.

Research suggests that different types of colleges tend to emphasize the three critical elements of learning to different degrees. Community colleges, for example are more likely to strive for student involvement in the classroom than are teachers

at the 4-year college level (Wilson, et al., 1975). And they are somewhat less likely than their counterparts in 4-year colleges to make the unwarranted assumption that students are learning when teachers are talking. But community college teachers are less likely to hold high expectations for student performance. The three elements of good learning identified by research over the past twenty years--student involvement, high expectations, and useful feedback on performance--are most effective when they appear in combination. Beyond that there is no standard formula for effective teaching.

Good teaching exists in a variety of forms. Joseph Axelrod wrote a book in 1976 that illustrates this fact nicely. It is entitled The University Teacher as Artist, and is based on the observation of hundreds of humanities teachers at work in their classrooms and on interviews with more than sixty faculty members regarding their views on teaching.

Let me describe briefly the four prototypes of evocative teachers that Axelrod identified through his research.

Although Axelrod's prototypes all happen to be men, I'll modify the descriptions a little bit to make them more realistic by including some women teachers in the prototypes. Professor A emphasizes the mastery of subject matter. His task, as he sees it, is to cover the materials of his discipline in a systematic way in order to help his students master the materials. He prefers "an emotion-free atmosphere" in his classroom, and he maintains a cool and rational approach. He conceives of knowledge as a product rather than a process--i.e. knowledge is something that people have, rather than an on-going activity of the mind. Stu-

dent growth, to Professor A, is demonstrated by movement from ignorance to knowledge (p.18,19).

Professor B, like Professor A, is instructor-centered in that she emphasizes the primary role of the teacher as authority and model. But Professor B believes that her major task is to provide students with a model of the educated mind. It is not really subject matter that is at the center of class activity, but rather the demonstration of a well-educated mind at work (p.25). Professor B is one of the best known and most colorful figures on campus. She makes no effort to cover the subject matter systematically; her task, as she sees it, is to demonstrate how to handle her discipline. She conceives of knowledge as process rather than product, and classtime is spent demonstrating "not a set of static products, but an ever-changing, ever-alive activity" (p.26).

The other two prototypes identified by Axelrod are student-centered, not so much because they emphasize the discussion method of teaching, as because they see the student as the central focus of the classroom activity. Professor C places major emphasis on the development of the mind, whereas Professor D is convinced that intellectual development cannot be split from other aspects of student development. Whereas Professor C concentrates on developing the higher level cognitive skills, such as analysis and the use of reason, language, and problem-solving, Professor D emphasizes wholeness and believes that faulty members should work with others in the college environment to effect the development of the whole person.

Mottos can be devised for each of the research prototypes.

For Professor A, who emphasizes principles and facts, the motto is "I teach what I know." For Professor B, modeling the educated person, the motto is "I teach what I am." The motto for the student-as-mind prototype, is "I develop minds," and for the professor interested in intellectual, emotional, aesthetic, and other aspects of the whole person, the motto is "I develop people."

I could ask you which professor you identify with. I could ask which constitutes excellence in the classroom, and I suspect that all four prototypes would appear in your answers. For this reason, colleges--even so-called teaching institutions--have avoided taking a stand on the recognition of good teaching on that grounds that there are many styles of effective teaching. But we know that good teachers have common characteristics, and they can be identified with pretty good agreement by both students and colleagues (Wilson, 1975). There is now reasonably consistent agreement in the research on student evaluations for us to make the following assertions:

- 1) There is general agreement among students and between students and faculty on the effectiveness of teachers.
- 2) The judgments which students make about their teachers persist and are replicated years after they graduate.
- 3) Student ratings are relatively independent of student characteristics which are commonly thought of as sources of bias, such as grade point average, actual grade and expected grade in course, and class level.
- 4) Student ratings are positively correlated with the amount of student learning. (Gaff & Wilson, 1971, p.479).

