At its 50-year mark, how can UCSD best shape undergraduate education? As a spin-off initially from the Task Force on Undergraduate Academic Advising, we propose here a coherent set of modifications to complicated structures that evolved because they could when there was lots of money, not because they are the best choice. Our hope is that the faculty of each department, division, and program will think about these ideas and other improvements. As UCSD moves into its second half-century, we believe that our world-class faculty colleagues can cooperate and think forward to turn the opportunity of the fiscal crisis to positive planning for a bright future.

As the Academic Advising study, co-chaired by Schneewind and Muir Provost Susan Smith, revealed, both staff and students are burdened by, and faculty are often ill-informed about or disengaged from, the many and complex requirements for a UCSD degree. GE requirements vary from college to college and are sometimes complex in themselves. Some majors require huge numbers of credits, and there may be complicated pre-requisites or tracks within the major. And more and more of our students come in with credits from AP courses and from other institutions, some of which may count for one aspect of the UCSD and not for another. Students are taking longer to graduate because of complicated GE requirements that do not necessarily fulfill pre-requisites to majors; heavy course loads for majors; double majors and triple majors; the high number of credits required for graduation (180); and the even higher number permitted (200; 240 for double majors). The 2-year plans required by the state really work out as 3-year plans, especially since transfer students have different backgrounds; and some 4-year plans are really 5-year plans. Furthermore, undue emphasis on the major, which is only one part of a university education, undermines students’ development of intellectual autonomy and their free selection, guided by faculty and advisors, of the best major and career path. The best-educated students will have the best careers and be most inclined and able to support UCSD later, as alumae/i donors and as California voters.

The Enrollment Management Task Force of 2003-4, co-chaired by Mark Appelbaum and Vistasp Karbhari, and including Dick Attiyeh, Paul Drake, and Bill Griswold, considered four “Models of Enrollment Management,” including what they called “The General College Model.” We are writing to support and elaborate on that model, whose different parts must be implemented together for any of them to really make sense. Specifically, we recommend that:

1. Students declare a major only after having completed all GE requirements and 90 hours of academic credit (including AP and transfer credit, although these topics should also be studied). Most freshmen are either undecided on admission or change their major as they explore many fields through their GE requirements and early coursework towards the major. About one-third of the 1997 entering class matriculated undeclared, and of the remainder, between 18% (Political Science) and 67% (Physics) changed their matriculation majors (between 30 and 50% for most departments). Changing a major, whether declared or undeclared, may well mean that some courses taken count for no
graduation requirement except the University total number of credit-hours. So we recommend below also that major requirements be cut back.

With delayed declaration and fewer major requirements, students might not feel trapped because of a preliminary interest in a subject or parental pressure. If parents knew that majors were not chosen until sophomore year, students would have time to develop their own thinking and independence, and might be able speak up for themselves as adults. Declaring a major later would give students a chance at independence and autonomy.

2. Departments and programs who have permission to regulate admissions to their majors be permitted to do so based only on course work completed at UCSD or feeder community colleges. Departments that restrict their majors should do so on the basis of criteria like pre-requisite courses, minimum college GPA, or minimum GPA within those pre-requisite courses. These pre-requisites would replace the “impacted major” status, which as granted by CEP was never intended to be permanent, but to provide a three-year period for the department or division to “expediently resolve the circumstances that led to a request for impacted status” (see Academic Senate, “Criteria for Impacted Status Requests,” October 8, 2002). In other words, if more students want to take certain gateway classes, more sections of them should be offered. Departments should think through carefully whether specific courses or more general sorts of courses are really necessary as pre-requisite for high-quality undergraduate work. Admitting students to a major based on work done at UCSD or at a community college, rather than on high school GPA and SAT test scores, would be fairer. Applicants to a popular UCSD major would have to prove their competence and talent in competition with their peers at the University. The various factors that play into admission into the University would not continue to skew opportunity after matriculation. Not only is this fairer than judging on high school work in different schools, but also those admitted to a major would be those who still wanted to apply for the major after experiencing college-level work, not those whose parents wanted them to do it before they even set foot on campus. To worries that not guaranteeing freshmen a spot in a popular major would weaken us in competition with UCLA and Berkeley, we would note that we are in any case only getting 4% of admits who are also admitted to Berkeley and UCLA, such a small percentage that it seems hardly worth clinging to a policy to retain them, if the policy is otherwise undesirable and unfair.

