

# The MIT Faculty Newsletter

Vol. VII No. 3

February/March 1995

## Administration Offers Retirement Plan Q&A

*The following interview (both questions and answers) was provided to the Faculty Newsletter by Vice President for Finance and Treasurer Glenn P. Strehle.*

**T**he *Faculty Newsletter* has recently become a forum for discussing various aspects of the MIT Retirement Plan. The MIT Plan is complex and the Benefits Office will soon initiate additional mailings and group meetings for members. Below, Glenn P. Strehle, vice president for finance and treasurer, presents his analyses and views in an interview.

**Q.** *Before we get into the details, why do we need to understand the MIT Plan?*

**A.** The MIT Plan offers choices to its members both during their years of service and as they approach retirement. The Benefits Office can provide helpful information in making these choices.

**Q.** *What are the key choices they have at retirement?*

**A.** Members can begin their annuity payments immediately following retirement, defer the start of payments to any month until age 70 1/2, or receive a portion of their benefit as a lump sum rather than an annuity from the Plan. The recently introduced Minimum Distribution Option (MDO) provides additional flexibility to those required by law to begin their benefits by age 70 1/2.

*(Continued on Page 3)*

## TEACH TALK

### Newsletter Introduces New Regular Feature

Lori Breslow

**S**everal months ago, a group of MIT faculty and administrators formalized the Teaching Resource Network (TRN), a consolidation of several programs at the Institute designed to improve the quality of teaching. Among the activities TRN sponsors is the fall orientation for new faculty, the IAP series "Better Teaching @MIT," and the videotape consulting program that gives MIT faculty the opportunity to have their classes taped and to review that tape with a teaching consultant. "Teach Talk," which becomes a regular feature of the *MIT Faculty Newsletter* with this issue, is the latest endeavor of TRN.

"Teach Talk" is intended to provide MIT faculty with practical, useful information about the strategies, tools, and resources that can help them be more efficient and effective in the classroom. It is envisioned as a place where questions will be answered, tactics shared, and philosophy debated. Just as

*(Continued on Page 8)*

**Behind the Senior Survey — Page 6**  
**Letters — Page 11**

**Electronic Distribution of Newsletter Considered — Page 11**

**M.I.T. Numbers — Page 12**

**Contents — Page 2**

## MIT Faculty Newsletter

### Editorial Board

**Stephan L. Chorover**

(Brain & Cognitive Sciences)

**Nazli Choucri**

(Political Science)

**Ernst G. Frankel**

(Ocean Engineering)

**Kristina E. Hill**

(Urban Studies & Planning)

**Jean E. Jackson**

(Anthropology/Archaeology)

**Gordon Kaufman**

(Management Science & Statistics)

**Daniel S. Kemp**

(Chemistry)

**Jonathan King**

(Biology)

**\*Lawrence M. Lidsky**

(Nuclear Engineering)

**Stephen J. Lippard**

(Chemistry)

**\*Fred Moavenzadeh**

(Civil Engineering)

**James Propp**

(Mathematics)

**Michael A. Rappa**

(Management)

**Merritt Roe Smith**

(Science, Technology, & Society)

**David Thorburn**

(Literature)

**Leon Trilling**

(Aeronautics & Astronautics)

**\*Editorial Committee for this issue.**

**David Lewis**

Managing Editor

**Address:** MIT Faculty Newsletter, MIT Bldg. 38-160  
Cambridge, MA 02139; (617) 253-7303.

**E-Mail:** fnl@athena.mit.edu.

**FAX:** 617-253-0458

**Subscriptions:** \$15/year On-Campus  
\$20/year Off-Campus

### Contents

Administration Offers Retirement Plan Q&A	1
<u>Teach Talk</u> Newsletter Introduces New Regular Feature	1
<u>Letters</u>	11
Electronic Distribution/Bulletin Board For Newsletter Considered	11
M.I.T. Numbers	12

