

REPORT OF THE
COMMISSION ON
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SUMMARY

In October 1993, President Gerhard Casper appointed a Commission on Undergraduate Education, composed of fourteen faculty members, two students, two alumni, and the Vice-Provost for Institutional Planning. For the next nine months, the Commission consulted widely with alumni, students, faculty, and staff about the university's degree requirements, major programs, advising system, residential education, academic calendar, and use of technology in teaching and learning. The Commission's report is the first comprehensive study of undergraduate education at Stanford since 1968.

The recommendations in this report fall into two large categories.

First, the Commission has developed a number of specific proposals to increase the rigor, coherence, and clarity of the undergraduate program:

- creation of a new core requirement to teach science, mathematics, and technology to nonscientists
- redefinition of the social science and humanities breadth requirement to enable students to focus on coherent sets of courses of their own choosing
- clarifying the purpose and increasing the cohesion of the Cultures, Ideas, and Values requirement by developing courses that focus on the historical evolution and comparative analysis of cultural traditions
- extension of the writing requirement to include at least one writing-intensive course in each student's major
- development of courses in oral communication
- strengthening the foreign language requirement to one year of college instruction or the passing of a proficiency examination
- steps to enhance the role of foreign languages in the undergraduate curriculum, including the creation of a language center
- definition of criteria for an effective major program and establishment of university-wide reviews for all departments
- introduction of an optional minor to encourage students to use their electives more effectively
- limitation on the number of courses in which a student may use the Credit-No credit option and clarification of the meaning of academic credit and credit units

Second, the Commission proposes a number of processes that would lead to long-term improvements in undergraduate education:

- establishment of a task force to encourage the effective use of technology in teaching and learning
- establishment of a group to study the grading system and ways it might be improved
- examination of ways the academic calendar might be used more flexibly, both by the university and by individual students

- clarification of the role of general advisors, more effective use of the Undergraduate Advising Center, and expansion of opportunities for first- and second-year students to work closely with faculty members
- improvements in the evaluation of teaching in all its forms, including more effective means of measuring student opinion and the introduction of peer evaluations
- introduction of ways to assess all aspects of Stanford's educational program, including the effectiveness of writing and language instruction, and the regular review of university requirements and of major programs
- more rigorous evaluation of teaching and advising and more prominent recognition of these activities in faculty appointments, promotions, and compensation
- appointment of a vice provost for undergraduate education to represent the needs and interests of undergraduates at the center of university governance

The commission's investigations revealed many sources of pride and satisfaction in Stanford's undergraduate programs. Stanford students are among the most talented and energetic in the world; many of them take full advantage of the extraordinary opportunities the university offers them. An impressive number of Stanford faculty and staff are devoted to the university's educational mission and go out of their way to instruct and inspire undergraduates. There are, nevertheless, many areas in which undergraduate education can be strengthened. The Commission emphasizes the continuing need to assess and improve our teaching programs because it is convinced that Stanford can settle for no less than excellence in both teaching and research.

1.

INTRODUCTION:

The Aims of Undergraduate Education

In his charge to the Commission, President Casper asked us "to articulate the educational goals of Stanford's undergraduate program." He correctly insisted on the plurality of these goals. The aims of undergraduate education are necessarily varied, in part because students come to the university with different talents and for different reasons, in part because the university itself has many purposes. The aims of university education, therefore, cannot be reduced to conveying a body of material "every educated person" should know. A successful education, as Alfred North Whitehead wrote, depends on "a delicate adjustment of many variable factors. . . . The evocation of curiosity, of judgment, of the power of mastering a complicated tangle of circumstances, [and] the use of theory in giving foresight in special cases—all these powers are not to be imparted by a set rule embodied in one schedule of examination subjects"—or, we would add, in one rigidly defined set of degree requirements.¹

At the heart of the university's various activities, the source of its central values and fundamental aspirations, is the search for knowledge. The most important aim of undergraduate education is to involve students in this search, where teaching and learning, instruction and research, the communication and discovery of knowledge are combined in a single enterprise. This aim has a special meaning for a research university like Stanford, in which students can have the opportunity to work on the frontiers of new knowledge.

To participate in the search for knowledge, students must be able to think critically and communicate effectively, those two closely connected abilities upon which all intellectual achievement rests. Students must be proficient in a second language, both to gain direct access to another culture and to understand better the nature of language itself. They must also be proficient in the language of mathematics, which is a prerequisite for the acquisition of scientific knowledge in all its forms.

Because they must be aware of the cultural context within which their search for knowledge takes place, students must acquire the comparative perspective and critical capacity that come from studying the history, values, and ideas of several different cultures.

An undergraduate education should be a judicious blend of flexibility and compulsion, breadth and depth.

Students must study several different kinds of knowledge. They must understand the nature and significance of scientific inquiry. And they must be introduced to the methods of analysis and ways of imagining to be found in the social sciences, the humanities, and the arts.

¹ Alfred North Whitehead, *The Aims of Education* (New York, 1929), p. 5.

Students must study one subject in some depth. This will show them how a particular discipline collects, analyzes, and communicates knowledge. Moreover, the cumulative study of one subject should make students into active participants in the search for knowledge by allowing them to share in the joy of discovery, to acquire a taste of mastery, and to recognize how much more there is for them to learn. These are the foundations for a lifetime of intellectual inquiry and development.

The university must be an environment that sustains the search for knowledge, an environment that challenges and nurtures its students, blends intellectual rigor with human compassion, encourages self-reliance and builds confidence. The university must insist that students take responsibility for their own education, while ensuring that they have competent advice and responsible instruction. It must set them free to go their own ways, but also create a community where they can learn from their teachers and from one another.

The university cannot survive without an unqualified commitment to free inquiry. As President Casper has written, the search for knowledge "must be carried out by critical analysis, according to standards of evidence that themselves are subject to examination and reexamination. They cannot be set by a political *Diktat*."² A commitment to free inquiry means the willingness to resist political interference, as well as the pressures of group loyalty and the pull of our own unexamined assumptions.

In every community, respect for the rights of others is a necessary precondition for freedom; the more diverse the community, the more essential this respect becomes. In the university, respect extends to other people's opinions as well as their rights. This is not indifference or neglect, nor is it merely a passive tolerance of different viewpoints; in the university, respect for the opinion of others includes a willingness to debate and dissent, to criticize but also to accept criticism, to persuade others and to be persuaded oneself. Without this active engagement with different ideas, the great promise of the university's diversity will remain unfulfilled.

The university should encourage many qualities of mind and spirit—a potential for leadership, a devotion to public service, an appreciation of beauty—but its special mission, and its distinctive contribution to the well-being of society, is to demonstrate the value of free inquiry and tolerant debate by engaging its Students in the search for knowledge.

² Gerhard Casper, "Concerning Culture and Cultures: Welcome of Freshmen and Their Parents," Stanford University, September 23, 1993.

2.

UNDERGRADUATE EDUCATION AT STANFORD: An Overview

A great deal has changed since the last full-scale examination of our undergraduate programs, *The Study of Education at Stanford*, was conducted in 1968. From the organization of international affairs to the fabric of private life, old certainties and structures have been shaken, and new opportunities and challenges have emerged. To take one obvious instance, consider how the computer, which was still an exotic and cumbersome novelty in 1968, has become an everyday part of our existence; it is difficult to remember how—or even when—we lived without it. Like the computer, all of the changes in the larger worlds of politics, society, and culture have had an impact on the smaller world of Stanford, on the kind of students we teach and what we teach them, on the cost and character of our research, on the ways we live and work together. Once again, one obvious example will illustrate the sort of transformations we have in mind: in 1968, the undergraduate student body was still predominately white; now over 40 percent come from minority groups.

The changes in the world and at Stanford are the context and the impetus for the work of the Commission on Undergraduate Education. President Casper charged us to “review the undergraduate curriculum and related programs with regard to the changing needs and expectations of our students and their families, the emerging opportunities and challenges of the 21st century, and the unique strengths and resources of Stanford University.”

Among Stanford’s greatest strengths and most precious resources are its undergraduates. Each year, the university enrolls about sixteen hundred new students, chosen from over thirteen thousand applicants. These students include some of the most talented high school graduates in the country; they come with excellent grades, high test scores, and numerous other achievements. Most of them have Advanced Placement credits for college-level courses taken in high school. After receiving their degrees, many go on to the nation’s best graduate schools. Stanford undergraduates have won 70 Rhodes scholarships, 51 Marshall scholarships (including an unprecedented six in 1993-94), and numerous other prestigious national and international awards.

President Casper instructed the Commission “to consider whether the present curriculum, including the range of undergraduate degrees, majors and distribution requirements, adequately and effectively meets the needs of our students.” To do so, we have examined every aspect of the curriculum and of the academic environment in which it operates. We have interviewed faculty and staff, analyzed enrollment data and survey results, and examined descriptions of departmental and interdepartmental programs. Above all, we have asked students and alumni about their experiences. We met with undergraduates informally over dinner in their dorms and at public meetings arranged by the Commission’s Student Advisory Group; we organized focus groups on particular themes; we participated in surveys conducted by the Office of Residential Education and the Associated Students of Stanford University; and we sent out our own survey to 750 alumni. As a result of these efforts, we believe that we now have a more complete and accurate picture of undergraduate education at Stanford than has ever been available.

There is a great deal in this picture of which we can be justly proud. In the course of our investigations we have encountered countless individuals who go out of their way to serve undergraduates: resident fellows, librarians, and the staff at the Center for Teaching and Learning, the Undergraduate Advising Center, and the Office of Undergraduate Research Opportunities—to name just a few. We came upon many faculty members who inspire as well as instruct their students both inside and outside the classroom, and many departments and programs that provide challenging courses and well-designed majors. We have been impressed by the flexibility of Stanford's curriculum and were delighted to find so much willingness to innovate among our colleagues.

We were especially pleased to observe the growing number of undergraduates who participate in the university's research mission. Over the past decade, the percentage of students in the School of Humanities and Sciences (which contains about 80 percent of all undergraduates) doing honors work has increased from 14 to 25. At the same time, thanks to the generosity of several donors and foundations, the resources available to support undergraduate research have significantly increased: in 1984-85, 52 students received grants totaling \$55,000; in 1992-93, there were 302 grants totaling \$332,000. As a result, a growing number of students have published original research before they graduate.

A great many Stanford undergraduates take advantage of the remarkable opportunities available to them. They do research in the university's libraries and archives, which contain an extraordinarily rich collection of materials. In Stanford's laboratories, they work with some of the world's best scientists on the moving edge of research. Almost 30 percent of the graduating class spends some time in one of our seven overseas centers, which students and alumni consistently rate as among their most rewarding educational experiences. Stanford in Washington offers students the chance to season their scholarly understanding of public affairs with immediate experience in government. Last year, the Haas Center for Public Service helped twenty-five hundred students to become involved in public service, sometimes as volunteer workers, sometimes in combination with an academic project. Two-thirds of the graduating class performed some sort of public service.

The overall satisfaction measured by surveys of students and alumni is uniformly high. For example, in the most recent surveys of graduating seniors, 98 percent of those responding rated the general quality of their education as "good" or better, 85 percent as "very good" or "excellent." These levels of satisfaction seem to remain stable over time: Herant Katchadourian and John Boli's follow-up study of students who entered Stanford in 1977 found that, ten years after graduation, respondents gave their education a score of 4.4 on a scale of 5; 92 percent said they would still choose to attend Stanford.³ All in all, the overwhelming majority of students and former students seem to be highly satisfied with the education they have received at Stanford.

Our investigation found many sources of satisfaction, but no reason for complacency. If we probe just beneath the surface of the surveys, for example, we begin to uncover some worrisome patterns. When seniors are asked about the specifics of their educational experience, their satisfaction levels are often significantly lower than their general impression: the numbers of "excellent" and "very good" rankings decline and the number of "goods" increases, as do the "fairs" and even the "poors." In most cases, the scores remain

³ Herant Katchadourian and John Boli, *The Cream of the Crop* (forthcoming), Chap. 1.

respectable, but not at the level of excellence we should demand of ourselves. In 1992, for example, 93 percent of the seniors ranked faculty teaching "good" or better; only 58 percent rated it "very good" or "excellent." As we will discuss in more detail later, a number of departments and programs are ranked below this average score.

Some aspects of undergraduate education at Stanford clearly do not work well. In the Senior Surveys (and in the memories of those interviewed by Katchadourian and Boli, as well as in our own sample of alumni), advising receives uniformly low marks: in 1986, 1987, and 1988, over 40 percent of the seniors ranked the advising they received during their first and second years as "poor," while less than 15 percent regarded it as "very good" or "excellent." Major advising usually scored somewhat better, but was still lackluster: around 30 percent of the seniors said advising in their major was "very good" or "excellent," as opposed to the 40 to 50 percent who regarded it as "fair" or "poor."

Our own impression, based on many discussions with students and our survey of alumni, is that undergraduate education at Stanford works best for students who take the initiative to find mentors, design scholarly projects, and become involved in faculty research. These students benefit from the university's flexibility, resources, and scholarly distinction. A minority of students seem to remain largely untouched by the university's academic enterprise. While they may be satisfied with their time at Stanford, their academic experiences are not a major ingredient in this satisfaction. We are especially concerned with those students who are somewhere between the self-starters and the academically uninterested, students who may lack the former's energy and commitment, but who have the potential for intellectual engagement. It is essential that those in this group be challenged and excited by their courses, that they get good advice and direction, and that as many as possible use wisely the wonderful opportunities Stanford provides.

