

The Job of a College President

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LIKE MOST FACULTY MEMBERS, I have a vast experience of offering advice to college presidents—advice usually unsolicited, and often unheeded. My presidential advisees over the past quarter-century have been an uncommon and uncommonly successful lot: Robert Gordon Sproul of Berkeley, who could have been a governor had he not preferred the challenges of academia in a university that he helped to build to eminence; Henry Towne Heald of Illinois Tech, who made a strong scientific institution out of hope and Depression debts, then went on to guide the Ford Foundation during its most significant decade; John Christian Warner of Carnegie Tech, a distinguished scientist turned distinguished administrator.

Sometimes, in moments of modesty, I suspect that I have learned almost as much from my advisees as they from me. The lesson I learned that has most relevance here is that a college president is an executive whose responsibilities and challenges are very much the same as those of the executives in business and government with whom I have worked.

I remark on this elementary fact because there is often an inclination on col-

lege campuses to deny that it is true, or, if true, to deny that it ought to be. To college faculty members and students, "administration" is, though not a four-letter word, a dirty one. To his former colleagues, a professor become dean or president is an émigré or a turncoat, a man who has renounced academic culture and scholarly values in favor of power and materialism. The esteem that students have for the president derives from his serving them as a bulwark against the overexacting demands of the faculty, as a national monarch protecting his people from grasping feudal lords. And like a national monarch, he may lose that esteem if his ambition for the institution drives him to demand of his dependents larger tuition fees and increased dormitory charges.

The president as executive

The college president is an executive. Like every executive, his responsibilities are varied and unbounded. His organization's product—new and transplanted knowledge and skill—may seem a bit unusual when compared with the products of an automobile manufacturer, a purveyor of breakfast cereal, or the head of a municipal street

department. But, at base, the product is not very different from that of the research and development laboratories of DuPont, the U.S. Bureau of Standards, or NBC. In particular, the college is no more exempt than they from pecuniary calculus, from the necessity of justifying its claims on society's resources.

The college president is an executive: that is, a man who has committed himself to making an institution thrive—maintaining high goals for it, securing and conserving the material and human resources it needs to reach those goals, and seeing that the resources are directed efficiently toward their realization. I could simply talk about the functions of the executive, and leave it to the reader to apply what I say to the job of the college president. But I have been an insider too long to pretend to talk as an outsider, to feign ignorance of the foibles, the special problems, and even the private language of the academic community. Hence, I will couch my remarks in campus terms and refer, when it seems appropriate, to the peculiar product that a college manufactures and the peculiar way in which that product is financed and marketed. But though I use campus language, I will never let you forget that I am talking about production, finance, and marketing, the common concerns of executives everywhere.

Comparing colleges with other organizations in our society, one sees that their most striking peculiarity is not their product, but the extent to which they are operated by amateurs. They are institutions run by amateurs to train professionals.

When I speak of "amateurs," I refer not only to college presidents, deans, and

department heads, who rarely have had as much as three semester-hours formal training for administrative work, and only less rarely any considerable amount of relevant administrative experience, but also to college faculty members, who however impressive their competences in their disciplines, are almost completely untrained in the skills of professing: that is, of teaching. If, by happy accident and natural endowment, a minority of them are nonetheless excellent teachers, this chance hardly deprives the faculty of its amateur status. There are gifted amateurs in almost all fields; with rare exceptions, they are no match for trained professionals.

I make these comments on the amateurism of college teachers and administrators in full awareness of the generally unsavory reputation of schools of education and of business schools. I am not recommending that existing professional curricula in education or management be made the roads to professionalism, though they might do only slight damage and even occasional good. I shall have some more concrete recommendations to make later.

The president's functions

What, then, are the functions of a college president—or of any top executive? I should like just to enumerate five of them, and then discuss several in some detail:

1. *To raise money.*
2. *To balance the budget.* I will have a good deal to say about this, because *how* the budget is balanced has much to do with the college's quality.
3. *To participate in setting institutional goals,* in partnership with trustees, faculty, and the community.