While these positive research findings do not mean that the evaluation of teaching should be based solely on student ratings, they do suggest there is little basis for the myths that have

grown up around student evaluations of teaching (See Eble, 1976). There is no evidence to support the myths that popular teachers are mere showmen, that the mature perspective of alumni will find virtues in the professors that were not respected ten years earlier, or that there is lack of agreement on what constitutes effective teaching. We cannot continue to hide behind the excuse that we cannot reward good teaching because we can't tell a good teacher from a poor one. That defies our common experience, and it is also contrary to the best research on the question.

If we are serious about improving college teaching, then we need to reward it. Most of the talk in the popular press, as well as in the policy committees of government, stress the importance of adequate pay and good working conditions for teachers. And I have no quarrel with that. But much of the reward for teachers is intrinsic rather than extrinsic. The greatest reward for teachers is to know that they make a difference in the lives of students.

Because I am convinced that teachers need to know what difference they make, I have proposed the development of a new breed of college teacher that I call a Classroom Researcher. A Classroom Researcher is different from today's research-minded faculty member. Recent research on college faculty by Jack Schuster and Howard Bowen (1985) shows that even colleges that have no research mission are turning to an emphasis on the publications of faculty in promotion and tenure decisions. There is, however, no evidence that research in one's discipline is related to effective teaching of undergraduates.

I do think, however, that there is a type of research that is

appropriate and highly desirable for college teachers. That is classroom research. I proposed the concept of the Classroom Researcher at this Spring's AAHE national conference (Cross, 1986) because I think it has the potential for making teaching more intellectually challenging and because teachers need feedback as much as students do if they are to improve their performance.

A Classroom Researcher is one who uses the classroom as a laboratory, collecting data and using a variety of research methodologies appropriate to the study of teaching and learning in his or her particular discipline. I suggest that the concept of Classroom Researchers should be the special province of "teaching institutions," i.e., community colleges, state colleges, and most liberal arts colleges for the following reasons:

First, there is good reason to think that while good teachers have certain characteristics in common--knowledge of their subject and enthusiasm for teaching it, for example--good teaching may not be the same in ethics as in physics. One of the reasons for the success of PSI, I think, is that it has been the province of classroom teachers from the beginning. Its methods are especially appropriate for teaching introductory psychology, and psychologists have had the research skills to evaluate and improve it in their own classrooms. One of the most troublesome bottlenecks to the implementation of research findings has always been the translation of research into practice. If researchers and practitioners were one, the likelihood of implementation would be greatly improved.

Moreover, if the current demoralization of the faculty

described in the Fall issue of Change is due to a lack of professional identity and shared values, as is claimed, then the model of Classroom Researchers has much to offer to departmental morale and cohesion. Departments would become the focal points for research on the teaching of the disciplines represented, and faculty meetings might well become seminars for the improvement of teaching. While some of the discoveries about improved teaching methods would warrant nation-wide dissemination and discussion, there is some merit in providing teachers with a strictly local platform for campus recognition of their work on teaching.

The involvement of teachers in searching for new knowledge about teaching effectiveness also begins to build a foundation for improved evaluation of teaching, an essential ingredient in rewarding teaching in promotion and tenure decisions. Finally and perhaps most important, is that as teachers study the learning situation, their actions, and student responses, they will probably learn more about learning as a process, and they will almost certainly learn more about improving their own teaching.

Most good teachers are constantly evaluating student responses, but they do this unsystematically, without any training and without a common language for mutual support and discussion. What I am suggesting is that the graduate schools take on the responsibility for developing and teaching the methodological tools for classroom research. Every graduate student who plans to be a college teacher anywhere should receive training in classroom research methods and should have an opportunity to do classroom research and to evaluate his or her own effectiveness in field work in the teaching discipline. The profession of

teaching would be greatly strengthened if classroom teachers had the research skills to measure the impact of their teaching on student learning.

I can think of nothing that would do quite as much for the improvement of teaching and learning as to let a thousand classroom laboratories bloom across the nation. Their purpose would be to discover more effective teaching methods for the Classroom Researchers themselves, but equally important to establish a foundation of knowledge about college teaching for maximum learning. That would be taking teaching seriously, and it would help move instruction into the 21st Century.

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