Our investigations have revealed a disturbing unevenness in the faculty's commitment to teaching and advising. Some individual faculty members take these responsibilities very seriously; others do not. Some regularly serve as advisors; others never do. Some often direct undergraduate research projects; others never do. Some invest a great deal of time and energy in teaching introductory courses; others avoid this task or do it halfheartedly. We will return to the issue of faculty responsibility in the penultimate section of our report, but let us state now what will be one of our central themes: Every faculty member at Stanford must be fully committed to excellence in both teaching and

On the following pages we consider various aspects of undergraduate education at Stanford. We begin with general degree requirements, then discuss the major, academic bookkeeping, the academic calendar, the use of technology in teaching and learning, academic advising, residential education, and finally the issues of faculty responsibilities and governance.

Before turning to our specific recommendations, we should note two general principles that have guided our efforts. First, educational decisions are inseparable from decisions about resources. Responsibility, accountability, and control over resources must go together. Second, good ideas are necessary but not sufficient. Educational reform must always include plans for implementation, assessment, and continuing improvement.

3.

WRITING AND CRITICAL THINKING

According to *Courses and Degrees*, the "purpose of the writing requirement is to promote effective communication by ensuring that every undergraduate can write clear and effective English prose. Words are the vehicles for thought and clear thinking requires facility in writing and speech." Since 1987, Stanford has had a two-tier writing requirement: students who score a 4 or 5 on the Advanced Placement Test in English (approximately one-third of the first-year class) must take one course in composition; others take a two-course sequence. These courses either are in the Writing and Critical Thinking (WCT) program, administered by the English department, or are special sections of three Cultures, Ideas, and Values tracks (Structured Liberal Education, Literature and Fine Arts, and History 1-2-3).

In 1993-94, the WCT program was reviewed by a committee appointed by the dean of the School of Humanities and Sciences and chaired by Professor Nancy Kollmann. CUE cooperated with the review committee, discussed both its initial charge and its final report, and fully endorses its recommendations, which will be presented to the Faculty Senate in 1994-95.

The review committee concluded that the university's current requirement was necessary and that it should be expanded so that writing might play a role in students' experience beyond their first year. We are convinced that one learns good writing and communication skills by practicing them regularly; moreover, writing is a powerful tool in learning. Therefore, students should be given the opportunity to write often, in different disciplines and in formats as diverse as research papers, laboratory reports, and the preparation of oral presentations. Students learn to think more clearly by revising their written work. Here the committee followed the formulation of the Writing and Critical Thinking program, which argues that revision is not simply correcting mistakes but "revisioning" a paper—reorganizing, developing the argument on a deeper level, even starting again from scratch if need be. Students master new material more deeply and are able to use it more effectively if they have written about it. Thus, writing (with a revising component) should be a more integral part of undergraduate education at Stanford.

To accomplish these goals, we recommend the following.

First, the current WCT requirement should be retained. The subject matter of the courses offered within the WCT program should have a somewhat broader range, designed to appeal to the interests of a variety of students. If possible, teaching assistants should be advanced graduate students from several departments. The WCT lecturers, who provide the program with expertise and continuity, should remain the core of the instructional staff. Their status should be improved and their positions professionalized.

Second, the university should expand the writing requirement so that each department or degree-granting program has at least one writing-intensive course, which its majors are required to pass. It is important that students have experience writing in the fields in which they are developing knowledge and expertise. (As a corollary, students who double-major will have to take two such courses.)

This recommendation extends the Writing Across the Curriculum program in which sixteen departments of the School of Humanities and Sciences currently participate. In order for the program to include all departments, it will be necessary to provide the resources necessary to train teaching assistants and provide support for faculty so that they can work with students on their writing. The Center for Teaching and Learning, which has a proven record of helping students and faculty in these matters, can serve as a resource.

Third, there should be some means of coordinating the various components of Stanford's writing requirement. We suggest the creation of an advisory board for writing programs at Stanford. The board should be appointed by the Committee on Undergraduate Study from faculty in various departments and schools, with the director of WCT, the senior lecturer in charge of writing pedagogy, and the director of the CTL as ex officio members.

Fourth, we should be able to assess how well the writing requirement works and how it might be improved. Focus groups of students, assembled at the end of their first year and again three years later, would provide valuable information and suggestions about the program. Questions about writing on the Senior Survey would record the views of a larger sample. We urge the advisory board to consider other means of evaluating student writing, including the creation of writing portfolios or the systematic examination of written work.

Fifth, the university should provide instruction in oral communication. According to *Courses and Degrees*, "all instructors expect that students will express themselves in speech and writing," but relatively little is now being done to help students learn how to speak clearly and effectively. Those courses on public speaking that do exist, at the Center for Teaching and Learning and in the School of Engineering, seem to be popular and effective. We recommend that these programs be expanded and that other ways of improving oral communication be examined and, if appropriate, adopted.

4.

THE LANGUAGE REQUIREMENT

"The Language Requirement ensures that every student gains a basic familiarity with a foreign language. Foreign language study extends the student's range of knowledge and expression in significant ways, providing access to materials and cultures that otherwise would be out of reach" (Courses and Degrees, p. 10). CUE encountered few people who doubted the second proposition and no one who believed the first. Stanford's language requirement is one of the weakest among our peer institutions. Since 1982, students who are not native speakers of another language have been able to fulfill the university's requirement (certain majors have more rigorous requirements) in one of three ways: one year of college instruction, an achievement test, or three years of high school instruction. Last year, 940 first-year students fulfilled their requirement with high school courses, 273 were native speakers of another language, and 256 passed the achievement test. Only 137, therefore, were required to take additional language courses. (See Appendix 3, Table 1.)

CUE believes that three years of high school instruction are not sufficient to ensure that our students have "basic familiarity with a foreign language." There is compelling evidence that it is rarely possible to learn how to use a language in these three years. Moreover, by accepting high school instruction as sufficient, we tell our students that they can be "finished with" language study before entering the university—which is exactly the wrong signal to be sending to them and to their high schools.

There are, we believe, at least five compelling reasons to encourage our students to develop competence in a foreign language. First, in a shrinking and increasingly interdependent world, competence in a foreign language improves the ability of individuals to function effectively as citizens and productive members of the global community. Second, foreign language competency is of immediate use to Americans who live in and/or work with multicultural communities throughout the United States, especially in California. Third, knowledge of a foreign language is a significant component of a humanistic education. Foreign language study provides access to foreign cultures, histories, and literatures. It brings insights into the nature of culture, fostering tolerance and a greater appreciation of differences and similarities. Fourth, foreign language study promotes greater understanding of the nature of language, its structure and its role in the development of cognition. And fifth, one's ability to understand and write the English language improves with the study of a foreign language.

We recommend, therefore, that the university language requirement be strengthened. Beginning in 1995-96, entering students should be required to complete one year of college language instruction or to pass a proficiency examination, which will be designed by the foreign language departments. Obviously an important first step in this process is to define what proficiency in various languages means and to determine the ways in which it can be demonstrated.

In order to assess the effectiveness of language instruction and to ensure that the two ways of meeting the requirement are equivalent, a sample of those who fulfill the requirement with course work will also be asked to take the examination.

Some will object that a year of study is insufficient to enable students to speak a language fluently or to be able to read difficult texts. For most students, this will certainly be true. Nevertheless, a year of university instruction will provide the foundation upon which a mastery of the language can be built.

An expansion of the requirement is a necessary but not sufficient means to increase the centrality of language learning at Stanford. Equally important will be a series of steps to encourage the sustained learning and diverse use of foreign languages beyond the language and literature departments, comparable to the diffusion of writing instruction across the curriculum. The overseas studies program is an obvious impetus to language study; more should be done to make study abroad possible and to strengthen its language component. Students should also be encouraged to use foreign languages in their course work and in research projects. As we will argue later in our report, students should have the option of taking a minor, in which language study might be combined with other course work, for example, in subjects such as Asian or African studies. We will also recommend changing the format of the undergraduate transcript so that special achievements, such as advanced language study, can be prominently displayed.

Finally, in order to encourage and improve language teaching and learning at Stanford, we recommend the creation of a language center, which is now being considered by the School of Humanities and Sciences. This center would coordinate and assess formal language instruction, encourage efforts to promote language study across the curriculum, and take the lead in developing new techniques and technologies for language learning.

Strengthening the language requirement, even to a minimum level of proficiency, will take additional resources, as will some of the other measures we propose. Until now, as a visiting committee on language instruction at Stanford pointed out in 1992, we have provided language study to our students "on the cheap." It is time to recognize that in order to live up to our claim to be an international and multicultural institution, we must be prepared to make language study a more effective and visible part of our undergraduate program.

5.

BREADTH REQUIREMENTS: The Science and Humanities and Social Sciences Cores

The breadth requirements share many of the goals of undergraduate education—to help students to think clearly and critically, to acquaint them with useful, interesting, and aesthetically pleasing subjects, and to prepare them for an effective public and private life. The breadth requirements' particular role in the curriculum is to make students aware of different ways to analyze material, organize knowledge, and imagine the world. This means not only being introduced to a variety of subjects, but also learning how different disciplines define problems, gather evidence, test hypotheses, and represent their objects of study.

While almost everyone would accept these goals—few people are prepared to take a stand against breadth—there is no agreement about how curricular breadth can best be achieved. Two alternative ways of providing breadth suggest the range of choices: in one, the university specifies a set of categories, sometimes defined by subject matter, more often by modes of thought, and then allows students to select from a limited number of courses within each; in the other, the university defines a few broad subjects and allows students to take whatever courses they wish within each one. The advantages and disadvantages of the two systems are clear enough: the first imposes order, but limits choice; the second allows considerable choice, but provides little guidance.

Stanford's current system of distribution requirements was introduced in 1980 and has been revised several times since, most recently in November 1990. It seems to combine elements of both alternatives; we have defined nine categories, within which students may choose from a very large number of courses. As it now stands, the requirement consists of the following:

- The Cultures Core (Areas 1, 2, 3): A three-quarter sequence in Cultures, Ideas, and Values, plus a course in World Cultures and one in American Cultures
- The Science Core (Areas 4, 5, 6): One course each in Mathematical Sciences, in Natural Sciences, and in Technology and Applied Sciences
- The Humanities and Social Sciences Core (Areas 7, 8, 9): One course in Literature and the Fine Arts, one in Philosophical, Social, and Religious Thought, and one in Social and Behavioral Sciences

In addition, students must fulfill a Gender Studies requirement by taking one course in Areas 2-9 that has been designated as dealing with gender issues.

The total number of courses needed to fulfill the distribution requirements (including CIV) is eleven, which might amount to 55 units—almost one—third of the total needed for graduation.

The original legislation intended that courses fulfilling a distribution requirement should meet an elaborate set of criteria and be certified by a subcommittee of the Committee on Undergraduate Studies. In practice, almost every course submitted is eventually approved. The result can be seen in the eight closely printed, double-columned pages in *Courses and Degrees, 1993-94*, that list the courses for various areas. A quick look at this list suggests the extraordinary range of courses that fulfill distribution requirements: Some are introductory courses like "Elementary Economics," some fairly specialized ones like "Twentieth-Century German History," both of which fulfill Area 9, Social and Behavioral Sciences; some cover a broad subject, like "Middle East, 570-1718," whereas some are more narrowly focused, like "Archaeology and Education at Zuni Pueblo," both of which fulfill Area 2, World Cultures. Moreover, there is a wide range in the number of courses available in the various categories. For example, Area 6, Technology and Applied Sciences, lists 24 courses, while Area 7, Literature and the Fine Arts, lists 105, including virtually all the offerings in some departments. We hope that when they consider the alternatives we propose, our readers will keep in mind the realities of the current system as represented by this bewildering array of courses.

The Commission's subcommittee on the breadth requirements spent a great deal of time talking to students about their experiences with the current system of distribution requirements (DRs). All but a small minority acknowledge the value of requiring some breadth: in a poll conducted by the ASSU in the spring of 1993-94, only 7 percent opposed distribution requirements of any kind. There is, however, widespread discontent with the present system, which only about one-third of those polled would like to retain. In focus groups and various dorm meetings, students complained that the requirements seem elaborate and arbitrary. ("We need a better explanation of why there is this system. I think we have just accepted it without questioning it.") They do not understand the reasons for particular categories of courses and the reasons why some courses count, while others do not. ("I don't understand the level of classes that fit into the DRs.") We had the strong impression that many students fulfill the requirements simply because they are there, not because the students understand or accept their purpose. Instead of stimulating reflection and encouraging intellectual breadth, the requirements become hurdles to be jumped and then forgotten. This not only has unfortunate consequences for individual courses, but also undermines the legitimacy of requirements per se.

There is no question that the distribution requirements encourage students to take many valuable courses that they find instructive and stimulating. Often these courses introduce them to material that they would not have encountered on their own. And yet it is difficult to conclude that the system as a whole is working as it should. Indeed, there is some reason to fear that, after a quarter century of revisions and reforms, our system of requirements resembles the one described by *The Study of Education at Stanford* in 1968, a system that "leaves the teacher and the student with the worst elements of two attractive but competing ideals: from the ideal of general education it leaves prescription in form but not prescription in substance; from the ideal of freedom to teach and to learn it leaves incoherence of purpose."⁴

We believe that we should be able to explain and justify whatever we require. We should also insist that students take these requirements seriously. We recommend, therefore, that

⁴ *The Study of Education at Stanford: Report to the University*, vol. 2, Undergraduate Education (1968), p. 10.

students no longer be allowed to use the Credit-No credit (Cr-NC) option for courses that fulfill their breadth requirements.