HERBERT A. SIMON, Professor of Computer Sciences and Psychology in the Graduate School of Industrial Administration at the Carnegie Institute of Technology, examines some of the specific tasks and considerations that confront the college president. This article is a slightly revised version of his opening address at the Presidents Institute held at Princeton University, June 19, 1966, under the auspices of the ACE Institute for College and University Administrators. Mr. Simon acknowledges an indebtedness to Elliott Dunlap Smith, sometime Provost of the Carnegie Institute of Technology, from whose precept and example he and many of his colleagues at Carnegie Tech learned to think professionally about learning and teaching. Mr. Smith, John Gardner, and Erwin Steinberg all provided helpful comments on an earlier draft.

4. To work with the faculty to create an environment that encourages learning, for both faculty and students.

5. To recruit and maintain a high quality of faculty.

These are functions familiar to those of any businessman: raising capital, managing the cash flows, determining product lines, manufacturing the product, recruiting and training staff. If we use a slightly different vocabulary in talking about the college, and eschew such terms as "product," we do not thereby exempt the college from the laws that govern any enterprise.

Rather than describing at length the differences between amateurism and professionalism in all these five functions, I will, after making a few introductory remarks about fund raising, concentrate on two, budgeting and designing the learning environment, which seem to me to illustrate best the central professional task: allocating and applying resources effectively to accomplish the college's educational goals.

Raising funds

The chief executive must see that his enterprise has the fixed and working capital it needs for its functioning. Generally, in all kinds of organizations, this responsibility requires much personal attention at the top. I won't dwell on that function here, except to emphasize that money raising is neither a trivial nor an indecent activity.

Money is a claim on society's resources. When a university seeks money—that is, seeks authorization to make that claim—it will be, and ought to be, successful only if it can make as persuasive a case for itself as is made by innumerable other would-be claimants: colleges, psychiatric clinics, symphony orchestras, city parks, food for India, and bird sanctuaries. To say that a president is a fund-raiser is to say that he is an interpreter to society of the goals of the college.

College faculties today are perhaps more understanding than in the past of the president's money-raising job, because some of their members, particularly those active in research, now share it with him. One can even envision a day when a president will be able to explain to a successful research

entrepreneur why the college must insist on a sizable overhead allowance in the research grants it accepts.

Thus if "money" is too crass a word for campus use (except at salary-fixing time), we can talk of social resources, and of the president's responsibility for justifying the college's right to draw on those resources in order to survive and thrive.

Budget arithmetic

A budget is concerned with dollars. It is equally concerned with where the dollars come from and what they are used for. In sum, a budget is a plan of action which, for the sake of convenience and comparability, is expressed in dollar terms.

A budget that is no more than a list of salaries and miscellaneous expenses is useless for managing a college. In the past few years, we have heard much about cost-benefit analysis and performance budgeting in the Defense Department and elsewhere in the Federal Government. The college president also needs a performance budget, described in terms of a few key variables, that relates expenditures and revenues to the main factors that determine them.

Figure 1 is an outline of a performance budget that will fit most colleges, although it would need to be elaborated a bit for a college with many sources of outside research support. In any event, it will illustrate some of the elementary facts of life for the college president who wants to understand the relation between his college's resources and its performance.

The key variables are listed at the top of the figure: first of all, number of students and number of faculty; then, the average salary per faculty member, the percentage that "overhead" (all nonsalary expenditures) represents of salaries, and total expenditures; then, the average course load (usually expressed in semester hours) per student, the average class size, and the average teaching load (also in semester hours); finally, tuition income per student, and other income.