### Authors

**Lori Breslow** is Lecturer, School of Management.

**Alberta Lipson** is Assistant Dean, Undergraduate Academic Affairs.

**Norma G. McGavern** is UROP Director.

**Glenn P. Strehle** is Vice President for Finance and Treasurer.

## Administration Offers Retirement Plan Q&A

*Continued from Page 1*

- Q.** *What important choices are available now?*
- A.** For those thinking about retirement, recent Plan changes offer important choices and improved benefits. An alternative formula for those planning to receive a retirement annuity from their Fixed Fund balances is available to those beginning their benefit from January 1, 1995 through January 1, 1996. If interest rates decline in the next few years, the alternative formula may provide a more favorable annuity relative to present account balances if you retire and start it now. I will explain the details later in this interview.
- Q.** *What important features should Plan members know about?*
- A.** The Plan provides very favorable benefits to long service members who made, or will make, contributions that are matched by MIT. As compared to TIAA, an analysis by our actuaries showed that accumulations in the Fixed Fund now provide annuities significantly higher for all those with ten or more years of participation and eligible to retire. This comparison includes important features of the Fixed Fund such as valuing your account at the higher of book value or market value when annuity payments begin.

### Comments and Questions About the Plan

- Q.** *What are the recent comments you hear about the MIT Plan?*
- A.** The most frequent comments I hear relate to the large accounts balances and the size of the resulting benefits that retirees receive relative to their recent salaries when they start their Fixed Fund annuities. The growth in the size of Variable Fund accounts has been even better.
- Q.** *Can you give us an example of some of their questions?*
- A.** Rather than a fixed annuity from their Fixed Fund accounts, they may be attracted by the concept of having their annuities increase, or decrease, in future years by "participating" in the earnings from the assets used to pay their retirement benefits. Others want to receive a large portion of their accounts in a lump sum

rather than as an annuity from the MIT Plan. We also get questions about our investment results and annuity amounts relative to those offered elsewhere.

- Q.** *What choices are available to those in the Supplemental Plan?*
- A.** The Supplemental Plan permits members to contribute up to 5% of pay with a one-for-one match (up to 5%) from MIT. This can go all, one-half, or none into the Fixed Fund with the remainder into the Variable Fund. These contributions with earnings accumulate until benefits begin. Your total retirement benefit comes from the Basic Plan, which requires no contributions, together with benefits from your participation in the Supplemental Plan and your accumulated benefits in the pre-1989 MIT plans. With its one-for-one match and relatively favorable investment results, everyone eligible should want to be in the Supplemental Plan.

### Valuation at the Time Monthly Annuities Begin

- Q.** *What determines the Fixed Fund valuation when the monthly annuity begins?*
- A.** The member's book value in the Fixed Fund of the Plan is an accumulation of the monthly contributions by the member, by MIT and the monthly earnings credited to the member's accounts. Just prior to starting annuity payments, the value is adjusted upward if the book value is exceeded by the current market value. (Separate market value adjustment rules apply to those Fixed Fund accounts that result from transfers from the Variable Fund.)
- Q.** *How is the member's adjusted book value converted to an annuity?*
- A.** An annuity purchase interest rate and a mortality table are used to determine the size of the monthly cash benefit, based upon the particular annuity option chosen. The interest rate used is the past 12-month average interest rate for 10-year Treasury bonds. To achieve a smoothing of the annuity purchase interest rate, it cannot go up or down by more than 1/4 of 1% per quarter.

*(Continued on next page)*

## Administration Offers Retirement Plan Q&A

*Continued from preceding page*

When a member annuitizes his/her Fixed Fund account, the member's share of assets is shifted at market value from the Fixed Fund to the Benefits Fund (Fixed Fund assets are all related to member accounts; the Benefits Fund assets all correspond to the funding of the liabilities of MIT for the Plan).

**Q.** *What has been the experience?*

**A.** In 1985, we adopted market-based methods of valuation. Since then, the market value adjustment has always been positive and, in addition, the annuity purchase interest rate fluctuated much less than the market interest rates. During almost all of this period, the annuity purchase interest rates were higher than the interest rates available in the market.