Most considerations of breadth requirements begin by trying to divide the curriculum into pieces that every student should sample. But this ignores the fact that "breadth" does not mean the same thing for all disciplines or for all students. For example, students in the humanities and social sciences, who have a great many electives, usually take a fairly broad range of courses. For them, breadth means being required to learn something about science, mathematics, and technology. As we will argue, providing this kind of breadth poses different curricular problems than the need to teach scientists or engineers about the humanities and social sciences. In what follows, therefore, we consider the current cores separately and try to keep in mind the particular needs they are designed to serve.

The Science Core

No one doubts the fundamental importance of science, mathematics, and technology for every aspect of modern society. But at the same time that these subjects have become increasingly important for all of us, they have become more specialized and therefore less accessible to those who do not study them full time. "The specialization of science," Robert Oppenheimer wrote in 1954, "is an inevitable accompaniment of progress—yet it is full of dangers and it is cruelly wasteful since so much that is beautiful and enlightening is cut off from most of the world." Being cut off from scientific knowledge undermines the nonscientist's ability to understand important aspects of our culture and to act as a responsible citizen. Moreover, as the literary critic Lionel Trilling pointed out in his Jefferson Lecture of 1972, "this exclusion of most of us from the mode of thought which is habitually said to be the characteristic achievement of the modern age is bound to be experienced as a wound given to our intellectual self-esteem."⁵

Stanford's current distribution requirements are one example of this larger cultural problem. At present, few nonscientists are drawn to the kinds of courses required for science majors; instead they usually fulfill Areas 4, 5, and 6 with courses specifically designed to attract nonspecialists. Whatever their other merits, many of these courses do not teach students what it means to think scientifically. Too few are both rigorously scientific and generally accessible. Indeed, we became convinced that these three areas were the weakest link in the current system, the ones that students were most likely to view cynically and to try to fulfill as effortlessly as possible.

We believe that Stanford has a special responsibility and an unusual opportunity to devise ways of teaching science to nonscientists. While we do not underestimate the intellectual difficulties that will have to be resolved or the institutional resources that will be necessary, we are convinced that the potential advantages make the attempt worthwhile, both for our own students and as a model solution to a ubiquitous problem.

We recommend the creation of a new three-quarter sequence, tentatively titled "Introduction to the Natural Sciences, Quantitative Analysis, and Technology," through which students could fulfill the current requirements included in Areas 4, 5, and 6.

This course would treat in a significant way the following themes:

⁵ Oppenheimer quoted in Jaroslav Pelikan, *The Idea of the University: A Reexamination* (New Haven and London, 1992), p. 98. Lionel Trilling, *Mind in the Modern World* (New York, 1972), p. 14.

- Problem solving—Much of the written work would be “problem sets,” with a strong emphasis on clear writing.
- Experimental work—There would be some kind of laboratory, in which there would be quantitative and observational work. Questions of the difficulty in making measurements and assessing their accuracy and reproducibility should be addressed.
- Technology—Students would learn basic issues in engineering and how engineering differs from science.
- Computer literacy, including numerical and graphical work (see the recommendations in Chapter 10).
- Elements of probability and statistics.

To provide a context for these themes, we would expect the course to include a study of the following: the interplay between the environment and biological systems, the molecular basis for living and nonliving things, the nature of energy in the physical world, the character of physical law, and the concepts of symmetry, growth, orders of magnitude, and the effects of scale.

The course would be organized into individual tracks with different emphases on such particular problems as, for example, disasters, global climate change, biological diversity, natural resources, how things work, or biological and physical change.

We recognize that the creation of this course will require the commitment and enthusiasm of a group of faculty. But we want to emphasize that to become part of our requirements, the course must have broadly based support among the faculty and a clear, long-term claim on institutional resources. If the course depends on the participation of a few individuals and short-term financial support, it will prove as ephemeral as have previous experiments of this sort.

If and when this course is available, Areas 4, 5, and 6 would be replaced by a science requirement that could be fulfilled in either of two ways:

1. The new three-quarter sequence of “Introduction to the Natural Sciences, Quantitative Analysis, and Technology,” or
2. Any three courses (with at least one quarter of lab) that can be used to fulfill the major in a natural science department.

If a course such as we propose turns out to be impossible to create, we then urge the appropriate faculty committee to take a much more active role in ensuring that all the courses in Areas 4, 5, and 6 are rigorous efforts to promote scientific, mathematical, and technological literacy among nonmajors.

The Humanities and Social Sciences Core

The curricular problems in the Humanities and Social Sciences Core (Areas 7, 8, and 9) are significantly different from those in the Science Core. If the latter has too few courses, the former has too many. This is because the areas in the Humanities and Social Sciences Core—Literature and the Fine Arts, Philosophical, Social, and Religious Thought, and Social and Behavioral Sciences—are so broadly defined that they include extremely diverse

collections of courses, many of which appear to overlap with the five-course Cultures Core. When one looks at the list of courses that can fulfill Areas 7, 8, and 9, it is not surprising that many students have trouble understanding the rationale for these requirements.

It is also important to bear in mind that because students majoring in the humanities or social sciences will fulfill Areas 7, 8, and 9 without difficulty, those most directly affected by these requirements are students majoring in science or engineering, who usually have the fewest electives with which to pursue their particular interests. The net effect of Areas 7, 8, and 9, therefore, is to limit the choice of some students without providing much guidance or direction. Indeed, it could be argued that by forcing students to spread their electives across three arbitrarily defined areas, the Humanities and Social Sciences Core legislates superficiality.

As is always the case with breadth requirements, in dealing with Areas 7, 8, and 9, the Commission faced the choice between imposing coherence and allowing choice. We considered, but finally rejected, the idea of establishing a set of courses on the humanities and social sciences comparable to our proposed science and technology sequence. We were skeptical that such an enterprise was possible and not convinced that it was necessary. In contrast to Areas 4, 5, and 6, a great many courses in the humanities and social sciences are both rigorous and accessible to nonspecialists. It seemed to us better to expand students' choice among these courses than to impose questionable coherence. We recommend, therefore, that Areas 7, 8, and 9 be abandoned and that students be required to take three courses in the humanities or social sciences outside of their majors. Most courses in these areas could be used to satisfy the requirement, with a few obvious exceptions, such as introductory language courses. Students would be further required to define some thematic connection among these three courses, which would have to be approved by their advisors.

Some members of the Commission were uneasy about allowing students totally free choice. They suggested that the three courses used to meet this requirement should have to include courses from both areas. In other words, students could not take all humanities or all social sciences. A majority of the Commission, however, was prepared to leave the choice open.

In order for our recommendations to work, students will need help from their advisors, who can use the selection of these courses as an occasion to talk about their advisees' intellectual interests and educational goals. Indeed, we hope that the need to talk about these issues will help make the student-advisor relationship more interesting and relevant.

To assist students and advisors, Courses and Degrees should suggest various themes around which the requirements might be organized. For instance, some students may wish to acquire a preliminary knowledge of a discipline by taking an introductory course in economics, sociology, political science, English literature, philosophy, or art. (As we will discuss in our section on advising, we hope that departments will make such introductory courses regular parts of their curricula.) Other students may want to pursue a special interest or build on a particular experience by combining courses from different departments on a subject like Asian society, comparative economic development, Mayan civilization, modernism in art and literature, contemporary European politics, the ancient world, or ethics and society. We would hope that faculty members might get together to suggest an array of courses to meet this requirement, focused on a particular theme such as the relationship of science and the humanities. For those students who have a limited

number of electives, defining the requirements in this way should make it easier to study at an overseas campus. And there may be some students who will wish to use these three courses as the first step toward the six related courses necessary for a minor. (See section 7.)

Allowing students to choose how to fulfill the humanities and social sciences breadth requirement gives them the ultimate responsibility for establishing curricular coherence. Coherence, after all, is not some abstract quality to be imposed from above; rather, as the author of a recent work on undergraduate education has argued, it is "a power of the mind to be developed and honed . . . an ability to look, sort, and connect."⁶ We believe that our proposal will encourage students to develop that ability.

⁶ Rudolph H. Weingartner, *Undergraduate Education: Goals and Means* (New York, 1992), p. 156.

6. BREADTH REQUIREMENTS: The Cultures Cores

Courses and Degrees gives two purposes for the distribution requirements: "to introduce students to a broad range of fields and areas of study . . . and to help students to be responsible members of society." This second purpose is most clearly served by the courses in the Cultures Core: the three quarters of Cultures, Ideas, and Values, the courses in World Cultures and American Cultures, and the Gender Studies requirement.

The goal of creating responsible members of society is well established in American universities, but the means have changed over time. In 1923, for example, Stanford introduced a required course, "Problems of Citizenship," which was replaced twelve years later by "History of Western Civilization." The cornerstone of Stanford's undergraduate program for over thirty years, "Western Civ" was essentially a course on the development of European thought from its classical origins to the present. It was taught from a common syllabus by some twenty young instructors, who were appointed and supervised by the history department. By the late 1960s, the course had begun to lose its cohesion and sense of purpose. In 1968, The Study of Education at Stanford recommended its abolition. Twelve years later, a new required course, "Western Culture," was introduced. Although similar to Western Civilization in some ways, Western Culture was not a single course but was taught in several tracks, which shared a "core list" of required and recommended readings.

Whereas Western Civilization lasted for more than thirty years, Western Culture survived for fewer than ten. After an intense debate (which was widely, if often inaccurately, covered by the national media), in 1988 the Faculty Senate replaced the Western Culture requirement with a new course entitled "Cultures, Ideas, and Values." Like its predecessor, CIV was composed of tracks. Its common reading was reduced to six works or authors; in addition, each track was required to include at least one work each quarter by a woman and one by a person of color, to consider issues of class, race, and gender, and to study at least one non-European culture that has influenced American society. Almost as soon as the debate on CIV was over, the Committee on Undergraduate Studies began to consider additional requirements, which eventually went into effect in 1990 as Areas 2 and 3, World and American Cultures, and the Gender Studies requirement. Although these new requirements overlapped with CIV in several ways, CIV itself was not discussed in 1990.

The Commission decided that it should view the Cultures Core as a whole. We began, however, with an intense examination of CIV, which was the subject of several focus groups, town meetings in the dorms, and numerous other discussions with faculty and students.

Student opinion on CIV was remarkably clear and consistent. Most agreed that there should be such a course. "It was a bonding experience," one student said; "I think it had a lot to do with the small group format." Another was pleased that CIV "forces people to read a lot of things they would probably never read in their lifetime." Nevertheless, many

students were critical of the program in practice: according to a poll taken by the Stanford Daily, 72 percent of students think CIV should be changed. In almost all of our discussions, the same three criticisms came up again and again. First, most students believed that the tracks differed too widely in purpose, work load, and grading policy. Our own examination of syllabi and grade distributions confirmed this impression. Second, students thought that the course materials—especially the non-Western materials—were not well integrated. Rightly or wrongly, many students viewed CIV as Western Culture with a few token additions. Third, because the course tries to meet so many different needs, students found that their reading and consequently the discussions were sketchy and superficial. There was a general sense of “overload” among both students and faculty. As one student summarized a long discussion in his residence, “In trying to do too much, CIV achieves only few goals. We recommend that all CIV tracks be reevaluated and revised to meet their original purpose.”

Given its disparate origins, organizational structure, and intellectual ambition, the problems with CIV are not surprising. At present, the course consists of nine different tracks, spread across several departments, involving about thirty senior faculty members and another two dozen or more lecturers. Some of these tracks were specifically created to meet the new requirement, but several of the largest began as part of the Western Culture program or had been long-standing departmental or interdepartmental courses. The Humanities track, for instance, was once required of all students in the Humanities Special Programs; the history track started as an introductory European history course. Neither the supervisory efforts of the Area I Committee nor the common list of six authors or works shared by all the tracks has been able to provide the kind of cohesion and consistency promised by the program’s founding legislation.

The first question the Commission posed was: Given the apparent problems in CIV, should the requirement be maintained? We concluded that the course has a number of valuable functions. It is a significant (and, for some first-year students, a unique) learning experience, in which students have the benefit of small group instruction, form a sustained relationship with a single teacher, and receive invaluable training in writing, critical analysis, and oral communication. Because we value the continuity of this experience, we rejected suggestions to divide the course into three separate quarters on Western, non-Western, and American cultures. In fact, we regard small group instruction as so central to the program that we recommend it be increased from at least two hours per week (as is now mandated) to at least three hours per week.

Although we recommend that there should be a first-year course modeled on CIV, we are convinced that the current program must be transformed if it is to fulfill in practice the first objective articulated in its founding legislation: “to provide students with the common intellectual experience of broadening their understanding of ideas and values drawn from different strands of their own culture, and to increase their understanding of cultural diversity and the process of cultural interaction. . . .”

The first problem we confronted was how to provide a “common intellectual experience.” We assumed that it would not be possible to return to the single-course “Western Civilization” structure; the course, therefore, would continue to have different tracks, formats, and approaches.

It is clear that six common works or authors (which are themselves defined broadly enough to include many possibilities, for example, the "Hebrew Bible") are totally inadequate. At present, students read different works at different times and in different ways. For all practical purposes, the tracks have become different courses.

One possible source of a "common intellectual experience" would be to increase substantially the common reading, that is, to return to the "core list" that was supposed to hold the Western Culture tracks together. But the very existence of a "core list" imposes on the course a definition of culture that many faculty members do not accept. Moreover, a core list of any sort necessarily gives to certain works the kind of privileged status that leads to endless debates about relative value and appropriate representation. Even if such a core list could be collectively compiled, it would substantially restrict the number of faculty members willing and able to teach the course.

If we cannot impose a common reading list, what other sources of commonality are there?