Now these variables are not all independent of each other: two important relations connect them. In the first place (equation 1), the number of faculty, teaching load,

Let: S = Number of Students
 F = Number of Faculty
 r = S/F
 W = Average Salary
 ϕ = Overhead Percentage
 E = Total Expenditures

h = Average Student Course Load
 c = Average Class Size
 t = Average Teaching Load
 i = Direct (Tuition) Income per Student
 I = Other Income

Then:

$$1) F t c = S h$$

that is:

$$2) S/F = \boxed{r = \frac{t \cdot c}{h}}$$

While

$$3) I + i S = F \cdot W \cdot (1 + \phi)$$

so that

$$4) W = \frac{I + i S}{F (1 + \phi)}$$

i.e.:

$$5) W = \frac{I r}{S (1 + \phi)} + \frac{i \cdot r}{(1 + \phi)}$$

$$\dots 6) \boxed{W = \frac{r}{(1 + \phi)} \left(\frac{I}{S} + i \right)}$$

FIG. 1: Performance Budget for a College

and class size are related to the number of students and the average student course load. By obvious arithmetic, the product of the first three variables must equal the product of the last two. Restating the manpower relation in terms of the student-faculty ratio (equation 2), this ratio must equal the product of average teaching load by average class size, divided by student course load.

In the second place, the dollars must add up (equation 3): total income equals the sum of income per student times number of students, and other income; total expenditures equals the number of faculty times the average salary times a factor to allow for overhead. This relation can also be stated in a variety of ways, perhaps the most instructive being that shown in equation 6: the average faculty salary equals

a product of two quantities. The first is the student-faculty ratio divided by the overhead factor. The second factor in the salary equation is the quantity: tuition rate plus the other income *per student*.

These two relations, equations 2 and 6, define the real world for the college president. Policy discussions with his faculty might be more fruitful and more amicable if both he and they understood them. Consider equation 2 for example. It states that you can lower average class size in three ways only: by raising the average teaching load, by lowering the student course load, or by lowering the student-faculty ratio. This last variable is, of course, not freely manipulatable, because it also enters into the budget-balancing equation 6. Let's assume, for the moment, that finances don't permit changing it. Then it is just wishful

thinking to propose a reduction in class sizes without contemplating a corresponding increase in teaching loads (unless student contact-hours are reduced also). Discussions of policy on class size might often take a different turn if this relation were clearly understood by the discussants.

Why not, then, cut the Gordian knot by reducing the student-faculty ratio? Equation 6 contains a possible answer to this question. If the student-faculty ratio is reduced, then something else must also give. You can reduce the ratio if you are willing to increase tuition or reduce faculty salaries, or if you can reduce nonsalary expenditures. Of course the happier solution (the second-last term in equation 6) is simply to increase nontuition income per student! I suspect, however, that if the college president could have done that, he already would have.

The last variable mentioned, nontuition income per student, deserves further comment. If the college has a significant endowment income (that is, if I/S is not insignificant relative to i), or some other relatively fixed sources of income, then any increase in its student body will force downward adjustments in salaries or overhead, or an upward adjustment in the student-faculty ratio. A college that receives, say, \$500 in nontuition income per student per year will only increase its problems if it enlarges its student body without finding sources of additional income amounting to \$500 per student added. (An economist will point out that I am talking about average costs instead of incremental costs, as I should be doing. However, I am prepared to argue vigorously that "economies of scale" expected to accrue from a larger student body are, with the existing production technology in education, largely illusory.)

Faculties are generally ardent advocates of small classes: they are perhaps even fonder of them than are students, who may feel more comfortable when more anonymous. Our budget analysis shows that there is an Iron Law binding class size to other variables of concern to faculty: salaries and teaching loads. It is unlikely that a faculty, understanding this

relation, will be willing to sacrifice the latter two variables to the former.

It will be objected that I haven't said a word about quality of education. Indeed I haven't. Don't I know that small classes are the prime guarantee of excellence in education? Alas, I don't. In fact, there is almost no evidence that this widely believed proposition is true and a fair body of evidence that it is false.¹ Since proof and evidence stand high among academic values, I am forced to accept the evidence and disbelieve the myth, however firmly it is held by my colleagues on the campus.

My present object, however, is not to discuss the process of "producing" knowledge and skill, much less to advocate large classes. I shall have more to say later about learning processes. My purpose here is simply to point out the key role played by class size in the college's budget equations, and to observe that colleges have universally preferred the expensive alternative—small classes—without evidence that it is superior to the cheap alternative; and that is surely not a defensible way to manage social resources. If it turns out that the benefits of small classes are, in fact, nonexistent, the myth that has prevailed in our colleges will have been horribly costly and damaging. It is certainly an important enough myth to deserve examination instead of the blind faith now accorded it.

