

The MIT Faculty Newsletter

Vol. XI No. 6

May/June 1999

MIT Medical: A Brief History and Plans for the Future

Michael Glover

Following is the first in a continuing series of articles from MIT Medical. Future pieces will address subjects such as new facilities, medical research, and other contemporary medical issues. -Ed.

Adapting to change

The Institute established what we now call MIT Medical nearly a century ago to provide high quality medical care for the MIT community. In 1904, this care consisted of several annual lectures on “hygiene,” regular measurements of students’ heights and weights, and prescriptions of “gymnastics training” to patients with poor posture.

By the early 1950s, MIT’s “medical service” had grown to 11 medical specialties: internal medicine, surgery, psychiatry, neurology, dental, ophthalmology, otolaryngology, radiology, occupational medicine, dermatology, and a laboratory. The charge for a consultation with a specialist was \$5.

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From The Faculty Chair

Initial Conditions

Lerman New Faculty Chair

Steven R. Lerman

By the time you will read this, I will have started my two-year term as the Chair of the MIT Faculty. I fully expect it to be an exciting time for me personally, and I hope I can serve the entire faculty with at least some of the wisdom and ability of my predecessor, Lotte Bailyn. As I said at a dinner meeting in May for the faculty involved in the governance system, Lotte will be a very hard act to follow. She is truly an extraordinary person, and MIT owes her our collective thanks for her leadership. I am grateful for the opportunity to have learned the ropes about the role of the chair from her.

The editors of the *Faculty Newsletter* asked me to write this first column as a brief autobiography. The idea is to give those of you I haven’t met some sense of who I am. They also asked me to write something that at least some readers would enjoy reading rather than a boring, prose version of my CV. So, here goes.

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What Are We Up To, Anyway?

John Hildebidle

“Now, what I want is, Facts. Teach these boys and girls nothing but Facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the minds of reasoning animals upon facts: nothing else will ever be of any service to them. This is the principle on which I bring up my own children, and this is the principle on which I bring up these [students]. Stick to Facts, sir!”

Of course, I’ve tricked you – this is not a transcript of a speech at an MIT faculty meeting. What I find chilling is that it almost *could* be, if I didn’t know it was the villainous, unfeeling Thomas Gradgrind, from Dickens’s slender but powerful satiric novel *Hard Times*. And the one thing that must be said in Gradgrind’s defense is that he has a fully-developed theory of education (or perhaps miseducation) to back up his polemic.

There was a dinner, a while ago, for those of us who offered Freshman Advisee Seminars; and we were invited to reflect on how the freshman

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Subscriptions: \$15/year On-Campus
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TEACH TALK

Lessons in Learning, cont. There is more to learning than what occurs in the cognitive domain

Lori Breslow

Stacey Eckman, a fifth-year Ph.D. student in chemistry, was at her wits' end. She had to spot weld a nickel crystal to two thin tungsten rods for an experiment she was running, and she couldn't do it. She had tried to call a former group member whom she had seen do the procedure several times before, but she wasn't at home. After two hours of trying to get the welding to work, she had a slightly scratched crystal and two somewhat discolored, unattached rods. She also found herself "very frazzled and nearly in tears because I couldn't keep my hands from shaking . . ." It was at that point that her former group member called, and speaking to her calmly, gave her some instructions for how to proceed. Wisely recognizing that she needed a break, Stacey went home and returned to the lab the next morning, much more relaxed, and did the welding perfectly.

Stacey was a student of mine in a course I co-taught last semester with Dr. Miriam Diamond, called "Teaching College-Level Chemistry" (5.95). [The 5.95 students were: Course 5 – Dana Buske, Stacey Eckman, George Greco, David Green, Robert Kennedy III, Justin Miller, Deborah Perlstein, Kevin Shea; Course 3 – Mike Fasolka and Bindu Nair; Course 7 – Mitch McVey.] She described her experience learning how to weld for a class assignment that asked the students to learn some new skill or set of data, and to monitor and make observations about their own learning processes. In my last

"Teach Talk" column, I described five "principles" of learning the students had uncovered, all of which could be loosely categorized as relating to cognitive processes or capabilities (e.g., the role of prior knowledge in information processing). In this "Teach Talk," I want to discuss five more concepts that appeared in the 5.95 papers, each of which describes – for lack of a better word – more elusive aspects of the learning process. These elements – attitudes, relationships, emotions – are often hard to identify, which means that instructors are less likely to think consciously about them or try to use them to improve learning. Nonetheless, these factors play a crucial role in the learning process, as the 5.95 students discovered.

Principle #1: Motivation is Complex.

While the psychological research once pointed to reward and punishment as the most powerful motivators for learning (hence the belief that the only thing that motivates students is grades), newer research centers on the idea that human beings, by their very nature, are curiosity seekers, problem solvers, and achievers. As John D. Bransford, Ann L. Brown, and Rodney R. Cocking write in their just released book, *How People Learn: Brain, Mind, Experience, and School* (published by the National Academy of Sciences), "Although extrinsic rewards and punishments clearly affect behavior, people work hard for intrinsic reasons, as well." (p. 48)

In a sense, all the students who took 5.95 were intrinsically motivated to enroll in the subject in the first place; after all, graduate students at MIT are not particularly encouraged to spend their time learning about learning or how to teach well. But in doing this assignment, the students observed some specific idiosyncrasies about what motivated them and why.

For example, Bob Kennedy had a very hard time memorizing the names of the presidents of MIT (along with the decades they were in office) for his 5.95 assignment. He had chosen that task because he knew "some facts in science just need to be memorized." However, he found that since he wasn't learning the names for any real or useful reason, it was hard for him to muster much enthusiasm.

Bob uncovered, as educational researcher Peter Ewell explains, that "learning occurs best in the context of a compelling 'presenting problem'" ("Organizing for Learning," *AAHE Bulletin*, December 1997, p. 4). If students are confronted with a specific, concrete problem that needs to be solved, they are likely to be motivated to tackle it, assuming they are capable of doing so (more on this below). If there seems to be no reason to undertake the work (except, of course, to do well on the test) it is much harder for students to mobilize themselves.

In doing his assignment, David Green came to see that motivation is closely tied to how hard the work is. If the assignment is too easy, it becomes

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Lessons in Learning, cont.

Breslow, from preceding page

boring; if it is too difficult, students are likely to give up in frustration. David decided he was going to “re-learn” Spanish, a language in which he had lost most of his proficiency. As he himself admitted, this was “a very ambitious goal,” and he struggled through the first week of the two-week assignment. He observed, “One major thing I would change if I were to have the chance to repeat the experience would be in how I began. It is a tendency of mine to try to do things beyond the level at which I am fully capable, and I think that I could have made as much progress, but enjoyed the initial stages more, if I had begun at an introductory level.” Nonetheless, by the time the assignment was complete, David did feel he had made significant progress.