We propose an answer drawn not from shared subject matter, but from the common problem of teaching and learning about culture at the end of the twentieth century. The common intellectual experience of the course, therefore, would be a self-consciousness about the enterprise itself, an awareness of the analytical and ideological issues that the study of culture involves. In order to be sure that this self-consciousness anchors the course, all the tracks would have to begin and end with the same readings, which would be designed to encourage both faculty and students to reflect on the intellectual project they were about to begin or had just completed. Such readings might be defenses of classic definitions of culture, such as Matthew Arnold's *Culture and Anarchy*; or cultural criticisms, such as Friedrich Nietzsche's *Advantages and Disadvantages of History*; or anthropological analyses of culture, such as James Clifford's essays in *The Predicament of Culture*. The process of discussing and agreeing upon these readings would require the faculty to articulate their goals for the course and exchange ideas about how these goals might best be reached.

We believe that the best way to clarify CIV's common goals is to return to its essential purpose, which is to help students acquire an understanding of culture's historical origins and character. This can be done by studying any one of several different cultures—European, Asian, Islamic. Based on a particular example, each track would examine a common set of themes and problems. Since all cultures develop in time, each track would include a historical treatment of a cultural tradition; since cultures have core works or ideas that claim to represent them, each track would consider some fundamental texts; since cultures must deal with internal differences, such as gender, status, wealth, and ethnicity, with values and moral codes, with religious faith and artistic beauty, each track would consider these issues; since each culture must have boundaries and must deal with outsiders, each track would consider how cultures relate to others, and here it would be necessary to read and compare works from both a European and a non-European culture; finally, since we are carrying on this study in the United States, each track must relate the study of its culture to American culture, either historically or comparatively.

In such a program, we could imagine a course on Asian culture that would begin with a classic Asian text and end with the great wave of Asian immigration to North America since 1965; or a course on the origins of American culture that followed the development of its

European and non-European elements; or a course on European culture that would examine its relationship to other cultures and especially its problematic relationship to the New World.

Defined in this way, the course should become the proper forum for a critical and historically informed discussion of issues of ethnicity, cultural identity, and political and social values. We believe that it will perform the function now assigned to Areas 1, 2, and 3 of the current distribution requirements. We recommend, therefore, that once the revision of CIV has been completed (which should take place no later than the fall of 1998), the World and American Cultures requirements should be abolished.

We recommend that the process for transforming (and, if possible, renaming) CIV begin at once and that it be placed in the hands of a design committee composed of faculty members who are prepared to teach in the new program. Their first task would be to clarify the goals and establish a common agenda for a new course on culture. In some cases, this would involve refashioning existing tracks, but we would hope that new tracks would also be created. These new tracks could begin at once on an experimental basis. The design committee should also propose a new and improved system of oversight and assessment, which might include the sort of midquarter evaluations conducted by the Center for Teaching and Learning.

The Commission did not reach consensus on the Gender Studies requirement. Some members believed that this requirement, like the World and American Cultures requirements, should be folded into a redefined CIV course. To do otherwise, it was argued, would be to isolate gender rather than to affirm its central place in any examination of culture. Others disagreed. They argued that without a special requirement, gender issues might easily get lost. Moreover, they maintained that our students ought to be aware of the important work being done in this new and exciting field. We recommend that the matter be revisited when the reevaluation of the CIV program has been completed.

At that point, the faculty will be in a better position to see if a separate requirement is still necessary.

Summary of Breadth Requirement Recommendations

Chapters 5 and 6

We recommend the following changes in what we now propose to call the breadth requirements.

The Science Core (three courses)

Either any three courses (including at least one quarter of lab) that can be used to fulfill the major in a natural science department; or one course each in Areas 4, 5, and 6.

We recommend that the university provide the resources for a task force to design a new set of courses, tentatively entitled "Introduction to the Natural Sciences, Quantitative Analysis, and Technology." When this course is offered on a regular basis, it will replace Areas 4, 5, and 6 and become the only alternative to the three regular science courses.

The Humanities and Social Sciences Core (three courses)

We recommend that Areas 7, 8, and 9 of the current DRs be abolished. Instead, students would be required to take three courses in the humanities and/or social sciences outside of their major program or department.

These courses should have some thematic relationship, defined by the student and approved by her or his advisor.

The Cultures Core (five courses, eventually contracting to three)

For the moment the Cultures Core would remain as it is: CIV, American and World Cultures, Gender Studies.

Immediate steps must be taken to restore a sense of common purpose and curricular consistency in the CIV program. At the same time, a task force should begin to create a set of courses that would fulfill the functions now served by the five courses in the Cultures Core. This course must be in place no later than the fall of 1998, at which time the present Areas 2 and 3 will be eliminated.

Other Changes

Students should not be allowed to take breadth requirements Cr-NC. The Cr-NC option has a number of valuable functions in our undergraduate program. It is, however, not appropriate for courses that the faculty believes are important enough to be required of all students. The current practice of using this option for distribution requirements undermines their value and legitimacy.

Stanford students must fulfill the breadth requirements with courses taken at Stanford, except that transfer students may fulfill them with courses taken before coming to Stanford. Moreover, transfer students may substitute three appropriate courses for the current and revised CIV.

7. THE MAJOR

Stanford offers undergraduate degrees in over sixty departments and programs. The largest has over three hundred majors, the smallest fewer than half a dozen. (See Appendix 3, Table 2.) Some major programs take up almost two-thirds of a student's total courses—Industrial Engineering, for example, has 113 units of required courses, including 67 in the major itself and 46 in cognate courses; others take up no more than a third—History requires 60 units in the major, with no cognate courses. The structure of different major programs also varies widely across the university. Characteristically, science and engineering curricula have hierarchical arrangements in which one set of courses leads to—and is a prerequisite for—the next level. (It is, of course, this structure that makes most of these courses inaccessible or irrelevant for the nonspecialist.) Most humanities and social science programs have a more flexible structure, in which the curricular path is less well defined and the possibility of individual choice substantially greater. Many of the courses in these programs are open to all interested students without prerequisites.

Obviously the Commission could not examine every one of Stanford's major programs. Instead, we decided to study a sample in some depth. Our Majors Subcommittee selected twelve undergraduate majors—five departments in Humanities and Sciences, two in Engineering, and five interdisciplinary programs. Subcommittee members then examined the relevant materials in *Courses and Degrees*, compiled statistics, interviewed the chairs and directors of undergraduate studies in each of these departments, and conducted focus groups with randomly selected undergraduate majors. In addition, questionnaires were sent out to 750 alumni, of whom over 500 replied. The subcommittee also interviewed several faculty and staff who were active in undergraduate affairs and 25 departmental administrators responsible for undergraduate programs.

The results of these investigations suggest that major programs may vary as much in quality as they do in size and structure. We found many current undergraduates and alumni for whom work in the major was the most valuable aspect of their time at Stanford. Some of them were doing or had done research projects; most of them had established close ties to one or more faculty members; almost all of them believed they had learned significant skills from their major. But a disturbingly large number of our informants had less positive experiences to report. They told us that their majors seemed poorly organized, that they often did not get good advice from the faculty, and that they perceived a general lack of commitment to the program. The unevenness of quality we found in our investigation is confirmed by the data in the most recent Senior Survey, which also suggest that the level of students' satisfaction with their major programs varies greatly. In some majors up to half the respondents ranked their work with faculty "excellent," in others less than one-fourth; in the highest-ranked major 95 percent of the respondents thought the quality of courses was "good" or better, in the lowest 47 percent. Similar ranges can be found in replies about the quality of teaching, opportunities for individual research, and faculty accessibility. However one interprets these data, we must conclude that they do not reflect the kind of excellence Stanford must demand from all its programs.

We cite these data not to indict any particular department or program, but rather to underscore our conviction that many of our undergraduate majors are in need of assessment and renewal. In order to encourage this process, we have distilled from our investigations those elements that the most effective major programs seem to share. We offer them as a guide to reflection and reform, not as a template according to which all majors should be refashioned.

Successful undergraduate majors at Stanford have the following characteristics.

First, they have a coherent and progressive curriculum. Because of the way knowledge is organized, curricular coherence and progress have different meanings in different parts of the university. In science and engineering, there is a clearly defined and rigorous sequence of courses, appropriately ordered from basic to more advanced. Students in these programs progress in a logical way from foundational to more advanced materials and modes of analysis. But also in the most effective humanities and social science majors, where knowledge is less hierarchically organized, students have a sense that their programs fit together and that they can progress through a set of interrelated and increasingly sophisticated courses.

Second, successful majors have a faculty committed to undergraduate education. Students in these majors believe that the faculty is concerned with the program as a whole and committed to consistently good teaching. Faculty advisors are available, responsive to student concerns, and well informed about the program.

Third, in successful majors students are encouraged to approach the material and problems of their discipline in several different ways. Although these students may spend some time in large lecture courses, their programs offer them a range of small classes and seminars in which participatory learning is possible. In these settings, students learn to present their arguments orally, acquire research skills, and undertake substantial writing projects.

Fourth, successful programs provide a synthesizing experience for seniors. Characteristically this is an opportunity to integrate their knowledge and demonstrate their capacity for independence and creativity. Students are given the advice and direction necessary to participate in research. In our own discussions, students mentioned this experience again and again as the high point of their undergraduate experience. In the Senior Surveys, 75 percent of those who did research or an honors project ranked the experience "very good" or "excellent."

Based on our findings, we make the following recommendations, which we urge our colleagues to consider and apply to their own particular departments and programs:

First, departments and programs should reexamine the aims and structure of their curricula. Ideally, majors should have a sequence of courses that distinguishes between foundational and advanced work. Centrally important courses should be offered regularly and should be consistent from year to year. When appropriate, programs should offer well-defined tracks or concentrations to guide students through the major.

To create a coherent and progressive curriculum requires more than merely labeling individual courses. Departments should decide how their various courses fit together, determine the purposes of their requirements, and consider how they articulate these

purposes to their students. This does not mean curricula should be uniform or inflexible. It does mean that students' total experience should be more than a sum of its parts. Rather than taking the same kinds of courses on different subjects, students should obtain a growing sense of mastery and sophistication as they move through the curriculum.

Second, we urge faculty members to reaffirm their collective responsibility for their departments' curricula. Required courses should be taught by regular faculty members, not by visitors, who often do not understand their purpose or place in the curriculum. In large lecture classes, the responsible faculty member should supervise the teaching assistants, teach at least one section, and be actively involved in designing examinations and evaluating students. Faculty members must recognize that advising is part of their teaching responsibility. Whenever appropriate they should enlist students to provide peer advising. And they should regularly and consistently seek students' opinions in order to give them a stake in the program's improvement and success.

Third, programs and departments should establish courses in which students are actively engaged in critical thinking, interpretation, and analysis. The university should encourage departments and programs to inform students about research opportunities and to ensure that those students who want to do research can do so. In this enterprise, cooperation with the professional schools can be of particular value. The biology department, for example, has greatly benefited from its collaboration with the School of Medicine in promoting undergraduate research. We believe that greater efforts could be made to forge similar partnerships between social science departments and the Law School, the Graduate School of Business, or the Hoover Institution.

Fourth, every department and program should have a set of courses that provide some sort of capstone experience for seniors. Students who cannot do a yearlong research project should still be exposed to research and have the chance to work with faculty members in a small group setting. This is the best way to be sure that the final year adds substantial value to a student's time at Stanford.

Fifth, we believe that the university must take greater responsibility for establishing and maintaining high standards across undergraduate programs. At present, interdisciplinary programs are regularly reviewed, while departments are not. We recommend that all undergraduate programs be regularly and comprehensively evaluated by a university-wide committee. This review should focus on program coherence and rigor, the quality of teaching and advising, and the effectiveness of the learning environment. Student evaluations would naturally be an important part of this process. When appropriate, several departments and programs should be reviewed together in order to have a comparative basis for judgment. Finally, the university should consider instituting a system of external review committees similar to those used in the School of Engineering.

Interdisciplinary Programs

In 1992-93, 30 percent of all undergraduates in the School of Humanities and Sciences received their degrees from interdisciplinary programs (IDPs). The students whom we interviewed frequently praised these programs because of their interesting and challenging courses, opportunities for independent research, and faculty dedication. The best IDPs also seem to have a culture that encourages and supports good teaching and an active engagement with undergraduates. Furthermore, as we have just pointed out, IDPs are evaluated on a regular basis and therefore are compelled to review and reconsider their

programs. While IDPs are not uniformly successful, we are convinced that they represent a valuable contribution to our undergraduate programs, one that should be supported and sustained.

Both the Majors Subcommittee and our Working Group on Innovation registered their concern that IDPs, while often unusually successful, do not have adequate funding. They run on minimal budgets and must continually engage in an unequal competition with departments for additional resources. We recommend, therefore, that successful IDPs be given adequate base funding for the entire period in which they have degree-granting authority. Moreover, the university should institute mechanisms for placing fractional billets in IDPs, either by reassigning existing faculty for a fixed period or by appointing some fraction of a new position to an IDP. In the latter case, a faculty member from the IDP would serve on the search committee and participate in the tenure and promotion process.

The members of the Working Group on Innovation were also worried that Stanford might be losing the flexibility and openness to innovation that has enabled interested faculty to create programs outside of the usual departmental frame. In order to preserve these valuable institutional qualities, we recommend that departments and individuals be encouraged to innovate and provided with the resources necessary to do so. This would require making funds available to both faculty members and departments to create new courses or sets of courses. It would also require seeking to minimize the regulations and bureaucracy that get in the way of experimentation. In contrast to many of our peer institutions, Stanford has an entrepreneurial, innovative spirit that we must preserve. Many IDPs are manifestations of this spirit at work.