For those who prefer arithmetic to algebra, I have worked out, in Figure 2, a hypothetical example to show how the budget equations work. In the second column are figures for Sweetcorn College, an undergraduate institution. The average class size is (horrors!) thirty, and it is proposed to reduce it to twenty, which, as everyone knows, is optimal (unless the average is already twenty, in which case fifteen is optimal). To permit this to be done economically, the student body is to be increased from 1,000 to 1,500. Mr. Scrooge, the controller, has worked out the tentative budget in column 3, to show the conse-

¹ For a fairly recent, professional survey of the evidence, see W. J. McKeachie, "Procedures and Techniques of Teaching," chapter 8 in *The American College*, ed. Nevitt Sanford (New York: John Wiley & Sons, 1962), pp. 325-26.

| (1) | | (2) | (3) |
|-----------------------|-----------|-------------|-------------|
| Number of Students | S | 1,000 | 1,500 |
| Number of Faculty | F | 63 | 107 |
| Ratio | $r = S/F$ | 16 | 14 |
| Average Salary | W | \$11,460 | \$9,340 |
| Overhead Percentage | ϕ | 80 | 80 |
| Total Expenditures | E | \$1,300,000 | \$1,800,000 |
| Average Student Load | h | 17 | 17 |
| Average Class Size | c | 30 | 20 |
| Average Teaching Load | t | 9 | 12 |
| Tuition | i | \$1,000 | \$1,000 |
| Other Income | I | \$300,000 | \$300,000 |

FIG. 2: Application of the Performance Budget

quences of the proposed policy changes. (After examining column 3 and discussing alternatives, the faculty recommended unanimously retaining the *status quo*.)

The learning environment

I have been talking mostly about money. It is time now to say something about how the money is used to produce learning, the fourth of the chief executive's concerns listed above. And here I must return to the theme of amateurism, for learning is a complex psychological process, and it would be naïve to think that anyone can design an effective learning environment and an effective program of learning experiences for students without a mastery of what is known, scientifically and practically, about that process.

We take the traditional organization of colleges so much for granted that we must step back and view them with Martian eyes, innocent of their history, to appreciate fully how outrageous their operation is. If we visited an organization responsible for designing, building, and maintaining large bridges, we would expect to find employed there a number of trained and experienced professional engineers, thoroughly educated in mechanics and the other laws of nature that determine whether a bridge will stand or fall. Today, the law in almost

every state requires that the men who design bridges, or even far simpler structures, have appropriate professional training.

What do we find in a university? Physicists well educated in physics, and trained for research in that discipline; English professors learned in their language and its literature (or at least some tiny corner of it); and so on down the list of the disciplines. But we find no one with a professional knowledge of the laws of learning, or of the techniques for applying them (unless it be a professor of educational psychology, who teaches these laws, but has no broader responsibility for their application in the college).

Notice, our topic is *learning*, not *teaching*. A college is a place where people come to learn. How much or how little teaching goes on there depends on whether teaching facilitates learning, and if so, under what circumstances. It is a measure of our naïveté that we assume implicitly, in almost all our practices, that teaching is the way to produce learning, and that something called a "class" is the best environment for teaching.

But what do we really know about the learning process: about how people learn, about what they learn, and about what they can do with what they learn? We know a great deal today, if by "we" is meant a

relatively small group of educational psychologists who have made this their major professional concern. We know much less, if by "we" is meant the rank and file of college teachers.

Five hundred years ago, before Gutenberg, knowledge was preserved and transmitted by being laboriously stored, in literal form, in human heads, or equally laboriously transcribed by hand into books. Today most college classes are conducted as though Gutenberg had never existed. The teacher lectures (from the textbook, if the students have their way, so they need not read it), and the students occupy themselves with tediously and illegibly copying his words into their notes.

Now it *might* be that, in spite of Gutenberg, this is the most efficient of all possible processes for learning. But the evidence indicates overwhelmingly that it is a hopelessly inefficient—indeed, a nearly totally ineffective—process.