Creating work that is neither too easy nor too hard is one responsibility of the instructor; determining how much new or novel material students should be exposed to is another. Most people will seek out novelty, but if they are exposed to too many unknown stimuli, they are likely to become anxious. Because motivation is highest in situations of moderate novelty, learning should be paced so that each step offers some degree of newness without overwhelming the learner.

Finally, according to Bransford, Brown, and Cocking, “Learners of all ages are more motivated when they can see the usefulness of what they are learning and when they can use that information to do something that has an impact on others . . .” (p. 49). Or, as David Green put it, “I think that one thing about myself that was made clear by this experience is that I enjoy learning much more when I actually apply what I have learned to something I feel is meaningful.” Many of the

subjects MIT offers are often perfect vehicles for this kind of “useful learning,” and we should be on the lookout for these opportunities.

Principle #2: There is an Emotional Component to Learning.

Throughout the 5.95 papers there is evidence of the role that emotion plays in the learning process. Kevin and Jennifer Shea tried to make pasta on a night when they were also packing for a weekend ski trip and were close to collapse from fatigue. In reflecting on how he could improve his ability to

Neuroscience has made tremendous progress in understanding how the brain functions generally and specifically how brain circuits produce emotion. Most important for the discussion here is the discovery that emotions and the ability to think and reason are intertwined. In fact, new research shows that rational thought cannot occur without input from the “emotional brain.” As biochemist James Zull writes in “The Emotional Brain in Learning and Teaching,” “We ‘feel’ rationality before we recognize

Most important for the discussion here is the discovery that emotions and the ability to think and reason are intertwined. In fact, new research shows that rational thought cannot occur without input from the “emotional brain.” As biochemist James Zull writes in “The Emotional Brain in Learning and Teaching,” “We ‘feel’ rationality before we recognize its logical elements. . . .”

learn, Kevin wrote, “. . . when we make fresh pasta again, we will do it on a Sunday afternoon when we are not tired” On the other hand, Justin Miller saw that “the prospect of completing a stage of the project [he was learning how to cross-stitch] encouraged me to continue, at times against my best interest (lack of sleep, hunger).” And Stacey Eckman, as described in the beginning of this column, found that as she became more and more unable to do the task, she became so frustrated that she eventually had to walk away. As she wrote, “When I get frustrated with something . . . I get bogged down in feeling frustrated, so much so that what efforts I do make towards learning are not very effective.”

its logical elements. Conversely, learners find it difficult to accept rational thinking which does not ‘feel right.’” (handout used in a workshop given at the 1998 Professional and Organizational Development Network in Higher Education conference, p. 6). Experiments in brain functioning have also shown that long-term memory is strongly linked to the emotional brain.

Thus it is easy to understand why Kevin and Jennifer Shea found it difficult to concentrate on pasta making when they were stressed from too much to do and too little sleep. Or that some degree of success spurred Justin Miller to continue his work on his cross-stitch piece. The question is,

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Lessons in Learning, cont.

Breslow, from preceding page

how can we provide a positive emotional environment for learning? This question leads into another observation the 5.95 students made – one about the impact of context on learning.

Principle #3: The Conditions in which Learning Takes Place Affect the Process.

Kevin and Jennifer, who were trying to complete their pasta making before “collapsing from fatigue,” put on a CD of traditional Italian music in order “to get into the mood.” Although it didn’t help much (Kevin’s first attempt ended up with “four eggs flowing from the flour crater like lava onto the dining room table”) they were on the right track. We know that the environment in which learning takes place exerts a powerful influence on how successfully or unsuccessfully learning objectives are met.

On one level, this is easy to understand: If the lights don’t work in a classroom or the seats squeak, teaching well in that room is all that much harder. But I also want to discuss the idea of the “teaching environment” in a more abstract way.

In an earlier “Teach Talk” column (*MIT Faculty Newsletter*, Vol. IX, No. 2, October-November, 1996), I described the work of educational researchers Ference Marton, Roger Säljö, Paul Ramsden, and Noel Entwistle, among others, who have postulated the theory of “deep” versus “superficial” learning. Students may work with material superficially, looking primarily for facts they will be tested on, or what they need to know to get an assignment done. Or they may interact with the material on a more complex level, trying to integrate new knowledge with old, so that their understanding of a specific phenomenon, process, or idea becomes more sophisticated and expert.

Based on twenty years of research observing thousands of students in over forty different countries, the hypothesis is that students are either “deep” or “superficial” learners not because of their own characteristics, personalities, or capabilities. *Rather deep and superficial learners are created by signals from within the environment in which the students are working.*

Students make decisions about how they will approach learning tasks quite pragmatically by assessing what will be expected of them in any given situation and then trying to fulfill those expectations. Students take a surface approach to learning, for example, when there is too much material in a subject or when methods of assessment stress surface learning. (In fact, these researchers point out that evaluation may be the most crucial variable in promoting deep learning.) On the other hand, they become deep learners when their instructors give them an opportunity to engage in active learning, or when lecturers make explicit references to how new ideas relate to previous ones.

While the 5.95 students did not hit upon this striking difference in environmental variables, they were observant enough to make the connection between the conditions under which they were learning and the ease with which they accomplished the tasks they set out for themselves. That is why Kevin Shea swears he and his wife will only attempt to make pasta again “on a Sunday afternoon when we are not tired and have all day to do it properly.”

Principle #4: Learning How to Learn Should be a Goal.

The idea of “life-long learning” – learning how to learn – has become a rallying cry in educational circles.

Mike Faselka provided an excellent example of why this is so important, and how it can be achieved.

Mike set out to learn how to play *Star Wars: Rogue Squadron* for this assignment. He detailed the three-phase process by which he mastered this skill: He acquired a rudimentary understanding of the skills he needed to begin playing; he experimented with how to make the game work; and, finally, he further defined and refined his understanding and abilities. (Lest you think this sequence only works for mastering videogames, Mike reported that when he had to learn to use an Atomic Force Microscope [AFM] for his research, he went through the same sequence of steps.)

Again, Mike realized as he approached this task that he had to begin by finding some sort of synopsis or outline of the rules of the game, so that he could get a “sense” of how the game was played. He recognized this need as part of his own learning style, and he was able to identify this process because he was savvy about himself as a learner. He wrote: “. . . I believe my desire for an outline comes from my long experience as a student: i.e., I was looking for a learning tool that I knew would start me on my way. I have come to believe this is in itself a developed skill, meaning I’m not sure that a less-experienced student (for example, me in my younger years) would have searched out this kind of resource as initially as I did.”