The Minor

Students should have the opportunity to pursue a subject in some depth, without making the kind of commitment a major requires. We recommend, therefore, that students have the option of declaring a minor, which would appear on their transcripts and diplomas.

Minors would consist of at least six courses outside the requirements for a student's major. Departments and interdisciplinary programs could design minors. Students, with the assistance of faculty advisors, could also design their own minors, which would have to be approved by the committee in charge of individually designed majors.

The minor could serve many different purposes. It might, for example, reflect a regional specialty, similar to the Certificate in African Studies now offered under the auspices of the Center for African Studies. Or it might focus on a particular problem, such as the relationship of science and technology to the liberal arts. Or it might record a student's linguistic expertise, Or it might simply represent a special interest that the student wishes to pursue in some depth. Whatever its purpose, the minor could not be six randomly selected courses. Like the major, it should be both coherent and progressive.

8.

ACADEMIC BOOKKEEPING: Credit, Units, Grades, the Transcript

In this section we turn to what *The Study of Education at Stanford* called "the metrics of the academic operation," those various units with which we define the character, measure the quantity, and evaluate the quality of students' academic experiences. As often happened in the course of our investigations, the examination of academic bookkeeping uncovered the healthy variety that flourishes in the university. We are fully aware that the final decision in these matters properly rests with departments, programs, and individual faculty members. While we have no desire to impose strict uniformity—even if such a state were possible—we do think it worthwhile to reexamine the metrics of our operation, review the principles upon which they rest, and consider whether some recalibrations might be in order.

Academic Credit

Let us begin with the question of definition: What should be given academic credit and therefore be counted toward a Stanford degree? This is obviously not a question about what is valuable and worthwhile. A great many good things happen at Stanford, but only some of them are academic in character. Consider, for example, participation in athletics or playing in the marching band—both worthy pursuits, but categorically different from the study of organic chemistry or Latin American politics. At present, however, Stanford, unlike any of its peer institutions, gives academic credit for being a member of an athletic team or the band and allows students to count up to twelve units of these "Activity Courses" (as defined by the Curriculum Committees of the athletics, physical education, and recreation department and the music department) toward the total necessary to receive a degree. We recommend that such Activity Courses no longer carry academic credit. Some designation of a student's activities might appear on his or her transcript, but the activity would no longer receive a grade or units. Since most students have many more than the 180 units necessary to graduate, this recommendation will not be a matter of great practical importance. But the creation of a more consistent and rigorous definition of "academic" does, we believe, have considerable symbolic significance.

We recognize that Activity Courses are by no means the only nonacademic activity that now receives academic credit. Indeed, we are concerned that the boundary between academic and nonacademic pursuits has become porous and indistinct; it may be time to reaffirm and, if necessary, readjust it. We urge programs, departments, and individual faculty members to consider what should or should not qualify as "academic." We are convinced that many internships, public service projects, and routine jobs in laboratories or faculty research projects, however useful and valuable in themselves, are not necessarily academic. We do not doubt that these pursuits should be encouraged, but we see no need to award them credit toward the degree. Of course, such activities can and should become the basis for academic work by being the subject of or occasion for further research, reflection, or description.

In recent years, there has been a notable increase in the number of S-NC (faculty-designated Satisfactory-No Credit) grades. The S-NC option is appropriate for many kinds of activities, just as the student-initiated Credit-No credit option is a valuable part of our grading system. We believe, however, that there should be limits on how these options can be used. Earlier in our report, we recommended that breadth requirement courses not be taken Cr-NC. We now recommend that the number of S-NC and Cr-NC units that students can count for their degree be no more than 20 percent of the total number of units required for the degree. Very few students currently exceed this generous limit.

Finally, we urge our colleagues to consider what courses should be offered for a grade. Using the grading system implies individual evaluation and comparative judgment. In other words, students should not get "Ns" in a course where it is not possible for them to get "B's," "C's," etc. Courses that require nothing other than attendance or the performance of a particular task should use the S-NC option.

Units per Course

The basic quantitative measure of a student's academic work is the unit. Our examination of a sample of courses from autumn quarter of 1993-94 reveals some inconsistencies in the use of units, both within and across schools. In some cases, there are dramatic differences in required class time among courses of identical unit value. For example, one seminar listed as meeting once weekly for an hour was assigned five units, whereas other five-unit classes typically meet at least three hours per week. Our survey of courses also suggests that it is difficult to distinguish the classroom effort expected in a four-unit course from that of three- and five-unit courses. Many courses are offered for varying amounts of credit (e.g., 3-5 units). There are even cases where cross-listed courses carry different unit values depending on the department through which the student enrolls, even though the work load for all students is ostensibly the same.

In an effort to see whether the present system of unit assignments is equitable, we attempted to look at it from students' perspectives. The distribution of enrolled units by academic major suggests that engineering courses may require more effort for the same number of credits relative to other disciplines. About 32.7 percent of engineering majors take less than the standard fifteen units per quarter, compared with 20.9 percent of humanities majors, 22.2 percent of natural science majors, and 23.3 percent of social science majors. Conversely, at the top end of the scale, only 16.5 percent of engineering majors enroll in nineteen or more course units, compared to 27 percent of humanities majors, 28 percent of natural science majors, and 23.3 percent of social science majors.

We also looked at data from the student evaluation forms. One question on the evaluation form is, "Did this course require more, less or about the same amount of work as other courses for the same amount of credit?" In general, the data suggest that for all types of courses—three-, four-, and five-unit lecture and non-lecture classes, lower- and upper-division—students taking courses in the natural sciences report a considerably greater work load on a per-unit basis. For example, 48 percent of students in four-unit upper-division natural science lectures report expending "more" or "much more" effort in their classes. About 23 percent of students in humanities classes and 35 percent of students in social sciences report similarly heavy work loads. The data also suggest, in general, that courses in languages and literatures and in interdisciplinary areas require more work on a per-unit basis than average.

Given the apparent unevenness of the current system, we considered whether to abandon the credit-unit system and assign a single measure of credit to all Stanford courses (that is, one course would equal one credit, regardless of the time and effort involved). Several other institutions operate in this way. We decided, however, that the current system should be modified but retained. By recognizing that some courses require more intensive effort than others, the unit system can help both faculty and students create expectations about work loads for specific courses.

Although we realize that a precise definition of an academic unit is not possible, we recommend as a general guideline that every unit for which credit is awarded should represent approximately three hours of actual work (including preparation time) per week for the average student. The three hours per unit is an average; actual time will depend on the rigor of individual courses and the abilities of individual students.

We recommend that departments regularly note student evaluations of their courses and change unit assignments where there are consistent reports of heavier or lighter than usual work loads. In order to reduce the significant variations in practice, we also recommend clarifying the administrative responsibility for reviewing course unit assignments. At present, it is unclear whether this responsibility rests with the Office of the University Registrar, with individual school deans or department chairs, or exclusively with the instructors. We recommend that the registrar review proposed unit assignments and investigate instances that do not appear to be consistent with university policy by discussing the situation with the instructor and department chair. We further recommend that the registrar report instances of gross over- or under-assignment of credit to the Senate Committee on Academic Appraisal and Achievement, which would have final authority to determine the appropriate assignment of credit.

Grades

In the spring of 1993-94, the Committee on Academic Appraisal and Achievement recommended a series of changes in the grading system, which were eventually passed by the Faculty Senate. These changes restored a nonpassing grade to the transcript, narrowed the period in which a student could add or drop a course, and limited the number of times a student could retake a course. Although this evoked a great deal of discussion at Stanford and in outside media about "grade inflation," the committee did not claim that its proposals would have much impact on the distribution of grades. Grade inflation remains a subject to be addressed.

Two things should be noted at the outset. First, the upward trend in grades is not a peculiarly Stanford phenomenon. Similar trends can be observed at most, if not all, of our peer institutions. Second, it is not a new issue. In 1968, *The Study of Education at Stanford* noted "a significant upward shift in the average grades given Stanford undergraduates."⁷ Over time, the upward shift in average grades has steadily progressed; the number of "As" and even "A+'s" has grown, while the number of "C's" has shrunk. (See Appendix 3, Graphs A and B.)

Although no one doubts the existence of this trend, there is considerable disagreement about its causes and consequences. Some continue to believe, as did the authors of the SES

⁷ *The Study of Education at Stanford, Report to the University*, vol 2, Undergraduate Education (1968), p. 47.

report in 1968, that it “probably reflects improvement within the secondary schools and, more certainly, the unusually high caliber of our undergraduates.” Others argue that the trend reflects changes in class size (because smaller classes allegedly produce higher grades), the introduction of course evaluations (because teachers seeking popularity allegedly give higher grades), or a variety of other factors. Nor is there any agreement about the effects of grade inflation. Some claim that both inside and outside the institution, the Stanford grading system continues to command respect; others fear that inflated grades make transcripts less useful for graduate schools and employers. Since all of these views rest on the slimmest of empirical bases, it is not surprising that they turn out to be difficult to resolve. As usually happens, into such evidentiary vacuums rush assumptions, anecdotes, and autobiography.

The Commission is inclined to believe that, whatever its origins, grade inflation really is a problem. If we think of grades not as a currency but rather as a kind of language, then it seems reasonable that a larger vocabulary is preferable to a smaller one. At present, our grading scale is not only moving up, but also becoming more compressed. It is difficult to imagine that this will not eventually have an adverse impact on the integrity and utility of our students’ transcripts. Moreover, we are convinced that the clustering of grades at the upper end of the scale makes it difficult to identify truly exceptional work. If, as there is reason to believe, our students actually are doing better work, it is surely unfortunate that we have no way of recognizing and rewarding them. In practice, the primary effect of the upward shift in grades is to weaken the relative power of the “A” and to amplify the significance of lower grades—the “C” means more now than it ever did.

The increasing diversity in grading policy across disciplines and schools concerns us at least as much as the upward trend in grading. At present, the diversity in the way grades are given has become so great that we seem to be in danger of losing a common language of evaluation. While there may be room for argument about the significance of grade inflation, surely we can all agree that grades should have roughly the same meaning throughout the university.

The Commission was not in a position to suggest remedies for the problems of our grading system. The recent work of the Committee on Academic Appraisal and Achievement, together with the community discussion and Senate debate that followed, underscored how complicated discussions of grading policy can be. We had neither the time nor the appropriate composition to conduct a full-scale investigation of grades. We will limit ourselves, therefore, to two procedural recommendations. First, because we think faculty members should be aware of grading practices in the university, we recommend that the grade distribution for courses, by course size and discipline, be published in a way that would not reveal the identity of individual courses. Second, we recommend that a task force be established to conduct a thorough, broadly based inquiry into grading policy and to recommend ways in which grades can play a more effective role in teaching and learning at Stanford. Since the Faculty Senate has ultimate responsibility for grading policy, this task force should probably be a subcommittee of the Senate’s Committee on Academic Appraisal and Achievement.

The Transcript

The Stanford transcript is a chronological record of a student’s courses and grades. Because it shows the development of a student’s academic career, this is a useful format for certain purposes. The current transcript does not, however, display whether or how a student has

fulfilled various requirements and thus does not mark progress toward the degree. More important, the transcript does not recognize special skills, such as language proficiency. Nor does it record the kind of coherence that we believe is an important part of a successful curriculum. We recommend, therefore, that the registrar prepare some alternative formats for the transcript, which would include information about students' language competence, how they fulfilled the breadth requirements, and what courses they used for their major and, if appropriate, their minor field of study. A document providing this information could serve as the basis for discussions between students and their advisors, as well as a record of their academic decisions and accomplishments.

8.

THE ACADEMIC CALENDAR

While one might suppose that the calendar would be one of the few common points of reference for the campus, Stanford does not follow a single timetable. We have a quarter system, but one school (Law) operates on semesters. The academic year begins and ends on certain dates, but in parts of the university these boundaries mean very little. Special periods (such as Dead Week) are observed (or not) in many different ways. Four years is the canonical time allotted to an undergraduate degree, but many students take less or more time.

Despite this variety, the calendar does give shape to the year for most undergraduates. The quarter system determines the pace and, to some extent, the style of instruction. Other conventions, such as the nine-month year and the four-year degree, are deeply rooted in most colleges and universities. Any of these conventions could be changed, and we do recommend some minor modifications. However, we have not tried to alter radically the structure of the academic calendar.

The Quarter System

The nine-month academic year is perhaps the most deeply ingrained tradition of our educational system, existing as it does from grade school through the university. Many aspects of our academic lives are shaped by this schedule: faculty depend on the summer to work on their research; student financial aid packages assume that students will use their summers to earn money to apply to their education; administering the university and its facilities depends on a summer break in the usual routines. But while almost all colleges and universities have a nine-month year, they divide it in many different ways. At present, about 61 percent use the so-called early semester system; 22 percent use the quarter system—a number that has declined in recent years.

Stanford adopted the quarter system in 1917-18. At least four times since then—in 1932, 1954, 1968, and 1982—committees reevaluated this decision. Some recommended changing back to semesters; others endorsed the status quo. To the delight of some and the dismay of others, the quarter system has survived. One reason for its durability is certainly the not inconsiderable cost of changing virtually every aspect of teaching and learning at Stanford. To effect such a change would require clear evidence that its possible benefits would match its unavoidable costs. This evidence does not seem to exist. Without it, there is little chance of finding either the administrative will or the political consensus necessary to scrap the quarter system. Therefore, despite the enthusiasm of some members of the Commission for semesters, we have decided not to recommend that Stanford abandon the quarter system.

We do believe that the present system can be made more efficient and effective.