3. The number of GE courses required should be more uniform across the colleges, so that GEs are an introduction to worlds of thought, not a burden and a hindrance. Students should be able to and required to complete GE requirements in their first two years, while still working on the pre-requisite and lower-division courses for their majors.

4. Further, while some of the differences in GE requirements are substantive (such as the core sequences) others are only variations on distribution requirements, which could be streamlined. Colleges should distinguish between making suggestions about (for instance) which History courses are good for freshmen, and permitting only courses from a set list, which does not take account of changes in departmental offerings or of specific students’ interests or abilities. Colleges and departments should work together to assure that wherever possible GE requirements will serve as pre-requisites for a wide variety of majors. That means that there should be as much latitude in both as is consistent with the intellectual work students truly need to have done to advance to the major. Taking the
science and math side as an example, the College requirements could be rationalized to, say, require that every student have:
   a. 2 general science courses (maybe lab science)
   b. 2 general math course, including calculus as an option
   c. 1 statistics course

There is no question that these subjects are critical to critical thinking. Scientific and mathematical methods are among the most important methods of knowing we have today; every student should be able to use them. A side effect of this approach would be that departments would be discouraged from requiring courses that are small variants of courses that students have taken in the Colleges: for instance, CSE used to require Physics for engineers, but now accepts Chemistry or Biology. That helps students change majors to CS, or select CS if they have AP’d Chemistry. (CSE could not delegate its science requirement to the Colleges, because engineering students are exempt from Warren College’s science requirement, an example of the high variation among College requirements.)

5. Each department should consider dramatically simplifying its major programs. With simpler majors, students are more likely to actually be able to graduate on time. But more importantly, a major is not a commitment to one path in life. It should not require the amount or level of in-depth work appropriate to graduate school (although some students may choose to take more courses than required in one area), but need require only as much depth as necessary for what is only one piece of a broad education in different styles of thinking, knowing, testing, and creating.

6. Students should be able to explore major choices for a year, change majors after a year, double major, or transfer from a community college and still graduate in 4 years, without having to carry more than 18 credits a term. CEP might mandate that “Every department must provide a breadth-targeted major suitable to (but not limited to) double majors, comprising no more than 60 upper-division credits. To provide flexibility to students in the timing of their decisions on a major, all course credits satisfying a requirement in one of the department's other majors should be acceptable to this breadth-targeted major.” Specifically, departments might think about the following.
   a. **Pre-requisites to the major.** Each department should work out which pre-requisites are truly necessary as evidence of aptitude and interest before a student enters the major. Departments that wish to limit the number of majors they accept might consider GPA or GPA within pre-requisite courses or grades in specific gateway courses as sluices to manage the flow.
   b. **Multiple majors within a discipline.** Many majors have required concentrations built into them, which further complicate students’ efforts to juggle their schedules and follow their developing interests. For instance, International Studies, with 1000 majors, offers 7 tracks, each with its own requirements. We recommend that majors be made as simple as possible. Concentration requirements should be eliminated or reduced. Similarly, UCSD has 28 departments and 17 programs, but 130 majors. Are their multiple majors and minors are truly different enough at the undergraduate level that the same student interests and education could not be handled by one major with optional courses within it? A major in a discipline, teaching disciplinary skills and modes of thought, may be sufficiently specialized for undergraduates. More precise courses of study for particular interests within a discipline can be suggested without being
required, so that if a student were unable to schedule a couple of courses in a particular track, she could still graduate on time, with most of the expertise she wanted. The undergraduate perception that everything must be labelled to count for anything should not be allowed to drive faculty judgement on curriculum or to box students into narrow fields of study. If department faculty think that very specific majors are important to admission to professional schools or for particular careers, hard evidence on that point should be sought; it cannot be assumed that overspecialization sells, but must be shown. Career Services advisors regard specific majors as unnecessary for most graduate and professional education.

c. **Reducing credits required for the major.** At present, majors at UCSD must include at least 12 upper-division courses, for 48 credits, in additional sometime quite substantial lower-division requirements. In fact, many majors require up to 60 credits, and some into the 90s. In a few cases the very high numbers may be required by engineering accreditation (but we have not been able to get good information on that), but in most cases they are not. Faculty should carefully revisit their major requirements with their students’ best educational interests and timely graduation in mind. Lower departmental credit-hour requirements may increase the pool of applicants, as parents might prefer UCSD if they think their kids can graduate on time. But more importantly, lower credit-hour requirements in majors will also enable students to follow their developing interests, experimenting with and even changing majors, or pursuing them single-mindedly, as their own individual intellectual development dictates.

d. **Multiple majors.** Multiple majors extend time to graduation, because 240 credits are then permitted. Triple majors should not be permitted. We are reluctant to end double majors entirely, because some programs’ majors are almost all double majors, but students should be probably be discouraged from double-majoring or required to do it with the normal time-to-degree. Other institutions do limit double majors. Students with one declared major should go on taking a variety of different courses, rather than locking themselves into a second major. FTE funding is dependent on enrollments rather than majors, so this change should not have implications for financing.