Having looked for an “overview” and found it, Mike was able to proceed much more quickly in mastering the game than he would have been able to do otherwise.

Bransford, Brown, and Cocking point out in *How People Learn* that at the basis of what we call life-long

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Lessons in Learning, cont.*Breslow, from preceding page*

learning is the concept of the learner as a learner. They write, "A learner's self-awareness as a learner and the role of appraisal strategies keep learning on target or help keep the learner asking if s/he understands." (p. xiv). Many of the 5.95 students reported becoming aware of strategies for learning that worked particularly well for them. (For example, George Greco explained that he learns best by "watching an experienced person do something, imitating him or her, and then practicing [the skill] until it becomes internalized.") A goal, then, for our own teaching should be to help students develop the metacognitive skill of reflecting upon their learning, and "to learn to determine for themselves if they understand" (*How People Learn*, p. xv).

Principle #5: Learning is a Human Endeavor

Dana Buske used the 5.95 assignment as an opportunity to learn how to skate ski. (For those of you who, like me, don't know, skate skiing is a hybrid of ice-skating and cross-country skiing.) Dana's motivation was simple: Her fiancé was an avid skier, and, so, she wrote, "My learning

process was greatly accelerated by a teacher who gave me encouragement and also constructive criticism in the form of suggestions for what I needed to work on."

It is interesting how many of the 5.95 students went to a family member or a friend to learn the skill they wanted to master: Kevin Shea to his grandmother; Mitch McVey to his friend, the expert bubble gum blower; Stacey Eckman to a fellow group member who knew how to weld.

Bindu Nair made the mistake of asking both her mother and her aunt for advice on how to make *dosa*, a South Indian rice cake. (It was a problem because the two women gave her contradictory information.) She wrote, "If I were to try to learn to make *dosa* over again, I would be sure that I picked either my aunt *or* my mother as my primary instructor." Nonetheless, when the process of grinding the lentil and rice mixture became a "pain," both her mother and her aunt sympathized with her and encouraged her to continue. "I realize I work best and don't give up," she wrote about her own ability to learn, "if I have constant

encouragement and reinforcement from others."

Dana Buske was able to take what she had observed in learning how to skate ski and generalize it to her own future as a teacher. "How I learned to skate ski relates well to how one teaches chemistry," she explained. She continued: "Although I am self motivated and enthusiastic about learning, having positive feedback and encouragement were invaluable Learning how to do something for the first time is a valuable experience for a potential teacher. I experienced the frustrations and satisfactions of learning how to do something and become good at it. These feelings will help me to be patient and empathetic, which are important qualities for a teacher."

I very much enjoyed teaching 5.95 last semester, and hope to teach similar courses in the future. But the fact that Dana had learned what she did about the human element in teaching, and that her classmates took away similar insights, made the course all the more important to me.❖

[Lori Breslow can be reached at lrb@mit.edu]



New from the Teaching and Learning Lab: The "Electronic Forum on Educational Innovation"

Beginning July 1, a new service from TLL, "The Electronic Forum on Educational Innovation," will come on line at the TLL home page. The Forum will be a collection of short descriptions of educational

innovations that have taken place, are currently going on, or are being planned at MIT both inside and outside of the classroom. Each submission will also contain contact information for a person associated with the project.

To post a description on the Forum or to access submissions, please go to the TLL home page <<http://web.mit.edu/odsue/tll/www/>>, and click on "Electronic Forum on Educational Innovation."

What Are We Up To, Anyhow?

Hildebidle, from Page 1

year could be improved. I was surprised to hear, as the first suggestion, “Abolish problem sets.” To which came the predictable response (I paraphrase, but fairly, I promise), “Yes, freshman year puts our students through hell. But after all, that’s a good preparation for life, isn’t it?” That’s New England Calvinism cubed, at the very least. But what seemed to me to emerge from the rather desultory conversation that night was a profound *drift* in our enterprise. We agree, in the main, with Gradgrind’s devotion to fact – it was said, explicitly, at the dinner of which I’ve been talking, that “you can’t imagine without data.” Which may be true of Chemical Engineering (how on earth would I know?) but surely is not true of most of the subjects taught in Literature or Writing or Music, to name just three areas at the Institute.

When, some years back, I was invited to be part of the IAP Charm School, my acerbic then-13-year-old son offered the opinion that I was more suitable as a student than as an instructor. Well, now I have my Ph.D. in charm framed and hanging on my office wall, much like a diploma from some Caribbean medical school. And Charm School has become a habit, you might say.

My usual “area of expertise” is how to start a conversation, usually disguised under some flippant label. This year I offered a “course” grappling with “The Ten Most Profound Questions of Our Time.” Trying out a rough draft on my wife and a few friends, they balked at the very first item – “Which is better, Coke or Pepsi?” “Feeble,” was, as I recall, the kindest characterization they offered. I challenged them to do better, and of course they did.

By consensus, the best, and most truly “profound,” question was offered

by my wife: “What will be the five most fundamental attributes of an educated person of the next century?” Which leads me, in a horrifically roundabout fashion, to my real subject here: what the heck are we up to, anyway?

I have come up against the realization that everyone at MIT, not just we humanists (truly anomalous at a “technological” institution, as I have

just that we are, at the Institute, in a condition of Power-Bog; it is that we don’t clearly know what we are trying to do. We aim to “educate the brightest young people in the world” – but educate them for what? Do we stop, ever, and try to imagine the world they will inhabit and (if past experience is any guide) tend even to dominate and control? When I asked this question of Larry Bacow, he pointed to the Report

I have come up against the realization that everyone at MIT, not just we humanists . . . but everyone, feels somehow marginalized. Everyone has the suspicion . . . that “somebody else is really in control.” . . . The “Hard” Scientists feel excluded by the Engineers, the bulk of the Engineers feel trampled by the Computer Scientists, the faculty at large, after the recent decision about Freshman Housing, feels excluded from power by the Administration.

argued in these pages before) but *everyone*, feels somehow marginalized. Everyone has the suspicion, grounded in what they feel is hard observation, that “somebody else is really in control.” Didn’t Machiavelli offer the realization that power breeds wariness in the powerless? If so, there is much powerlessness abroad at MIT, these days. The “Hard” Scientists feel excluded by the Engineers, the bulk of the Engineers feel trampled by the Computer Scientists, the faculty at large, after the recent decision about Freshman Housing, feels excluded from power by the Administration. I can’t imagine whom President Vest worries about, in the dark of night – but I’d wager there is someone.

But I have, after due consideration, come to a further conclusion. It is not

on Campus Life – which misses the point entirely. It is not “what sort of community should this be, ideally?” which is the question I propose; it is “what should we be teaching, and why?”