First, we recommend that the beginning of the academic year be set so as to guarantee a minimum of three weeks between the end of autumn quarter exams and the beginning of winter quarter. This can be done simply by always beginning the autumn quarter no later than fourteen weeks before January 1. This means that classes would generally start no later

than the fourth week of September rather than the first week of October. Registration, orientation, and other prequarter activities would also be about one week earlier. According to the director of Housing and Dining Services, this would not pose significant logistical problems, nor would it reduce revenues from summer programs in the residence halls.

Second, we recommend that all classes end on the Wednesday of the tenth week of the quarter. Thursday and Friday of that week would be a dedicated study period, prior to the beginning of finals, thus ensuring four full days (including the weekend) for reading and preparation. At present, Dead Week, according to the Faculty Handbook, is supposed "to permit students to concentrate on academic work and prepare for final examinations." In practice, there appears to be considerable variability in the way the faculty interpret the meaning of Dead Week. It is clear that the period is rarely a time of significantly reduced activity. Many faculty simply ignore it; others find it impossible to distinguish between class meetings during Dead Week and other class meetings. No one seems happy with the current system.

The Summer Quarter

The only significant way to alter the cycle of nine-month academic years would be to make the summer quarter an integral part of the educational experience of more students.

Some institutions vigorously exploit the opportunities offered by the summer: At Dartmouth, for example, undergraduates are required to remain on campus during the summer after their sophomore year. This is used as a time when a single cohort of students can take a common set of classes in relative isolation from other students. Dartmouth reports (and this is confirmed by anecdotal evidence from students) that its program has been quite successful. It is a good "bonding," as well as a productive academic, experience for the students; the faculty find it a good time to teach.

Even without such an elaborate formal program, we believe that more students should be encouraged to spend one or more summers at Stanford. According to data from the registrar's office, 26 percent of Stanford undergraduates take summer courses at some institution, though only about 8 percent enroll for summer work at Stanford. Obviously many students attend institutions near their homes, but we presume some would consider remaining at Stanford if it were more attractive to do so.

We identified three impediments to undergraduate studies during the summer.

First, Stanford's cost is high compared to the costs of most other summer programs. Many institutions charge lower tuition in the summer than during the academic year. This is done in part to attract visiting students from elsewhere, and in part to let matriculated students enroll without drawing financial aid. Since students are limited to twelve quarters of aid, most would not use a quarter's eligibility for the summer, especially if they were taking less than a normal load. We strongly recommend that the summer session office be allowed to experiment by lowering the tuition to a level that is competitive with that of other major programs. The purpose of the experiment should be to determine whether the number of students increases as the price is lowered. If so, and if there is no net loss in revenue, we recommend a permanent change in the pricing structure.

Second, there is little or no incentive for regular Stanford faculty to teach in the summer. Authorized compensation levels for summer session teaching are too low to be

attractive to most faculty. As a result, courses are mainly staffed by visiting faculty and lecturers. The attractiveness of these courses to Stanford students is therefore reduced. We recommend that the summer session office be allowed to increase compensation rates for Stanford faculty who are willing to teach in the summer on an extra-service basis. We also encourage the summer session office to experiment with different schedules during the summer—for example, by offering four-week sessions on a more intensive daily schedule so that some faculty could spend part of summer away from campus but still have time to offer a course.

Third, there are some glaring deficiencies in the summer curriculum. Some departments have been unwilling to structure faculty teaching assignments or courses to allow for summer offerings. This is particularly true in the sciences, an area of great demand on the part of our students. In fact, anecdotal evidence suggests that many students take science courses during the summer, then transfer the credits back to Stanford. We recommend that departments be encouraged to plan at least some representative sample of courses during the summer so that students have a full range of disciplines from which to select courses.

There are some obvious economic advantages in using our facilities for four quarters rather than three. This was, in fact, the major impetus for the introduction of the quarter system into American higher education by the first president of the University of Chicago.

In addition to these economic considerations, the summer can also be used for various kinds of educational experimentation and innovation. One example of what can be done is the highly successful Honors College, a three-week program that was established two years ago for students about to begin their senior honors projects. Another possible use of the summer would be a Sophomore College, in which students entering their second year would have the opportunity to return to Stanford in September for special courses. This would have many benefits: it would provide an unhurried, intensive, guided learning experience; it would create a number of opportunities for formal and informal advising; it would give students a chance to explore possible majors and encourage them to reevaluate their goals for the remainder of their time at Stanford. We recommend that a working group be established to consider the feasibility of a Sophomore College, with the goal of creating a pilot program for September 1995.

Time to Degree

No other aspect of the Commission's work has generated as much national attention as its charge "to consider whether it is possible and desirable to give more students the opportunity to graduate in less than four years." The way in which the idea of a "three-year degree" seemed to capture people's imagination surely reflects widespread concern about the rising costs of higher education and might reflect growing uncertainty about its proper content and ultimate purpose.

Rather than debate the merits of the three-year degree in the abstract, we examined data from registration records showing what Stanford students do with their four years and whether the present curriculum actually takes that long to complete. Our sample was the three cohorts of students who entered Stanford in 1987, 1988, and 1989. Of the 3,931 students who had graduated from these three cohorts as of 1994, close to 85 percent did so in four years. Less than 2 percent—55 students—graduated in three years. The remaining 13 percent graduated in five years or more.

While the vast majority of students remained on campus for four years, many of them accomplished much more than the minimum requirements for graduation. Almost 11 percent of all students graduating within four years completed two majors, 9 percent completed within four years a “co-term” degree, in which they earned both a bachelor’s and a master’s degree, and 3 percent completed two bachelor’s degrees—an A.B. and a B.S. just under one-quarter of our undergraduates was able to accomplish more than a single degree in a single major within the space of four years.

Additional evidence about the rate of “overachievement” is the number of credits earned by graduating students. All Stanford undergraduates must earn 180 units of credit for graduation. Of the 2,602 students who earned a single degree in a single major, the average number of units earned at graduation was approximately 200. Assuming an average quarter load of fifteen units, these students earned more than one quarter’s worth of additional credits. Students earning more than one major graduated with an average of 211 units, or more than two quarters of additional credit. Students earning dual degrees and co-terminal degrees typically finished with 240 to 250 units, or well over one year of additional credit beyond the average work load.

Looked at another way, 21 percent of students in the 1987-1989 entering cohorts had earned their 180th unit by the end of their third year (see Appendix 3, Table 3). This does not mean that all of these students could have graduated within three years; many of these units may not have applied to degree requirements. The data do suggest, however, that it is possible for many students to accumulate enough credits in three years or less to complete some Stanford degree programs.

It is important to note that the accumulation of credits rests heavily on Stanford’s fairly liberal policies regarding Advanced Placement credits and transfer credits. Of the students in our three cohorts, 71 percent entered Stanford with Advanced Placement credits—typically 20 to 30 credits per student (see Appendix 3, Table 4). Up to 45 AP credits may be applied to a Stanford degree, although they may not be used to meet distribution or major requirements. Of the same three cohorts of students, 38 percent received transfer units (our sample does not include transfer students); the average was approximately thirteen transfer units per student. Up to 90 transfer units may be applied to a Stanford degree.

One argument often given in favor of the four-year degree is that it allows time for students to sample a range of courses in different disciplines, to take their time in selecting a major, and indeed to change majors relatively late in their undergraduate careers. It is difficult to measure the extent to which students actually use their four years in this way. We gathered data on the kinds of courses taken after the accumulation of the 180th unit of credit and note that the most frequently taken courses are in the athletics, physical education, and recreation department (about 7 percent of all courses taken after the 180th unit). However, close behind are courses in human biology, biological sciences, psychology, English, physics, economics, and chemistry. While it is clear from looking at randomly selected transcripts that some students lighten their loads substantially during their last few quarters at Stanford, many others continue to work on their requirements up to the last day of their fourth year. And some take fewer courses during their senior year so that they can devote more time to working as research assistants or writing honors theses.

While all of these data are far from conclusive, they suggest that a significant subset of Stanford students might be able to complete their undergraduate degrees in less than four years if they were properly motivated and properly advised. This is true, at least, under the current requirements for an undergraduate degree in many, if not all, majors.

We do not think that Stanford should push students to graduate early. What and how well students do here is far more important than how quickly they can get it done. Our aim, therefore, should be to encourage exploration and dedication to learning among our students, not to help them find the shortest way to a degree. On the other hand, we should recognize that there are students who might benefit from completing their undergraduate degrees in less than the conventional time. And there are a growing number of students and families who may conclude that three years at Stanford is a better choice than four years at a less expensive institution. We should make it clear that such students are welcome at Stanford and that it is possible for them to complete a degree here.

We recommend that advisors be available to help plan shortened degree programs for anyone who is interested. We also recommend that the university prepare a special publication describing some typical paths toward a bachelor's degree, including three-year, double-degree, and co-terminal programs that would be available to interested and qualified students. From the beginning of their time at Stanford, students should be aware of the options available to them, and of the costs and benefits of each.

10.

TECHNOLOGY AND TECHNIQUES IN TEACHING AND LEARNING

The Commission on Undergraduate Education was charged "to consider new ways of instruction made possible by computers, video equipment and other forms of new technology." In response, we established a subcommittee to examine how Stanford faculty use technology in teaching and to define the principles that should guide our response to the new opportunities in this rapidly changing area. Two things were clear to us from the start. First, we could not hope to make specific recommendations about which technological innovations could or should be employed at Stanford; second, all considerations of technology should be seen in the light of the institution's educational goals. Educational technology should be viewed as ancillary to the process of teaching and learning, not as an end in itself.

The subcommittee began by defining three principles.

First, the university's teaching and research rely heavily on the generation, manipulation, transmission, presentation, and storage of information. Information exists in many forms and ranges over a vast, complex field that only begins with simple "facts." just knowing the facts is becoming increasingly difficult, given the quantity of information being generated. Understanding the relationships between sets of facts is harder still—and at times, impossible—without new means for information processing.

Second, the technology of information processing is evolving very rapidly. If used properly, this technology cannot help but change the ways in which the university's mission is fulfilled. In some instances, it will allow us to do what we already do more effectively; in others, it will allow us to do things that were previously impossible.

Third, there are so many means by which students can become educated that our current reliance on standard lectures—a pedagogy based solely upon the transmission of knowledge—should be questioned. When alternative teaching and learning practices are effectively used, students improve their skills, learn more, and acquire a deeper understanding of the material.

In order to get an idea about present uses of technology in teaching, the subcommittee sent a questionnaire to about 750 faculty in the three schools responsible for undergraduate instruction. The responses showed that most faculty members do not employ technological aids in their courses, that the vast majority do not exploit existing campus resources on technology, and that little systematic work has been done to evaluate the effectiveness of teaching technology. Despite the fact that few use educational technology, most respondents are not opposed to such technology and most acknowledge its value. The most frequently cited impediment to using technology was the lack of time to acquire the necessary skills.

The subcommittee recognized that in order to encourage faculty members to take advantage of educational technology, it was necessary to work within the limits set by the

personal and individualistic nature of teaching and learning. It is simply not part of the academic culture at Stanford (or any other university) to specify the procedures, methods, and techniques—in short, the style—of teaching a course. Thus it is neither feasible nor desirable to try to mandate changes in an individual's pedagogy. The problem is to effect real change in a noncoercive manner, without relying solely on suggestion or exhortation.

We make the following recommendations.

The university must position itself to take advantage of rapidly evolving information technology, and recognize and reward the use of innovative educational practices.

It is unlikely that the pace of technological development will slacken in the near future. In fact, the pace will quicken; consider, for instance, the near-exponential growth in the number of nodes on the Internet, the explosion of electronic databases, and the inevitable merging of television and computer technologies. What will it mean when 500 courses from around the country are available to Stanford students using video-server technology? Will the unquestioned value of human-to-human, face-to-face interactions survive this and related developments? Will we be able to make creative use of technology to reduce the number of large lectures, freeing at least some faculty time for other educational activities? Will the flexibility offered by some technologies outweigh the benefits of those face-to-face interactions, at least some of the time? These are the types of questions that must become permanent fixtures in our culture. Driven by rapid changes in technology, their answers will change at a correspondingly high rate.

There will never be some "golden moment" at which it becomes appropriate or imperative that a certain piece of technology be adopted for use at Stanford. Rather, we must recognize that developments pertinent to the educational enterprise will continue apace, and that various segments of our community will make more or less use of them as time goes by. The question is, how can Stanford make optimal use of appropriate innovations?

The university must champion those who innovate by using a well-defined incentive structure and by widely publicizing the success stories of these individuals. It is imperative that deans, department chairs, department review boards, award committees, and promotion review committees encourage innovative teaching practices through proper incentives. Perhaps one of the university's many teaching awards should be used to highlight technological innovation in education.

The university must allocate sufficient resources to enable individuals to bring about innovation in teaching and learning.

The university must actively assist those who want to be innovative in their teaching activities and grant them sufficient time to develop these innovations. It must be realized that the most effective use of innovative practices will often involve complete redesigns of courses.

The physical infrastructure of the university with regard to information technology must be recognized as inadequate; a commitment to address these inadequacies must be made. High priority should be given to proper classroom outfitting and to distributed information technology facilities for faculty and student use.

We are delighted that President Casper has already acted on our recommendation to create a permanent group to facilitate innovative teaching and learning practices.

We suggest that this group consider the following questions as part of its mission: What should its relationship to other administrative agencies responsible for technology at Stanford? How can it coordinate the many activities occurring on campus that are related to technology in teaching and learning? How can the university be in a position to take advantage of changes in technology and to avoid costly mistakes? How can those faculty members already using innovative technology be included in the committee's work?