7. **Writing across the curriculum.** Not only the number of pre-requisites and major courses could be re-thought, but also the kind of courses and the kind of curriculum we offer. Majors are for moving towards expertise, not in terms of mere facts, but in the ability to do things. To do things well requires lots of practice; and that means that we have to choose carefully which things we want our students to be able to do. They will not become expert, as undergraduates, in every aspect of a discipline; but they can become expert in one or two, or in areas that will allow them to become expert in others later as their careers develop. In addition to cutting some courses in the really demanding majors, therefore, we might also develop a different kind of education for engineers and scientists, one that included more writing, more speaking, and more creative and research projects, at the expense of some advanced technical courses, which they could take in graduate school. If every major included continued development of critical thinking skills (made manifest in writing and in oral reports and discussion), then our students
would be prepared both for further learning, and immediately to take their places in
careers that always demand persuasive and analytical writing and speaking skills in the
form of grant applications, diagnoses, engineering analyses, contract bids, etc. Every
career requires, in some form, the metal deployment and clear expression of logic,
critical thinking, argument, evidence, standards of proof. With GE requirements finished
in the first two years, students would be well-equipped to conjoin the technical courses in
their majors with the writing and speaking work that demonstrates clear thinking about
complex topics. Writing across the curriculum might create pressure to add courses to
majors, in opposition to our goal of reducing major credit-hour requirements, but writing
should be integrated into content courses, not tacked on.

Such big changes will certainly require changes in student culture. Students free to
choose courses widely might require more advising rather than less, because they do not have the
habit of identifying their own interests and choosing for themselves. But instead of giving in to
student habits, it is our duty as faculty to shape them. Student cultural changes take time:
perhaps, as in the case of on-line Wait-list system, a full cycle (4-5 years) of student life. We do
not propose that the University mandate one-size-fits-all limits on the size of majors and other
issues; merely that faculty think them through from an informed educational and career
perspective. That means not just buying into a model of inflated majors common across the
country; and not just buying into the perceptions of the students we are meant to be educating;
but really investigating what kind of curriculum is best in each field – best not just to produce
competence, but to reproduce people at the top of the field, where so many of us are.

Addendum:

In the course of working on the Task Force, Schneewind did a little poking around on the
educational and career rationale for curriculum streamlining and reform. This was initially from
an advising perspective, but it became clear that there were larger issues at stake. What follows
is just a sampling of some reporting on the issue, as an initial basis for faculty debate. Since the
sciences and engineering tend to be the high-credit-hour majors, much of this focusses on them.

The heavy workload of advisors is part of a national dilemma identified in a recent New
wrote: “Even before they arrive on campus, students — and their parents — are increasingly
focused on what comes after college. What’s the return on investment, especially as the cost of
that investment keeps rising? How will that major translate into a job? The pressure on
institutions to answer those questions is prompting changes from the admissions office to the
career center. But even as they rush to prove their relevance, colleges and universities worry that
students are specializing too early, that they are so focused on picking the perfect major that they
don’t allow time for self-discovery, much less late blooming.” She reported that at the
University of Michigan, courses had been developed to link learning more directly with business
and professional activity; but the same president who has been overseeing that process, Dr. Mary
Sue Coleman, opposed training students too narrowly — “creating them to do some little
widget,” as she put it. Successful entrepreneurs and professionals need what Dr. Coleman calls
“core knowledge.” “We believe that we do our best for students when we give them tools to be
analytical, to be able to gather information and to determine the validity of that information
themselves, particularly in this world where people don’t filter for you anymore,” Dr. Coleman says. “We want to teach them how to make an argument, how to defend an argument, to make a choice.” Zernicke concluded by reporting that “The Association of American Colleges and Universities recently asked employers who hire at least 25 percent of their workforce from two- or four-year colleges what they want institutions to teach. The answers did not suggest a narrow focus. Instead, 89 percent said they wanted more emphasis on “the ability to effectively communicate orally and in writing,” 81 percent asked for better “critical thinking and analytical reasoning skills” and 70 percent were looking for “the ability to innovate and be creative.”