Absent a good idea of what our overall purpose is or might be, we fall back too easily on a sort of “add-on” system. Biology seems to be a coming thing – so let’s add a “Biology Requirement.” Our students seem to have trouble “communicating,” so let’s add a “Communication Requirement.” It’s hard to believe we will hold out much longer against the realization that the world is remarkably polyglot, so why not have a “Language Requirement?” Students have a limited pool of available time

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What Are We Up To, Anyhow?

Hildebidle, from preceding page

and energy, of course – but we have surely long since abandoned that as a limiting condition.

When, at one of those grandly collegial faculty dinners Jay Keyser hosts from time to time, I offered the basic proposition of this essay, I was roundly rebuked by a fellow sitting across the table. But when I, in reply, asked him to articulate the “clear sense of purpose” which MIT surely had, he found himself at a loss for words. I take that as evidence for my argument.

We are, of course, compelled to fall back on our own education as a model, for good or ill: either to be repeated or avoided, in much the way a parent will reflect on his/her own parents, as models or warnings or a baffling mixture of both. Quick now, what *are* the most important attributes we can offer to our students, to prepare them to function effectively (no matter as what) in the next century, presuming we all manage to sidestep the horrors of Y2K? And dare we really assume that that century will resemble ours in any conveniently predictable way?

When I ran the idea behind this essay past one of my humanist colleagues, he rebuked me firmly for having given way to engineering-style thinking: “Too goal- or product-oriented.” Well, I refuse to let technology imperialize the whole notion of purpose to that degree. Surely Aristotle and Aquinas and the framers of the first public education law in the country, passed in this very Commonwealth around 1638 (they wanted everyone to be able to read the bible and thus to resist Satan), and Cardinal Newman and John Dewey and even James Bryant Conant knew – or believed they knew – what an “educated person” was, and guided

their notions of “curriculum” and even “pace and pressure” (that perennial MIT buzz-phrase) by that notion. Can we say the same?

I think I have a Favorite Physicist. He writes for the *Globe* and meditates on science and other matters; his name is Chet Raymo. Recently, he pondered an encounter with a Great Blue Heron (a bird that seems to engender powerful thought – Adrienne Rich

once going to the Symphony (or even the Pops) or visiting the MFA or the Gardner. But then I’d just be adding-on more work for them to do, wouldn’t I?

Well, as Whitman remarked, usefully, “Do I contradict myself? Very well then, I contradict myself.” And surely you have heard Emerson’s rejection of consistency as “the hobgoblin of little minds.” I would

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has a fine essay on the subject in her book *What Is Found There*, and Mary Oliver writes poem after poem about these birds). Raymo, finding words not quite up to the mark (and not even trying, blessedly, to run the numbers, aeronautical or otherwise), falls back on the poets John Ciardi and Theodore Roethke, and even Chekhov, and builds to a conclusion that flies in the face of much of what passes for “educational thinking,” nowadays: “Instead of putting computers in our elementary school classrooms, we should take the children out into nature” It is an old, old song, of course, which Raymo sings. My own version would observe that we have much to be ashamed about, when almost every single one of our graduating seniors has spent four years in Boston without

add one more useful apothegm, this time from Wallace Stevens: “One’s ignorance is one’s chief asset.” But not, I hasten to add, when it amounts to an ignorance, even an avoidance of considering, the fundamental goals and purposes of the entire Institute itself.

I offer a final exam – but this will not be true-false or multiple-choice. Take out a piece of lined paper, put your name in the upper right-hand corner, and, in 100 words or less, write out the fundamental *goal* of the educational enterprise at MIT, at the undergraduate level. Make your answer specific and comprehensive. Style will be considered in the grading. No extensions, no incompletes. Ready, set, go✦

[John Hildebidle can be reached at jjhildeb@mit.edu]

Initial Conditions Lerman New Faculty Chair

Lerman, from Page 1

In a very real sense, I am a product of MIT. I came here from a suburb of New York City as an undergraduate in 1969, and somehow never left. I always wanted to be a teacher and researcher, so becoming a professor seemed like a natural result of at least my more realistic childhood yearnings. (Actually, until age eight I wanted to be a helicopter pilot, but that is a different story altogether.) I originally thought I would become a physicist, but I became interested in public infrastructure issues through a freshman seminar offered by two professors in the Civil Engineering Department (now the Civil and Environmental Engineering Department). I stayed on through 1975 to get my doctorate in Transportation Systems, and joined the faculty immediately thereafter. In short, if MIT were operated by the federal penal system, I'd be considered a "lifer."

My early academic career was largely uneventful, so I'll skip most of it. Actually, I didn't get much sleep during those years as an untenured professor, so I don't remember many of the details.

The more interesting part of my academic career started in 1983. By that time I was a full professor, and I was becoming increasingly interested in how computers and communications technologies might be used as part of the educational process. I had been involved in some of the informal deliberations leading to the formation of Project Athena at MIT, and (through a process I still don't understand) the then dean of engineering, Gerald Wilson, asked me to direct it. I felt ready for a change in my work, and I was excited by the prospect of running a major educational research initiative.

Athena offered me the opportunity to get outside the traditional "stovepipe" boundaries of the academic departments for the first time. It was also the most challenging program I have ever been involved in. For the next five years, virtually my entire professional life was focused on the project. The truth is that I

had never run anything even remotely at that scale, so Athena was perhaps one of the better examples of learning on the job.

I directed Project Athena for five years, and then took a sabbatical at Digital Equipment Corporation working with both their external research organization and their just-opened Cambridge Research Lab. When Athena came to its end as an externally-funded research program in 1991, the then provost, Mark Wrighton, asked me to create a new interdepartmental lab devoted to research in the use of computers and communications in education. With his advice and support, we created the Center for Educational Computing Initiatives, which I continue to direct. The Center became part of the newly formed Center for Advanced Educational Services about three years ago.

Two years ago, the chair of the Nominations Committee, Arnaldo Hax, called me and asked if I would be interested in becoming the associate chair of the faculty. Lotte Bailyn was about to become chair, and she was interested in an associate chair who was involved in MIT-wide activities and knew parts of MIT she was less familiar with, particularly the School of Engineering. I hadn't spent much time on faculty governance issues recently, so I viewed the offer as yet another opportunity to do something different.

A year ago Arnaldo called me again and asked me if I would serve as chair of the faculty. The offer forced me to reflect on whether I had truly enjoyed being involved in issues of governance. That reflection made me understand that, at least at this point in my academic career, I found the broad range of problems facing MIT fascinating, and the offer to become chair of the faculty was a rare and wonderful opportunity. My youngest child will be leaving for college next year, so I was about to make major life changes anyway. Accepting the offer to become chair was, at least for me, the right choice at the right time. I suspect there will be a few moments

in the next two years when I ask myself, "What was I thinking?"