What do we know about learning? Why am I so confident that an application, in a professional way, of sound learning principles, would improve results, not to a minor degree but dramatically? Because one can point to generalizations of proved validity that demonstrate the futility of much current practice. Let me, without trying to be exhaustive, give some examples.

1. *Learning depends only on what the student does, and not (except indirectly) on what the teacher does.* This principle rests on no esoteric knowledge of psychology, but simply on the premise that effects are not produced magically: they are caused. Since the desired effect in education is a change in the student, it must take place, ultimately, in the student's nervous system, not the teacher's. It follows that the planning of curricula, courses, classes, and assignments must begin with a description of what it is hoped the student will be induced to do, and what changes will be brought about in him by his doing it. The teacher plans *his* activities, then, on the basis of his plan for the *student's* activities.

2. *Learning depends on what the student does outside the classroom as well as within.* A student is awake about 112 hours a

week; he is in class only about 16—14 percent of his waking time. Today that 14 percent is what the teacher devotes most time and attention to. What learning is going on during the other 86 percent, and why?

3. *Learning takes place only when there is knowledge of results.* Ask a student (who doesn't know the answer) what the German word for "dog" is. After he guesses, ask him again. How long will you have to keep this up before he knows?

Let us assume, optimistically, that a college maintains a student-faculty ratio of ten, once considered the ideal. How much detailed, specific knowledge of results can the faculty give to individual students even under these conditions? What English faculty, however devoted to the most odious part of its duties, can correct more than the tiniest fraction of errors of grammar, or infelicities of style, in its students' essays?

Clearly, the learning environment must be designed to provide much richer sources of knowledge of results than can be provided directly by the faculty. The teaching machine is designed with the objective of providing massive knowledge of results. In its present primitive state of development, the range of matters for which it can do this well is terribly restricted. We must discover where we can use it, and what other techniques can be used to give students enough feedback so that they can learn effectively.

4. *Learning will continue after graduation only if the student has learned skills for providing his own knowledge of results.* At every convocation we describe to our graduating students the world of incessant and accelerating change that they are entering, a world in which their knowledge will soon be obsolete unless learning continues. If we believe what we say in such addresses, then helping the student to learn subject matter or specific skills is unimportant; helping him to acquire the skill of independent learning is all-important. If we act on our beliefs and give more than lip service to the goal of lifelong learning, then learning to learn, instead of learning subject matter, will become the central objective of almost every college course.

If knowledge of results is essential to learning—and it is—how will the student continue to learn when he holds sheepskin in hand and has left teacher behind? How can a student, in college, learn to provide *himself* with feedback, with knowledge of results? And what experiences are we providing him to enable him to learn this?

5. *What is learned must be defined in terms of what the student should be able to do.* If learning means change in the student, then that change should be visible in changed potentialities of behavior. I am not speaking of skills in any narrow sense, and I will yield to no one in my admiration of knowledge for knowledge's sake.

The point is that to say the student should "know" electricity and magnetism, or should "know" eighteenth-century French history is to say absolutely nothing. What should a person who "knows" these subjects be able to do? What questions should he be able to answer; what problems should he be able to solve; what inquiries should he be able to make; what intuitions—physical or historical—should he exhibit in his thinking and speech? Until specific, operational answers have been provided to these questions, no learning environment has been designed.

For this reason, faculty deliberations on curriculum revision are mostly superficial and irrelevant. They are concerned with the relative "importance" of subject areas, when no subject areas are intrinsically important. It is important that students acquire skills—broad, transferable skills—of orderly, professional problem solving, imaginative thinking, and independent learning.

A wide range of alternative subject matters can be used as the problem material and as for-instances for learning these skills; but concern for subject matter per se will almost guarantee that they will not be learned. We are still repeating Thorndike's dictum that Latin courses don't teach logical thinking without understanding either the limitations of his finding (he didn't consider different possible learning goals and techniques in the Latin course) or the insufficiency of his evidence. I am not

arguing that chemists do not need to learn chemistry; but I am arguing against the prevalent view that "learning chemistry" has something to do with a curriculum in which every known fact and principle of chemistry is mentioned somewhere.