If the proposed "science for nonscientists" sequence of courses is established, we recommend that it make extensive use of educational technology for things such as the simulation and modeling of physical systems and the visualization of numerical data. Competency in standard computer techniques, such as the use of electronic mail and file transfers, spreadsheets, and simple databases, should be achieved by all students completing these courses.

In conclusion, we must all recognize that technological innovation will not be without cost. To acquire and maintain the necessary space, hardware, and software, as well as to create the faculty and staff time for the requisite development activities, will require resources. At least in the short term, the use of these innovative practices will rarely lead to greater educational efficiency or productivity (however one defines these elusive qualities). Nevertheless, we are convinced that no matter how expensive innovation may be, ignoring changes of this magnitude is certain to be even more costly.

11.

THE ACADEMIC ENVIRONMENT: Advising

Advising goes on throughout the university. It is done by the professionals at the Undergraduate Advising Center (UAC), by faculty and staff acting as “general advisors” for students who have not declared a major, by members of various departments and programs, and, perhaps most frequently, by an informal network composed of resident fellows and their staffs, faculty members, and students. In different ways and with varying degrees of success, these advisors provide students with the information and direction they need to make their way through the university. Since almost everyone who enters Stanford graduates, it might be argued that the advising system works, but few students think that it works as well as it should. Despite the devoted work of the UAC staff and the volunteer efforts of faculty, staff, and student advisors, advising turns out to be the aspect of undergraduate education with which there is the most dissatisfaction.

The most visible and least successful kind of advising is that given to those who need it most: the incoming students who are assigned an advisor to guide them until they declare a major, which usually happens at the end of their second year. The available evidence suggests that only a minority of students think the general advising system works well; a disturbingly large number find that their advisors are unable to give them the advice they need. Student dissatisfaction with general advising is combined with, and perhaps in part is caused by, widespread faculty indifference. Only about one-third of the general advisors are regular faculty members. Of the 1,320 members of the Academic Council, no more than 119, or less than 10 percent, take the time to help students begin their academic careers at Stanford.

The Commission formed a Subcommittee on the Academic Environment to study the advising system and suggest measures to improve it.

The subcommittee began by examining two alternative models. The first, similar to the system used at the University of Chicago, takes advising out of the hands of the faculty and gives it to a group of full-time professionals, who advise undergraduates throughout their time at the university. The second, practiced at Yale University, for example, makes advising an obligation that must be fulfilled by all faculty members. Although both these approaches have appealing features, in the end neither seemed appropriate for us: the first because it went against our conviction that students should have intellectual ties to the faculty, the second because we feared that compulsion would lead to a further erosion of quality—as it had a few years ago when departments were compelled to produce a certain quota of advisors. Indeed, the more we looked at other universities, the more we realized that the advising system was a source of dissatisfaction at most of our peer institutions.

We do not have a single dramatic remedy for the ills in our advising system. Rather, we have sought to clarify and improve the existing system. In addition, we have suggested some pilot programs that should be tried and, if successful, institutionalized.

First, we urge that more be done to clarify what advisors and advisees should expect from their relationship. One reason why advising is such a common problem may be that it combines at least two essential functions: providing quite specific information about courses and requirements, and giving general advice about students' intellectual interests and career alternatives. Often neither the advisor nor the advisee is quite certain how to strike a proper balance between technical advice and mentoring. In this regard, it is useful to contrast students' unsatisfactory relationship with their advisors with their much more satisfying experiences at the UAC. We suspect that the difference is not only that the professionals at the UAC know the answers, but also that the students who go there know the kind of questions they want to ask. In many advisor-advisee relationships there is no comparable symmetry between the advice the advisor is willing and able to give and the advice the advisee wants to receive. Faculty members should make clear to students how they define their role as advisors. Students should be encouraged to take the initiative in seeking advice, and if their relationship with their advisor is unsatisfactory, they should be free to change.

Second, we recommend that the UAC be given additional resources so that it can become a more active element in the advising relationship. Advisors should be better aware of the services the UAC can perform; advisees should know what is available there. Whenever appropriate, the UAC should provide technical advice so that faculty members can concentrate on discussing students' long-range goals and educational values.

Third, we recommend that the system of peer advising be strengthened. The head advising associates and the advising associates who work with general advisors are an essential part of the system. We recommend that the head associates be given monetary compensation and that they be more fully integrated into residences that house first-year students. The UAC and the Office of Residential Education should examine the feasibility of having all advising associates live in first-year dorms. During the year, all the peer advisors should participate in workshops taught by the UAC staff with the assistance of experienced faculty advisors.

Fourth, we recommend that more vigorous steps be taken to improve the advising available to sophomores, who too often become unattached from their general advisors and drift until they become moored to a major. Many second-year students need advice on selecting a major. This is also a time when a mentoring relationship with the faculty would be of particular value. The summer Sophomore College, which we discussed earlier, would encourage this sort of relationship.

Fifth, we recommend that more faculty be encouraged to serve as advisors. The president, provost, and deans must make clear that advising is a valued part of the faculty's teaching obligation. We will discuss later how advising can be given a more prominent role in the university's reward structure.

Sixth, we recommend that the university create a broad range of opportunities for first- and second-year students to work closely with faculty members.

The university should develop spring quarter tutorials and seminars—small group courses modeled on the successful Sophomore Dialogues and Peters Seminars—taught by faculty advisors and other faculty who wish to offer courses for students at the end of their first year. These courses should be taught in the residences (with student participants

selected from among the dorm residents) and should serve as introductions to a topic of interest to the faculty or as introductions to a field or discipline. Ideally, these courses would help students think about their academic future at Stanford and encourage mentoring relationships between students and professors. A variety of dorm settings (e.g., four-class dorms, all-frosh dorms, and theme houses) should be selected as possible sites for these freshman spring quarter tutorials and seminars. Faculty who teach these courses should be compensated, depending on the number of units, just as they are now compensated for teaching in the sophomore programs.

More opportunities should be available for sophomores to explore academic disciplines and interdisciplinary programs. The institutionalization of the Sophomore Dialogues and Peters Seminars was an important first step in providing more small group courses for second-year students, but student demand for these courses continues to outstretch supply.

We also recommend that every department and program offering undergraduate degrees develop, as a core part of its curriculum, introductory courses to assist sophomores in selecting a major. These courses could be a series of faculty presentations on their teaching and research interests (for one or two units); or they could be directed readings for small groups of students to discuss a discipline's methods and distinctive problems; or they could be introductory lecture courses that give an overview of the discipline. In some cases, faculty from clusters of departments might collaborate to develop courses providing an introduction to the social sciences or an introduction to the humanities. A few good examples of such courses have been developed by certain departments and schools (e.g., Engineering 1 and 6), but a real need exists for all departments and programs to help sophomores find a major and a faculty advisor. University funds should be made available to develop such courses.

Seventh, we recommend that one or two residences be selected for a pilot program in which resident fellows could appoint a team of "dorm faculty mentors," who will develop intellectual connections with dorm residents through discussions, formal dorm-based courses, or other activities. This program would resemble the "college system," but on a much smaller scale. Its goal would be to increase the opportunities to have intellectual exchanges and develop mentoring relationships with interested faculty. Such programs, would be particularly appropriate for the academic theme houses and focus houses.

In conclusion, we want to emphasize that advising is inseparable from the university's other attempts to communicate its goals and values. This process should begin with students' first contact with Stanford and continue throughout their undergraduate career. We urge that those responsible for undergraduate education examine the material sent to prospective and incoming students, starting with the pamphlet, *Stanford Preview*, that is sent to potential applicants. All of this material should not only provide information but should convey the institution's expectations and aspirations. During the summer before their first year, students must be sent a copy of *Courses and Degrees* and a tentative time schedule so that they can begin their academic planning as early as possible.

12.

THE ACADEMIC ENVIRONMENT:

Residential Education

A large majority of Stanford undergraduates live in the university's 75 residences. First-year students are all assigned university housing. Thereafter, students choose their housing through a lottery system or can request special housing priority. At present there are 9 all-fresh houses, 22 four-class houses, and 44 upper-class houses. They range in size from 25 to 300 students; some are large residence halls, but there are also student-managed houses, cooperatives, and apartments. Slightly more than half of the living groups have faculty or staff resident fellows; all have a student staff, which can include resident assistants, theme associates, residence computer consultants, residence tutors, and advising associates.

Five residences are organized as "academic theme houses," in which the programs revolve around an academic subject (e.g., American Studies or Haus Mitteleuropa). Half of the residents draw into these dorms by requesting priority status in the housing lottery. In addition to the theme houses, there are six "focus houses," whose programs emphasize a particular interest (e.g., community service). One-third of their residents can request priority status in the draw. Finally, there are four ethnic theme houses, whose programs are associated with the culture of an American ethnic minority. No more than half of the spaces in these ethnic houses are reserved for members of the relevant ethnic group.

According to a mission statement issued in August 1991, "the essential conviction behind the Stanford residence program is that formal teaching, informal learning, and personal support in residences are integral to a Stanford education. Residential Education programs extend the classroom into the residences and complement the academic curriculum with activities and experiences essential to students' preparation for a life of leadership, intellectual engagement, citizenship and service."

The Commission did not set out to examine all of the many different facets of residential life at Stanford. In the light of our particular mission, we decided to concentrate on those aspects that were directly related to undergraduates' academic and intellectual experiences. Together with advising, this became the main task of the Subcommittee on the Academic Environment.

The subcommittee gathered a great deal of information about residential education. It reviewed materials provided by Acting Director Ann Porteus and her staff, developed questions for the residential education survey distributed to students in January 1994, conducted two focus groups in student dorms, and met with resident fellows, resident assistants, and the ResEd staff. In addition, the Commission worked closely with the Committee on Undergraduate Studies' Subcommittee on Residential Education and Advising, chaired by Professor Jeremy Cohen, which met during the spring to examine the program's objectives and organizational structure.

We found that most undergraduates value the role of residential education in their Stanford experience. In the most recent Senior Survey, over two-thirds of the participants

said that living in the residences had positively affected their "personal growth." And in reply to our questions in the residential education survey, the residents of all but two dorms agreed that the program provided intellectual stimulation. Opinion was more divided as to whether ResEd helped the advising program or encouraged leadership, as well as to whether it met the objective of "promoting a pluralistic community." According to the Commission's Student Advisory Group, the most successful part of residential education is the staff system of resident fellows and resident assistants.

Our investigations convinced us that residential education is an essential part of undergraduate life at Stanford. A dedicated professional staff, a remarkable cadre of resident fellows, and a large group of student leaders work hard to make this program a success. We especially admire the variety of living opportunities Stanford offers and urge that all of them be retained. Our recommendations are designed to strengthen, not replace, the existing system.

First, we recommend that those responsible for residential education do a better job communicating its goals and values to both faculty and students. Our Student Advisory Group pointed out that few students were aware of ResEd's mission. "This ignorance has led to the negative image of an imposed system that ResEd has acquired among a significant portion of students." Professor Cohen's subcommittee also found "a gulf between general perceptions from outside . . . and the actual goals and practices of Residential Education."

Second, we recommend that the residential education staff regularly reevaluate how its programs and activities fit into the broader context of formal class, room instruction and advising. As we have recommended elsewhere, dorm-based courses can help develop valuable mentoring relations between students and faculty. The residential education staff, however, should keep in mind the Student Advisory Group's useful point that while "Intellectual programming . . . maintains academic characteristics, it exists in creative independence allowing different possibilities for interaction and learning than lecture-based classroom academics."

Furthermore, the ResEd staff must redouble their efforts to ensure that their programs provide balanced perspectives in order to expose students to a diversity of views about a wide range of subjects.

Third, we recommend that the three types of theme houses be maintained and that the guidelines distinguishing among them be clarified. We also recommend that greater oversight be exercised over the theme houses and that a review mechanism be established.

Fourth, we recommend that the Committee on Undergraduate Studies' Subcommittee on Residential Education and Advising, which was reactivated this January, remain a active source of policy-making and oversight. As we will argue later, we believe that the academic side of residential education should be part of the portfolio of a vice provost for undergraduate education.

FACULTY RESPONSIBILITY, ASSESSMENT, AND GOVERNANCE

"The fox knows many things," says a fragment of the Greek poet Archilochus, "but the hedgehog knows one big thing." Thus far, our report has been like the fox; we have looked at many different aspects of Stanford's undergraduate education and have made many suggestions for improvement. In this section, we change from fox to hedgehog, from the pursuit of many things to the statement of one big thing. And that big thing is this: In order to survive and flourish as an institution, Stanford must renew and reaffirm its dual commitment to excellence in both research and teaching. This section considers the implications of this dual commitment for faculty recruitment and compensation, the evaluation of courses and programs, and the governance structure of the university.

Faculty Responsibility

In the three schools with undergraduate programs, the overwhelming majority of the faculty does some undergraduate teaching. In Humanities and Sciences, for example, 95 percent of faculty taught undergraduates in 1992-93; 70 percent of the school's enrollments were in classes taught by a member of the Academic Council. At the same time, the number of courses taught, size of enrollments, number of students doing directed readings or individual research, participants in general and major advising—in other words, all measures of faculty participation in undergraduate education—vary greatly from department to department and, we suspect, even more dramatically within departments. Of course such data are often crude and sometimes misleading; the quantity and quality of an individual's contributions to the university are notoriously difficult to measure. Nevertheless, it is clear to us that teaching responsibilities at Stanford are very unevenly distributed. Indeed, recent arrivals from other institutions are sometimes struck by the comparative ease with which individuals can decide how much, or even whether, they wish to be involved with undergraduates. As one recently appointed senior faculty member wrote to us, "I have noticed since coming here the most enormous disparity between the amounts that my different colleagues contribute to the university and its students."