The next two years will be important to MIT, and there are serious issues that we as a faculty need to debate and decide upon. I'll address these in later *Faculty Newsletter* articles, and just give some highlights here.

- Our undergraduate housing system will be radically altered in the next two years, and our collective and individual involvement will be needed during the transition. More importantly, if we are to be successful in linking student life and learning, we as a faculty must be more involved in the student residence system on a sustained basis.

- There are some exciting new proposals for a new undergraduate degree that fuses the best traditions of our science and technology curriculum with an expanded view of the humanities. These need to be considered and, if deemed appropriate, approved and implemented.

- We are about to launch a major capital campaign that should reflect our institutional priorities. Faculty members need to be active participants in both setting those priorities and working with the administration to make the campaign a success.

- We need to build on the momentum created by the Study on the Status of Women Faculty in Science at MIT by both broadening it to other Schools and delivering on the promise to create a fair, inclusive, supportive environment for everyone on the faculty.

Finally, we need to continue the commitment to excellence in both research and teaching that we inherit from the faculty members and students who made MIT the premiere institution it is. This is the reason we came here in the first place, and it's the reason for staying here when there are other opportunities that require less work and are more lucrative. We must never lose sight of this.♣

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MIT Medical: A Brief History and Plans for the Future

Glover, from Page 1

MIT Medical had become an excellent health service, but it had a couple of drawbacks. Although it provided care for the entire community, its main focus was on student health care. This focus provided too small a patient population to offer patients the wide range of medical specialties typical of good hospitals or to give patients much choice of providers within a particular specialty.

A bold venture

In the summer of 1973, MIT Medical embarked on a bold new venture, creating the MIT Health Plan – a prepaid, comprehensive health care plan that not only provided treatment for health problems, but, for the first time, covered preventive care as well.

The MIT Health Plan was one of the very first health maintenance organizations in the Boston area. This “model plan,” open to MIT faculty, staff, employees, and their families, was first introduced as a three-year experiment limited to 1,000 families.

The MIT Health Plan proved very popular, quickly reaching its 1,000-family limit and continuing to grow in the years since. Today more MIT employees (46 percent) choose one of the MIT Health Plans than any other plan offered at MIT, including about 67 percent of the Institute’s faculty.

More high quality services

Adding MIT employees and their families to the patient base has allowed MIT Medical to offer more high quality services to the Institute community:

- students and employees now have access to nearly 40 medical services without leaving the Cambridge campus;
- students and employees have a choice of providers in most specialties;
- the broader patient base is more interesting to providers, which helps

MIT Medical recruit higher quality physicians and nurses;

- MIT Medical has proven that *good* managed care works: it keeps quality high *and* costs down. By focusing on quality right from the start, the MIT Health Plan has given managed care a good name.

Changing demography

In April 1974, the first issue of the *MIT Health Plan Newsletter* reported 1,038 subscribers with a total membership, including family members, of 2,653. Two-thirds of the contracts were family contracts, with membership evenly divided between women and men.

In 1999, the Traditional and Flexible MIT Health Plans together have about 4,500 subscribers with a total membership, including family members, of about 8700. About 44 percent of the contracts are family contracts, with membership still evenly divided between women and men.

What’s behind the smaller percentage of family contracts? Patient feedback has consistently ranked MIT Medical’s Pediatrics Service and its relationship with Boston’s Children’s Hospital as one of the very best things about MIT Medical, so it’s probably not families looking for better care for their children. But does geography provide an answer?

Geographic realities

In 1974, although MIT Health Plan members lived in 92 different communities, the largest number (18 percent of total membership) lived in Cambridge, with another 43 percent living in Arlington, Belmont, Brookline, Lexington, Newton, Somerville, and Watertown.

Today fewer MIT employees can afford to live in Cambridge or nearby, which makes receiving care at a single Cambridge location less convenient,

particularly for employees with families. In addition, the approximately 2,400 MIT employees at Lincoln Laboratory in Lexington have been asking for health care closer to work and home.

Data from 1988 and 1995 MIT Health Plan zip code analyses of where MIT campus and Lincoln Laboratory employees live, show that most benefits-eligible employees are clustered in the Boston/Cambridge area and in the northwest corridor between routes 128 and 495 from the Mass Pike to 93 north.

Lexington facility to open in September

That’s why in the fall of 1999 MIT Medical will open a new health care center on the campus of Lincoln Laboratory in Lexington, Massachusetts, open to the entire MIT community, including family members. MIT Medical/ Lexington will provide high quality internal medicine and pediatric care during regular weekday business hours, with specialty and after hours care continuing to be provided at MIT Medical/ Cambridge.

The new Lexington center will provide convenient medical services for Lincoln Laboratory employees and their families as well as for the many campus employees whose families live closer to Lexington than to Cambridge.

Construction is well underway, and at this writing is on schedule for a September 1999 opening. To be added to the mailing list for information updates, send your name and address (e-mail, office, and/or home) to <health@mit.edu> or MIT Medical, 77 Mass. Ave. E23-308, Cambridge, MA 02139-4307, or call (617) 253-1322. More information will be available later this summer.♣

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Communication Revisited: Some Clarifications

James Buzard

I have received a number of e-mail responses to my second letter on the new Communication Requirement, which appeared in the last issue of the *Newsletter*. In the course of my exchanges with colleagues from around the Institute, several issues have arisen that seem to call for further clarification. I have isolated four dominant themes:

1. *"HASS" Is Not Equal To "Humanities."* One colleague objects to my proposal because he feels that the idea of relying upon HASS to develop students' communication skills "has demonstrably failed." This may well be true, but I was writing about what I called "core humanities" courses, not all HASS courses. The tendency to conflate these categories will prevent us from appreciating the distinctive contribution that core humanities subjects like Literature and History can make to a new Communication program, if they are put in a position to do so.

If the idea of letting HASS handle communication training has failed, I would attribute the failure to the fact that the existing HASS-D system offers those students weakest in communication skills too many ways to avoid taking the kind of classes (core humanities ones) in which communication training is not merely added on to the intellectual substance of the discipline, but is inextricably involved with it.

As I said about my own discipline in my last letter: What we fundamentally do is teach students to respond to language, in language. HASS courses that are primarily quantitative or

creative in nature do not involve so intimate a connection between intellectual substance and communication skills, and so do not compel students to acknowledge communication skills as more than secondary matters. My debates with colleagues on this issue have strengthened my conviction that we need to raise the visibility of MIT's core humanities subjects, which operate in different ways and with different rationales than do the Social Sciences or the Creative or Performing Arts.