Finally, let me raise some more specific issues relating to technique:

6. *There is no evidence that small classes provide a superior learning environment.* I have already pointed out the budgetary importance of the class-size issue. Theoretically, one can point to the greater opportunities for providing feedback in the small class. One can also point, per contra, to its encouraging the student to depend on knowledge of results provided by the teacher.

Further, counterposing small class against large class does not really define a sharp issue in learning design: What goes on in the small class? in the large class? Above all, what is the student *doing*: what is he attending to, thinking of? When we have designed classroom processes carefully enough so that we can answer questions like these, it will be time enough to reintroduce class size as a variable.

7. *There is no evidence that note-taking is efficient or even useful.* When students are taking copious notes, we can at least be sure they are attending to the sound of the teacher's voice and to their own handwriting. From what we know of human capabilities—that the central nervous system functions basically as a serial, one-at-a-time, rather than a parallel, device—we can also be fairly sure that the student is not *thinking* about problems posed by the teacher's discourse, hence not learning much of anything at all. He is probably not even memorizing efficiently what he is writing down, supposing memorization to be desirable.²

² Elliott Dunlap Smith points out to me that requiring a student to write down a coherent analytic outline of the course of a lecture or discussion *may* provide a valuable learning experience. Of course, as he observes, if this is to happen, the nature and quality of the notes would have to be made an explicit objective, and some means provided for the student to get knowledge of results—something quite different from note-taking as it is practiced!

8. *There are ascertainable and definable differences between rote and meaningful learning.* In particular: (a) learning is faster when organized meaningfully than when attempted by rote; (b) it is retained much better and longer when meaningful; (c) it is more readily transferred to new situations when meaningful.

I won't try to define "meaningful" or "rote" precisely here; their common-sense meanings will suffice. The empirical evidence for these propositions is overwhelming, and the gains from substituting meaningful for rote learning are massive; gains by factors of two or three are easily achieved.

Since my list is only a sample, I won't go on with it. In particular, I have stuck to some fairly common-sense ideas and haven't gone at all into more intricate but no less important matters that contemporary research in cognitive psychology is revealing. My aim is to suggest that we at least adapt to Gutenberg by ceasing to confuse college student with medieval scribe, before a new revolution in the technology of learning overwhelms us.

Nor is it important whether, in detail, the learning principles stated above are right or wrong. What is important is that we do not, in our colleges today, make use of *any* learning principles in a considered, systematic, professional way. We do not design the college as a learning environment. We do not give anyone a specific responsibility for bringing to the college the best available professional and scientific knowledge for designing that environment. We are a community of scholars, of amateur teachers.

The broader learning environment

The design of the learning environment extends far beyond the individual classroom and the individual student. Let me cite two examples of what implications certain decisions not usually thought of as specifically educational decisions have for learning.³

³ The best introduction to research and existing knowledge on this range of topics is the volume, edited by Nevitt Sanford, *The American College*, cited above.

If children did not have brothers and sisters, older playmates as well as exact contemporaries, the game of hopscotch would die out in a few years. For it is transmitted from one generation of children to another through their play. If we grant this, then it hardly seems conceivable that any college campus would harbor such an institution as a freshman dormitory that shields new students from the college culture, from any contacts that might help them take the next steps from adolescence to adulthood. Perhaps other considerations argue in favor of freshman dormitories. But what analysis of the implications of such decisions for the pattern of social and intellectual communication on the campus does the college carry out?

A second example. When a miscellaneous group of human beings come together in a social setting—a boat trip, a dinner party, or what not—they talk about the weather, they talk about baseball (if male), they talk about children (if female, of a certain age). If they are young and male (female), they talk about girls (boys).

Perhaps they do this because weather, baseball, children, and the opposite sex are the most interesting topics, intrinsically, that have come along since speech was invented. Perhaps. But another explanation seems more plausible to me. These are the greatest-common-denominator topics, the topics where a heterogeneous group stands on a common footing.