This disparity should not be tolerated. If we are to fulfill our commitment to excellence in teaching and research, individuals cannot be allowed to opt out of their teaching responsibilities. Teaching can and should involve many different kinds of activities, including classroom work and advising, teaching large introductory courses, and directing individual research. Most of us will not do all of these things equally well, but all of us should be expected to contribute to the university's teaching mission—and in those parts of the university where undergraduates are taught, "teaching" must include teaching undergraduates.

We realize that there will always be members of the faculty who do not meet this norm; for a variety of reasons, some will be unwilling or unable to teach effectively, just as some will be unwilling or unable to do research. At present, however, the consequences of not doing research are frequently quite different from the consequences of inadequate teaching; a poor research record usually has a direct effect on a faculty member's salary and status,

while poor teaching may not have any adverse consequences at all. We believe this is wrong. Because Stanford cannot afford to have "free riders" in either research or teaching, a commitment to both must be built into the structure of faculty selection, promotion, and compensation throughout the university,

In order to make this dual commitment an integral part of our institutional life, we recommend the following.

First, Stanford must ensure that there are incentives and rewards through which faculty members can be compensated for their sustained commitment to undergraduate education. At present, we reward outstanding teaching with special prizes. Other incentives and rewards (especially levels of compensation) are usually based on research performance. Some benefits (sabbatical leave, for example) are entitlements given to all faculty. We recommend that this system be changed to put more emphasis on teaching performance. For example, a certain percentage, say one-third, of an individual's annual salary raise should depend on teaching performance. Similarly, research funds should be used to compensate those who serve as advisors, direct undergraduate research, and perform a variety of other forms of "hidden teaching." Sabbatical credits should be increased for those who contribute an unusual amount of service to the university's teaching mission—an absolutely symmetrical exchange, in which faculty members are compensated in kind for contributing time, that most valuable and nonrenewable human resource.

These rewards and incentives will not revolutionize the way resources at Stanford are distributed. But they will represent concrete expressions of the university's commitment to undergraduate education. As such, they will contribute to that change in institutional culture that is essential to sustaining teaching excellence.

Second, teaching effectiveness as well as research productivity should always be a central part of the selection, promotion, and review of faculty members. Compelling evidence of teaching effectiveness must be present in all hiring decisions. Moreover, the teaching responsibility of new faculty members must be clearly defined and mutually agreed upon at the time of appointment. Teaching must play a role in the annual discussion of salary. And, perhaps most important of all, no one should be given tenure who cannot contribute to the university's teaching mission. Finally, teaching effectiveness must also be taken into account when a faculty member receives an offer from another institution. In sum, research alone should not be the only measure of a faculty member's value to Stanford.

Although we believe that the professoriate must take full responsibility for teaching undergraduates, we are also convinced that lecturers play an essential role at Stanford. This role is of particular importance in the small group settings where first- and second-year students acquire the foundational skills upon which their education will be built. In our investigation of Writing and Critical Thinking, language training, and CIV, we have been impressed by the effectiveness of the university's lecturers. In both writing and language programs, they provide the core of professional expertise upon which the entire enterprise depends; and those aspects of CIV most worth preserving are unimaginable without the program's dedicated group of young teachers. We are very skeptical about the alleged budgetary gains and pedagogical advantages that would come from de-emphasizing the role of lecturers. Indeed, we are persuaded that they provide a cost-effective teaching resource that should be sustained and encouraged.

Assessment

Most faculty members at Stanford are part of complex evaluative systems. We are accustomed to having our research judged by funding agencies, referees for scholarly journals, book reviewers, and many others. But in comparison to the elaborate mechanisms that exist for evaluating research, the methods of evaluating teaching are uneven and imprecise. They rarely provide the kind of evidence necessary for either institutional decision-making or individual self-improvement. All of our previous recommendations about rewards and incentives for teaching, therefore, depend on developing a more accurate, discriminating system of evaluation.

Because student opinions are an important part of any system of evaluation, it is essential that we have better means of sampling these opinions than the current course evaluation forms. We recommend, therefore, that the Committee on Academic Appraisal and Achievement, working with its Subcommittee on the Evaluation and the Improvement of Teaching, produce an improved form as quickly as possible. In this regard, it is worth noting that the form currently used by the School of Engineering is superior to those in Humanities and Sciences and Earth Sciences. In Engineering, teaching evaluations are published and thus can serve as guides for students selecting courses. This seems to us a worthwhile kind of consumer protection.

It is essential that we be able to evaluate the quality as well as the popularity of an individual's teaching. Although research on the subject suggests that students are astute and discriminating judges of teaching, it may be true that excellent teaching is not always immediately recognized and that popular teaching does not always have the greatest long-term impact. Teaching evaluations should include, therefore, a summary of a course's contents and objectives, a statement on the way teaching assistants are supervised, and similar forms of explanation and self-evaluation. As we have repeatedly noted, teaching is not only a matter of particular courses; accordingly, work in small groups, the direction of honors projects, various kinds of advising, and other informal modes of teaching should also be evaluated. Some form of peer evaluation of teaching, comparable to what is taken for granted in research, should be employed. We are pleased to note, therefore, that four Stanford departments are participating in a national project on peer evaluation, organized by the American Association of Higher Education and led by Professor Lee Shulman. Their efforts, together with procedures now being used by the Graduate School of Business and some other departments, can be models for new evaluation procedures.

Teaching evaluation is not only important for institutional decision-making, but also a valuable source of self-improvement. Therefore, faculty members should be encouraged to use a variety of evaluative means in order to increase their teaching effectiveness. We especially recommend the services of the Center for Teaching and Learning. Indeed, it is our hope that the center will become a more central part of Stanford's life so that a larger number of faculty members can take advantage of its resources.

The university must also develop more effective ways of assessing its programs. Here again we are struck by the contrast between teaching and research: Whereas we can measure the success of our research mission in a number of ways—volume of research support, number of fellowships and awards, faculty membership in national societies—our ability to assess teaching is much more limited. In addition to the course evaluation forms, we have the surveys sent to graduating seniors and a few other ad hoc evaluations. We need to know a great deal more about how well we are fulfilling our educational objectives;

above all, we need to know not simply what is being taught, but also what our students are learning. The most important purpose of acquiring this information—and the principle governing its collection—must be the improvement of teaching and learning.

The need for assessment has been a recurrent theme in our report. In our discussion of Writing and Critical Thinking, we recommended that the effectiveness of writing instruction be regularly assessed. Similarly, one of our proposals for strengthening language instruction was to measure the proficiency of a sample of those who fulfilled their requirement with a year of instruction at Stanford.

We recommended that the CIV program use focus groups in order to monitor and improve the coherence and consistency of its component tracks. And finally, we recommended that the curricula of departments, like those of interdisciplinary programs, be evaluated at regular intervals.

In addition to these specialized modes of evaluation, we recommend that Stanford begin a program of assessment comparable to the Harvard Assessment Seminars organized by Richard J. Light.⁸ These seminars involve faculty, students, and alumni in a series of studies of education. They use interviews, focus groups, and surveys. Their purpose is to gather information that can be used to improve the quality of courses and programs. At Stanford, such a program should begin modestly, with a faculty director and a few participants, whose selection and composition might resemble those of the current university fellows. Their first task would be to define a set of issues to be explored and to begin the process of data collection. They should report the results of their efforts to the university.

At the beginning of our report, we defined the work of the university as the search for knowledge. Among the things we should know are how well we teach, how well our students learn, and how we can improve both teaching and learning.

Governance

Our final set of recommendations confronts a persistent problem at all research universities: How should the interests of undergraduate education be represented in the administrative structure? Stanford's efforts to answer this question underscore its difficulty. In 1968, *The Study of Education at Stanford* recommended the creation of a dean of undergraduate studies; this position was then converted into a vice provost for undergraduate studies, whose responsibilities were eventually transferred to an associate dean of the School of Humanities and Sciences. These various offices have been occupied by some of our most energetic and distinguished colleagues, who have made lasting contributions to education at Stanford. But there is a widespread sense, shared by many of the incumbents themselves, that the governance problem has never been solved.

As our predecessors did in *The Study of Education at Stanford*, we recommend the creation of a position in the central administration that is responsible for undergraduate education. It seems to us appropriate that this position be in the office of the provost, the chief academic officer of the university. We are attracted by the idea of having a vice provost for undergraduate education that would parallel the vice provost for research and graduate affairs and thus underscore our dual commitment to undergraduate teaching and research.

⁸ For a description of these seminars and a summary of their findings, see Richard J. Light, *The Harvard Assessment Seminars* (Cambridge, Mass., 1990 and 1992).

Moreover, we are convinced that many of the problems of undergraduate education—advising and residential education are obvious examples—are best addressed at the provostial level because they transcend school boundaries. To locate responsibility for undergraduate education in Humanities and Sciences tends to marginalize the other two schools that teach undergraduates, and also to inhibit the development of cooperative ventures with the professional schools.

We recognize that this office must have the authority and resources necessary to effect change. We recommend, therefore, that the vice provost for undergraduate education be given the following responsibilities:

First, to monitor the system of incentives and rewards directly related to teaching, to approve decisions on promotions and hiring, to participate in salary setting, and to be involved in negotiations concerning offers to Stanford faculty from other institutions;

Second, to play a leading role in the assessment of teaching and learning at Stanford, to supervise programs required of all undergraduates (Writing and Critical Thinking, language, the breadth requirements, and CIV), and to participate in the regular evaluations of programs and departments;

Third, to assume responsibility for the Center for Teaching and Learning, the Haas Center for Public Service, the Undergraduate Advising Center, the Office of Undergraduate Research Opportunities, and the educational functions of residential education; these critically important aspects of undergraduate education should be firmly tied to the academic structure of the university;

Fourth, to take the initiative in implementing the various recommendations of the Commission on Undergraduate Education, including strengthening the writing and language requirements, developing a new science course, redefining CIV, creating new mechanisms for curricular evaluation, monitoring reforms in academic bookkeeping, participating in discussion of the pedagogical uses of technology, working to improve the advising system, clarifying the goals of residential education, enhancing the role of teaching in faculty selection and compensation, and gathering the information necessary for the continual assessment and improvement of teaching and learning.

It is not an accident that Stanford, like every other research university, has had such difficulty finding the best way to represent undergraduates in its administrative structure. We do not claim that we have found the perfect solution to this persistent problem; indeed we are skeptical that a perfect solution exists. But we are firmly convinced that there should be one person, strategically located at the center of the university, who is responsible for undergraduate education. Among the various alternatives, it seems to us that a vice provost is the best person to carry out this responsibility.

11.

CONCLUSION:

Undergraduate Education at a Research University

In the preface to his classic treatise, *The Idea of a University*, John Henry Newman wrote: "To discover and to teach are distinct functions; they are also distinct gifts, and are not commonly found united in the same person." Universities like Stanford are based on the conviction that Newman was wrong, that discovery and teaching are mutually enriching activities, and that it is possible to pursue excellence in both. Indeed we would like to believe that, in the words of President Nannerl Keohane of Duke, "the functions of discovering and sharing knowledge are intimately related . . . two ways of defining the same experience."⁹

In the course of our report, we have had many occasions to point out the close relationship between teaching and research. We have noted the growing involvement of our undergraduates in the university's research activities. This involvement, we believe, is Stanford's most apparent "competitive advantage" in undergraduate education. Enabling students to work at the edge of knowledge, to explore with the faculty new subjects and modes of inquiry, and to use the university's extraordinary resources gives them opportunities available at few other places. There is ample evidence that students value these opportunities highly and use them well. Several of our recommendations point to ways they might be expanded.

While we do not doubt that teaching and research can often be productively related, they are not always the same thing. Some research will not be accessible to undergraduates. And there are important aspects of our teaching mission, especially in the student's first two years, that will have relatively little to do with the faculty's research interests. We should not use the valuable goal of connecting teaching and research as an excuse to undervalue or avoid the kind of instruction through which students are introduced to elementary material and learn basic skills. Because the institutional grain of the university so manifestly runs toward research, it is especially important that this kind of foundational teaching be sustained and rewarded.

No matter how ingenious we are about combining them, there will always be a certain tension between teaching and research, in the daily lives of individual faculty members and in the values and organization of the university. From this tension comes the question recently posed by Jonathan Cole of Columbia University: "Is it possible in the highly competitive world of research universities . . . to produce faculty members who are among the most distinguished in the world in terms of research productivity and who will devote sufficient time and energy to teaching, particularly teaching undergraduates?"¹⁰ We are

⁹ John Henry Newman, *The Idea of a University* (1852, reprinted Notre Dame, Ind., 1982), p. xl; Nannerl O. Keohane, "The Mission of the Research University," *Daedalks* (Fall 1993), p. 105.

¹⁰ Jonathan R. Cole, "Balancing Acts: Dilemma of Choice Facing Research Universities," *Daedalus* (Fall 1993), p. 23.

firmly convinced that the need to find an affirmative answer to this question has never been more pressing, nor the consequences of failing to do so more perilous for our well-being.

We view our report as the beginning of a process of reflection about the proper role of undergraduate education at Stanford. We recognize that lasting change at the university must come from within, from the commitment and energies of those who will have to develop particular courses and programs, assume the responsibility of advising students, direct their research projects, and perform all of those other tasks that contribute to the education of Stanford undergraduates. We have tried to encourage this commitment and suggest ways to channel these energies; without them our words will have no life. Our worst fear is not that the Commission's recommendations will be rejected, but that they will be ignored. Our best hope is that our report will become the occasion for sustained debate and creative innovation. We will regard our enterprise as successful if, now that we have fulfilled our charge, our work becomes the work of the university.