2. *To Deny Some Kind Of CI [Communication Intensive] Credit To All Humanities Courses Is To Make A Mockery Of The New Requirement.* A colleague rejects my idea that all core humanities courses should carry CI credit, arguing that literature courses "don't need to be designated communication-intensive because it's obvious." My experience at MIT has led me to believe I can take very little about my discipline for granted on the grounds of its general obviousness. But the important thing here is that only CI credit, not flattering words, will suffice. Only by granting some kind of CI credit to our courses will MIT signal to students that it recognizes the contribution humanities courses can (and should) make to communication training. MIT must put its money where its mouth is, and in this context, credit is the only "cash."

3. *A Student's Four Years Of CI Training Should Be Conceived Of As A Progression Through Different Tiers Of CI Credit.* The idea of different tiers of CI credit is vital: I was alluding to it above when I wrote that all humanities

courses should carry "some kind of" CI credit. As I envisioned things, most middle and upper tier humanities courses would carry "CI#3" credit and would retain their status as electives. Juniors and seniors would be able to choose CI#3 courses in their major departments, if they preferred.

4. *A Student's Four Years Of CI Training Should Give Due Weight To The Goal Of Shaping Citizens, Not Just Future Professionals.* A number of respondents argued that, in order to work, the new requirement ought to build upon students' primary interests by focusing their CI training within their major departments. I agree that, as one interlocutor put it, "passion has a lot to do with success." But MIT has a responsibility to direct students toward other areas it considers important for them to encounter. It has recognized this responsibility by instituting HASS requirements, but the problem of communication calls out for a more detailed roadmap.

Humanities subjects should not exercise exclusive control over the new requirement, but they should play a central role. If MIT students lack the motivation to work hard enough at their humanities courses to reap the full benefits those courses offer, MIT can help by strengthening its message to students about the importance of taking humanities (not just HASS) courses. And it cannot do this by lip service alone (see #2 above).

Thank you for the opportunity to revisit this issue.✦

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From The Libraries

Transforming Public Services: New Directions for the MIT Libraries

Ruth K. Seidman

Information is all around us these days, with so much available on the Web. It is fair to raise the question of the role of the academic library in this new world of electronic access to the printed word. In fact there is a very clear role for the academic library. Not only does the library continue to provide access to traditional and still important sources of knowledge, but the library now plays a very important role in helping people to navigate through the vast array of material of varying levels of quality and completeness that can be reached electronically.

Because of this new information landscape, the MIT Libraries have recently been taking a serious look at their services. With the goal of making the Libraries more responsive to the needs of the MIT community, the Public Service units – all divisional and branch libraries as well as the Institute Archives and Document Services – recently completed a major review and are now implementing changes and improvements. The underlying principle is that a place of MIT's caliber requires world-class library services. Providing this service requires a user-centered philosophy that is shared by staff at all levels.

Other related goals that emerged during this process include the creation of an environment in which staff understand the paramount importance of being knowledgeable about the information needs and use patterns of members of the MIT community, and the creation of an overall sense of the MIT Libraries that transcends the many individual units around the campus

and leads to a better sharing of resources to deliver consistently high quality services.

In order to accomplish all of this, it has been important to seek ways to create a more flexible organization capable of responding rapidly to change and to the needs of those who make use of the Libraries. It is also

statement, a list of service priorities, recommendations for improved organizational structure, methodologies for measurement and assessment, and mechanisms for achieving effective communication within the organization.

The values statement speaks of the MIT Libraries as a learning community

The Libraries need a good method of tailoring services to the various segments of the user community. A solution that will be tried out is the creation of a series of committees to focus on the major library user groups – undergraduates, graduate students, faculty, researchers, administrators, alumni, and outside users. The five divisional library heads, the Institute Archivist, and the head of Document Services will each chair one of these committees

important to find ways of developing skills and enthusiasm so that library staff at all levels will take the initiative and will make on-the-spot decisions to ensure timely service.

Ginny Steel, associate director for public services, has initiated and led this Public Services Redefinition Process throughout 1998 and its implementation in 1999. The process made use of the spring 1998 library survey of undergraduate and graduate students as well as input from the Faculty Committee on the Library System and other faculty suggestions and comments. A series of task forces, composed of library professional and support staff, developed a values

within learning communities, and the desire of the staff to offer excellent services and to make the MIT Libraries easier to use. Services include: providing well-chosen and well-organized collections – both print and electronic – as well as convenient access to materials not held at MIT, instruction in information literacy for both current and future needs, and the collecting and preserving of unique materials produced at MIT. Also in the values statement is the intention that the organizational culture within the MIT Libraries will encourage creativity, innovation, flexibility and a dynamic attitude toward work and change.

(Continued on next page)

New Directions for the MIT Libraries

Seidman, from preceding page

A number of priorities were identified; these are gradually being introduced as new or enhanced services that will be announced as they become available. Some of these priorities are self-service book circulation, Web access to library instructional materials, improvements in library space and equipment, and providing a clearer and more content-rich Libraries' Web site.

Three major structural changes are now taking place as a result of the redefinition process.

- In recent years, each divisional library head had been responsible for two units (Dewey and Humanities, Engineering and Science, Rotch and Archives). Reassignment of staff positions will now allow for separate heads for each of these six organizations. Some new appointments have already been made and others will be announced within the next several months. This new arrangement will enable each of the library heads to focus more attention on his or her user constituency.

- The Libraries need a good method of tailoring services to the various segments of the user community. A solution that will be tried out is the creation of a series of committees to focus on the major library user groups – undergraduates, graduate students, faculty, researchers, administrators, alumni, and outside users. The five divisional library heads, the Institute Archivist, and the head of Document Services will each chair one of these committees, and each librarian in Public Services has selected a committee to join. More information on these new constituency committees

and how to contact them will be made public in the 1999 fall term.

- Groups are being established to coordinate functions across the library system and to provide improved communication among library staff. For example, the Instruction Committee has a representative from each of the divisional libraries – Barker, Dewey, Humanities, Rotch, and Science. This group is sharing ideas, expertise and resources, and is planning to introduce instructional activities and resources that cut across subject lines.

One of the Redefinition task forces investigated methods of measuring library service quality. The group also sponsored several programs for library staff to learn about these methods, and, more important, to learn about developing “a culture of assessment” – a continuous process of obtaining qualitative and quantitative feedback on service quality and then finding ways to improve service. In order for this culture of assessment to work, it is necessary for staff to understand and to participate fully in the process. One of the ways in which this effort will move forward in the Libraries is to have a member of each of the functional groups (for example, Instruction) who takes the lead in developing ways to measure the success of that particular function. Another aspect of assessment is the need to develop simple but effective methods of collecting and analyzing data.