In somewhat more sophisticated groups, other topics may be available: politics (if all belong to the same party), the arts, yachting. The principle is the same: the permitted topics are the topics the group has in common.

Dormitory dinner table talk and bull sessions obey the same law. Therefore, if we think it is important to capture some of the 96 hours outside class for learning, we must provide common learning topics. In all the discussions, pro and con, on general education and survey courses, how much consideration have we given to the design of student conversation? And how important is that conversation, in the total learning process, in comparison with the 16 hours of classwork?

The object of our design must be this total environment of the campus, especially if we take seriously the necessity of the students' acquiring the skills of independent learning. For it is the social environment of the campus, not the formal environment of the classroom, that most closely approximates the world in which later learning will take place, if it takes place at all.

The president's responsibility

There is no simple path that will take us immediately from the contemporary amateurism of the college to the professional design of learning environments and learning experiences. There are, however, some obvious first steps along the way.

The most important step is to find a place on the campus for a team of individuals who *are* professionals in the design of learning environments—learning engineers, if you will. Recalling our earlier budget equations, how will we pay for the new learning engineer? The increase of average class size is one possibility, but I won't insist on that route if another, more appealing, suggests itself.

The learning engineers would have several responsibilities. The most important is that, working in collaboration with members of the faculty whose interest they can excite, they design and redesign learning experiences in particular disciplines. Like all staff experts—operations analysts in business, for example—their long-run effectiveness will hinge on their ability to transmit their expertness to the line organization, in this instance the teaching faculty. Because they are experts in designing learning experiences, an important part of their skill will be directed toward devising learning experiences for the faculty. In particular, concrete demonstrations of increased learning effectiveness, on however small a scale initially, will be the most powerful means of persuading a faculty that a professional approach to their students' learning can be an exciting and challenging part of their lives.

Other activities of the learning specialists suggest themselves from our earlier discussion. One sphere will be to work with the

college administration in improving the design of the broader campus environment. Another will be to bring the campus into contact with the lively and significant current activity in cognitive psychology, and with developments related to learning machines and computer-aided instruction; this will be another important element in raising the professional skills of the faculty and improving their ability to make use of new learning procedures as they are developed.

It is too early to forecast what the composition of a faculty might be after a decade with such a program. Perhaps the discipline-oriented professor will prove as obsolete as the horse and buggy. Or perhaps the training of all teachers will broaden (and deepen) to include attention to the learning process. Almost certainly, the learning specialist will continue to play some important role on the college campus.

I am not unaware that my remarks have been unkind to several varieties of sacred cows. Unfortunately, as India knows, cows can be sacred without being harmless. I know of no way to introduce professionalism into the learning process on the college campus without disturbing highly venerated practices and strongly held myths.

By the same token, a college president should not imagine that a professional approach to learning processes can be introduced without objection and opposition. He will be lucky if the defense of traditional practices is not wrapped in the flag of academic freedom. Surely, however, academic freedom does not include the freedom to approach a professional task—the principal task to which the faculty member's career is devoted—as an amateur. I am optimistic enough to think that a large part, and the ablest part, of his faculty will come to accept the design of a learning environment as a challenge to professional skill rather than as a threat to entrenched privilege.

But if the members of the college faculty are to take a professional approach to the design of learning experiences for students, then the college administration must create an environment where thinking (professionals' not amateurs' thinking) about the learning process is both exciting and re-

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warding. Openness to experiment and the recruitment of an effective team of learning engineers will go far toward creating the excitement. Such activity will be rewarding only if the administration is willing and able to judge performance—if both administrators and teachers can be provided with knowledge of results.

A substantial part of this nation's resources are being devoted to higher education. The nation has a right to expect more than talented amateurism and an occasional

Mark Hopkins in return. A college president who tries to make education professional should not expect a unanimous vote of thanks from his faculty, or even his students. But if a man's first aim in life were to be comfortable and to be liked, he would choose an easier occupation than college president. Leadership that persuades an institution to seize the opportunities before it can be a source of deep satisfactions, satisfactions that will repay the effort, stress, and even conflict required to achieve them.