Zernicke’s findings are borne out by comments from middle-level management at Citibank, Deutsche Bank, and Siemens. Citibank managers are increasingly fed up with applicants who cannot write well. At Deutsche Bank, it is observed that top-level management are all excellent writers: poor writing is a block to real advancement. At Siemens, new engineers who have a broad background and have shown depth in one particular area by doing a serious senior project are preferred to those with lots and lots of coursework: a person who can go in-depth in one area can learn to do so in others. The Siemens manager commented that the weakness of mediocre engineers lies not in their lack of skills, which can always be learnt, but in their inability to look at a problem from more than one perspective. Another article in the New York Times, “Multicultural Critical Theory. At B-School?” by Lane Wallace (January 10, 2010), echoes these views: Wallace interviewed a number of business school faculty who argue that successful business students need “to learn how to think critically and creatively every bit as much … as finance or accounting. More specifically, they needed to learn how to approach problems from many perspectives and to combine various approaches to come up with innovative solutions.” The Dean of Rotman School of Management at Toronto described his goal as “a kind of ‘liberal arts M.B.A.’” Three-quarters of business schools are expected to move in this direction in the next decade.

Twenty percent of UCSD students major in engineering. Yet across the country there is a dearth of engineers and a fear that the US has passed leadership in this area to Asia. There are two possible ways to remedy this situation within the University setting. First, take the path preferred by some UC professors: to cram as much professional knowledge as possible into undergraduates, even though half of them will not need much of the advanced coursework they have done in the jobs they will get. Without doing that, faculty fear, they will be nothing more than a technical school. But there is a second way of viewing the problem. Pamela A. Eibeck, a former dean of engineering at Texas Tech and now President of the University of the Pacific, recommended in Insidershighered.com (“Engineering Flexibility,” December 4, 2009), that advanced coursework be left for advanced degrees, while we educate undergraduate engineers in the whole broad human tradition, giving them the same chance other students have to think about really big issues and develop their reading, writing, and analytical skills and their creativity. Eibeck argues that one reason the US is producing so few engineers, compared with China and India, is that most American students demand some flexibility in their educations, and steer clear of engineering programs that present a fixed course of education that cannot even be completed in four years, never mind leaving time for literature, music, art, history, political science, sociology, and other aspects of education. That means that Engineering draws singleminded and homogenous students, and produces narrow and homogenous professionals. (UCSD’s engineering students do have the same GE breadth requirements as other UCSD students.)

Another kind of homogeneity is also evident in engineering schools: too few women and black and Hispanic students signing up. This is disturbing at UCSD, given the stated
commitment to diversity as well as excellence in admissions. While the causes are diverse and interwoven, curriculum plays a role. Domenico Grasso, (“Is It Time to Shut Down Engineering Colleges?,” InsideHigherEd.com, September 23, 2005) points out that “the United States is at a 14-year low in the percentage of women (16.3 percent [of enrolled engineering students]) and African Americans (7.1 percent) enrolling in engineering programs.” He argues that the complex design challenges of today demand that “engineers…grow beyond their traditional roles as problem-solvers to become problem-definers. To catalyze this shift, our engineering curriculum, now packed with technical courses, needs a fresh start. Today’s engineers must be educated to think broadly in fundamental and integrative ways about the basic tenets of engineering. If we define engineering as the application of math and science in service to humanity, these tenets must include study of the human condition, the human experience, the human record, [including]…literature and economics, history and music, philosophy and languages… To create a competitive new generation of engineering leaders [we must] scale back the number of increasingly narrow, and quickly outmoded technical courses students are now required to take -- leaving only those that teach them to think like engineers and to gain knowledge to solve problems. Students need to have room to in their schedules for wide ranging elective study. There is a need for advanced engineering training, to be sure, but the place for that is at the graduate level -- in one of the growing number of nine-month masters programs, perhaps. Teaching engineers to think, in the broadest, cross-disciplinary sense, is critical.”

Similar issues are raised by Julio de Paula, “Reforming Pre-Med” (Inside Higher Ed, August 20, 2009 ), one of the co-authors of the report “Scientific Foundations for Future Physicians,” released by the Association of American Medical Colleges in collaboration with the Howard Hughes Medical Institute. De Paula writes that pre-medical education must become more committed to “an important goal of liberal education: to explore and discover connections between different threads of human thought and experience. Scientists and engineers trained in the tradition of the liberal arts understand the socioeconomic and political contexts of global challenges, and are more likely to find solutions that affirm human rights, protect the environment, and raise standards of living across the globe.”