The job of carrying through many of the recommendations of the Public Services Redefinition is being handled by the Implementation Leadership Group; co-convenors are Deborah Helman of Barker Engineering Library

and Michael Leininger of the Rotch Library (architecture and planning). Leininger comments, “The MIT Libraries are embarking on a long-term change in focus. We are reorganizing ourselves and streamlining our structure and our internal processes, with the library user in mind. As a result of these changes, we believe that clearer and more consistent policies will enhance ease of use in the various library units at MIT.”

What are some of the enhanced services that are under consideration or in the planning stages for 1999-2000?

- Regular, publicized office hours for librarians, so that members of the MIT community can easily make appointments with subject specialists and with specialists in instruction or in the use of specific information technologies and formats.

- Delivery of library materials. A staff group has been set up to investigate demand for, methods, and cost factors involved in the delivery of materials, in both print and electronic formats, to offices around the campus.

- More Web-based tutorials, some course-related and some more general on research methods and use of information resources. These will be accessible through the Libraries' Web pages.

- New and enhanced services will be announced as they become available. Watch this “From The Libraries” column, as well as information at the libraries and on the Web for updates during the coming academic year.❖

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The Year 2000 Team

Prophets, Predictions & Precautions

Gayle C. Willman

“Recently a lot of people who once scorned predictions have taken to wondering anxiously about our immediate future. . . . Like children leaning forward to watch the odometer roll up zeros, we brace ourselves for the big change and possible doomsday.” [From “You Can’t Keep a Good Prophet Down” in the April ’99 issue of *Smithsonian Magazine*.]

“Even the briefest tour of the [Y2K] subject on the World Wide Web leaves the scroller dizzy by the expected hailstorm of catastrophes, fiends, demons and avenging angels disguised as flying saucers, all coming to a world near you.” observed *Smithsonian Magazine* author Barbara Holland in a recent article.

The prophets of doom have been very active! There is even a “doomsday calculator” <<http://www.y2knewswire.com/Y2Kengine.htm>> on the Web. So, perhaps it’s no wonder a common question about Y2K is, “What do you *really* think will happen?” Here are some points to consider.

The first point is “. . . the human future, as opposed to some aspects of the natural future, is ‘fact-free’. . . in the area of so new, powerful, pervasive, and . . . mysterious a world as that of computers, the potential impact of these problems is simply not calculable. Thus, despite its purely secular, technical properties, the issue shares with some religious phenomena the dynamics of a particular kind of religious time – the apocalyptic belief that soon some dramatic event will occur that will radically change our lives, for better or worse,” says Richard Landes of the Center for Millennial Studies, <<http://www.mille.org/>>.

An impressive Y2K concern about technology is: how might a minor failure, within the vast interdependencies that have evolved from technology, affect other connected enterprises? Direct deposits tie

employers to financial institutions. Just-in-time deliveries tie manufacturing processes to freight carriers and remote suppliers. The full impact of a minor failure is unknown. Doomsday prophets capitalize on these unknowns, though the issues have been recognized, and hundreds of millions of dollars and countless staff hours have been invested to mitigate the associated risks.

The second point to consider is that many of the anticipated Y2K technology failures *have already occurred*. According to a recent survey [Cap Gemini is a computer consulting firm. Details about the survey can be found at: <<http://www.usa.capgemini.com/>>] 72 percent of the major U.S. corporations and government agencies responding said they had experienced a Y2K-related failure through the first quarter of 1999, up from 55 percent at the end of December.” Of the companies experiencing Y2K failures: 82 percent reported data-processing disruptions; 93 percent reported financial miscalculations; 38 percent reported logistical or supply-chain difficulties.

In this context, the what-and-when of any Y2K-initiated “dramatic event” is challenged. We have no reason to expect a sudden onslaught of events on December 31, 1999. In fact, experts have long predicted that Y2K technology failures would begin in early 1999, and extend well into the New Year 2000 with a peak during the transition weekend.

The third point is that Year 2000 concerns have best been described as “management issues with technological solutions.” A significant amount of the work associated with Y2K-preparedness does not fall into the “mysterious” domain of computer programmers. It is both possible and important for administrators to know how IT affects their day-to-day operations. Management can determine which systems are critical to normal operations, which

suppliers are essential, how dates are used in normal work processes and how staff is expected to respond if a Y2K failure does occur. This work does require scheduling, allocation of staff resources and up-to-date information – but it is manageable, and reliable information is available.

Given the enormous amount of work being done to avert Y2K-related failures, the evening of December 31, 1999 may prove the doomsday prophets wrong. One thing is certain: if the transition to the Year 2000 does not present dramatic events, it won’t be because Y2K wasn’t an issue in the first place. Year 2000 computer and microchip issues are very real. The realization of MIT’s stated goal of “no Y2K-driven material failures or disruptions at the Institute” will be the result of the timely completion of Y2K readiness and testing, and the implementation of reasonable precautions.

In addition to Y2K-readiness efforts, the Institute’s existing contingency and business continuity plans are being expanded to encompass Y2K-related concerns. Here, it is important to make a distinction between “prediction” and “precaution.” This planning should not be viewed as a *prediction* of dramatic events. MIT has a comprehensive set of plans in place to address issues that could affect the campus at *any time* <<http://web.mit.edu/security/www/isorecov.htm>>. These *precautions* are in place so that if an event occurs, appropriate actions will have been predetermined, and key staff will know how to respond to the event.

Updated Y2K information is regularly posted to the Y2K Team’s Web site at <<http://web.mit.edu/mity2k/>>. Additional assistance may be obtained by sending email to: <y2k-help@mit.edu>. The team can also offer assistance in sorting out what’s “hype” and what’s not.♣

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From Kenya to Nepal: Alumni Travel Program is Worldwide

Melissa Chapman

“Martha Gellhorn, Ernest Hemingway’s third wife, wrote a friend that Ponce de Leon was wrong about the fountain of youth: it is not a spurt of water, but a spurt of travel. My advice to my MIT colleagues is that you ought to try it.” Reflecting on his experiences leading alumni trips for the MIT Alumni Travel Program, Professor Emeritus Jay Keyser continues: “Not only are MIT alumni hungry for your company but so too are the animals you are likely to encounter, especially if, like me, your last three trips have been to Africa. Whoever said it was a small world has never been to the Angaruka Plain, watched the Maasai kill a goat and drink its blood, seen the reflection of Mt. Kilimanjaro against the pre-dawn sky or been accosted by four lionesses while walking in the bush.”

Professor Keyser traveled with a group of alumni last October on a tented camp safari in Kenya. He survived the journey with only a few scratches, and has lived to tell the tale.

Through the trips offered by the MIT Alumni Travel Program, designed to offer travel with education, MIT faculty can become involved and reap the satisfaction of sharing their expertise with our curious alumni while traveling to destinations around the globe.

During the past few years, a growing number of distinguished faculty have generously offered their time and energy to our alumni and in turn have enjoyed every aspect of the experience. The MIT Alumni Travel Program staff would like to speak to other faculty members who might be interested in similar opportunities.

This past March, Professor Emeritus Eugene B. Skolnikoff of Political Science led a group of 17 alumni and friends on an around-the-world program that made many stops,

Thank You, MIT Faculty, from the Alumni Association

The MIT faculty have been the backbone of the Alumni Association’s many programs this past season. Faculty made presentations to thousands of alumni on campus at Technology Day, the Alumni Leadership Conference, the Cardinal & Gray Society, the MIT Enterprise Forum; at the MIT On The Road program; as part of the MIT Alumni Travel Program; and at the many MIT Clubs in the United States and around the world.

Conscious of the sacrifices you make in order to participate in all of these events, our deepest appreciation goes to the members of the faculty (too numerous to list here) who helped us this past season. In addition, we would like to give a special note of thanks to Rebecca M. Vest for her time and commitment to Alumni Association events.

including Petra, Nepal, Tibet, Cambodia, and Uzbekistan. Of his travel experience, Professor Skolnikoff

comments, “This was a spectacular and fascinating trip that also provided an intensive opportunity to get to know MIT alumni from many classes and professions. They were deeply curious about all the places we visited, and proved to be personally and intellectually rewarding to be with. Recent developments at MIT also turned out to be of great interest, with a willingness to engage in serious discussion about the Institute. It was clear how strong was the tie most felt to MIT and how pleased they were to engage in extensive interaction with a member of the faculty.”

Later this year Dr. Margery Resnick (Foreign Languages and Literatures) and Dr. Mary Fuller (Literature) will lead programs to Spain and Greenland, and Maritime Canada, respectively. Dr. Elizabeth Wood (History) departs this month with a group of alumni traveling from the Czech Republic to Germany.

Upcoming Alumni Trips

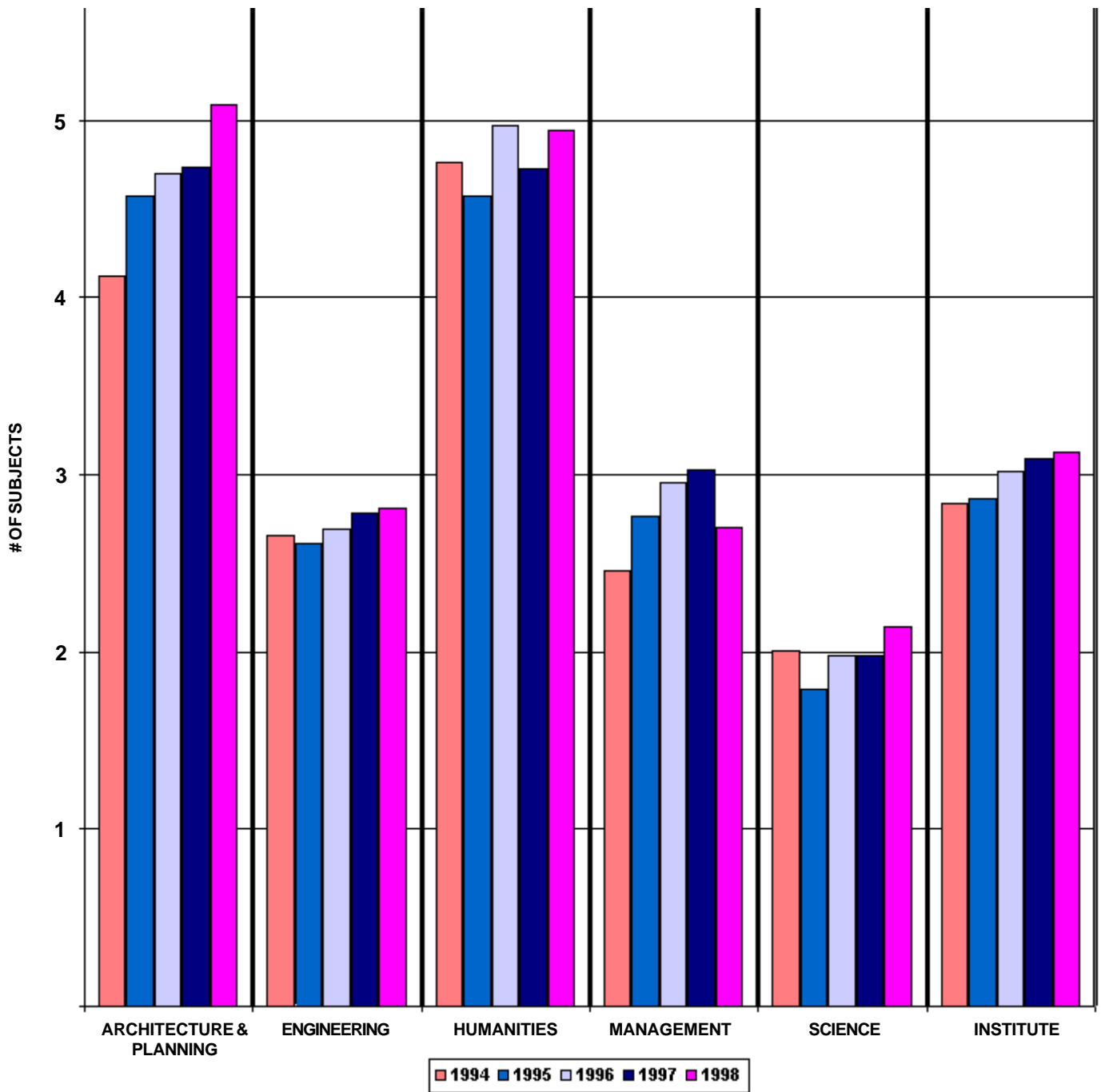
As the manager of the Alumni Travel Program, I would like to speak to faculty interested in participating on a trip, helping to provide the educational content for our alumni. Some of the destinations for which there are faculty openings are Saudi Arabia, the Western Mediterranean, Burgundy and Provence, Montana, The Great Lakes and Canada, Southern France and Italy, Japan, and three programs geared toward families in the Galapagos, Hawaii, and Tanzania.

How do I find out more?

Please contact me to get more information. I can be reached at <mchapman@mit.edu>, 253-8265, or by fax 258-6211.♣

M.I.T. Numbers

Total Subjects Taught Per Faculty (1994-98)



Source: MIT Planning Office