**Q.** *Hasn't this changed?*

**A.** Yes. The decline in market interest rates that reached 20-year lows in 1993 also caused the annuity purchase interest rate to decline. When interest rates rose rapidly in 1994, it caused a decline in bond prices, and, correspondingly, in the market value adjustment. By contrast, the smoothing formula used to determine the annuity purchase interest rate was slow to react to the higher interest rates because it increases by no more than 1/4 of 1% per quarter. *As a result, the size of annuities in dollars relative to account balances for those starting their annuities was still declining in mid-1994 while interest rates were rising.*

### Recent Plan Changes

**Q.** *What was done to address this issue?*

**A.** The MIT Plan was recently amended to allow an alternative formula for determining the annuity purchase interest rate from January 1, 1995 forward for a class of retirees. This is the group of retirees who started their annuity payments beginning January 1, 1993 through December 1, 1994 and those retirees who will begin receiving their annuities from January 1, 1995 through January 1, 1996. The alternative formula employs a 7.25% annuity purchase interest rate and a 5% market value adjustment. The effect is to bring the effective

interest rate applied to the book value of member accounts to approximately 8%. These retirees will receive the higher of the annuities determined by the regular formula and the new alternative formula.

**Q.** *What is the future outlook?*

**A.** If interest rates stay near today's levels (around 7 1/2%) or increase, the regular annuity purchase interest rate which is now 6.51% will increase by 1/4 of 1% per quarter to 7.51% by January 1, 1996. After this date, the alternative formula no longer applies. If interest rates decline, the annuities payable under the regular formula could be less. The alternative formula provides those thinking about starting their annuity payments over the next year an opportunity to have the larger of the two formulas. *Unless the Fixed Fund has a large increase in the market value adjustment, now below 5%, we expect the retirement benefits determined by the alternative formula to exceed those determined by the regular formula until at least October 1, 1995.*

**Q.** *What are other Plan changes?*

**A.** One recent change in the MIT Plan provides members with much greater flexibility to withdraw a large portion of their accounts as a lump sum after retirement as an alternative to starting an annuity. Another change was to permit those at age 70 1/2 to begin their benefit under the tax rules for a Minimum Distribution Option (MDO) rather than as an annuity.

### Comparison of the Fixed Fund with TIAA

**Q.** *How does the Fixed Fund of the Plan compare with the accumulations and benefits provided by the TIAA, the largest of the college retirement plans and the one most often compared with the MIT Plan?*

**A.** In the past, comparisons have showed us that the Fixed Fund provided benefits that were better than TIAA for the same amount of contributions. Towers Perrin, our actuaries, recently updated our earlier studies.

*(Continued on next page)*

## Administration Offers Retirement Plan Q&A

*Continued from preceding page*

For those contemplating retirement at age 55 or older, the Fixed Fund now provides a higher annuity benefit as determined by the accumulation in book value of a member's account, by the market value adjustment (TIAA has none) and by the Plan's annuity purchase interest rate and mortality table. *The study showed that the Fixed Fund now provides an initial annuity from the Plan at least 15% higher than a TIAA annuity would have for typical members age 60 or older with 10 or more years of Plan membership.*

**Q.** *Can you provide further examples?*

**A.** The study found that for equal contributions, the accumulations in the book value of accounts in the Fixed Fund exceeded those in TIAA by almost 3% for employees with only 10 years of service, and by 15% for those with 40 years of service. We then include the market value adjustment of 5% and the higher annuity payments resulting from the mortality table used by MIT. The result is that a 65-year-old member with a typical pay history and 30 years of service will get Fixed Fund annuity payments that start over 22% higher than if he/she had been in TIAA. For those age 70 with 40 years of service, it is over 30% higher. The comparisons are even more favorable if members defer the start of their annuities following retirement.

**Q.** *In what other ways do the two plans differ?*

**A.** The Fixed Fund holds over 90% of its assets in marketable securities with about 25% in equities, 70% in bonds and the remainder in real estate. By contrast, TIAA has almost all of its assets in real estate and bonds, much of which is not publicly traded. TIAA beneficiaries actually participate in the gains and declines in investment returns. If interest rates on new bonds and earnings on real estate investments decline, as they did over the past decade, then the ongoing annuity payments to retirees from TIAA decline. Many TIAA retirees saw their annuity payments decline by 10% or more over the past decade. By contrast, the annuity payments resulting from Fixed Fund accounts in the MIT Plan are fixed and did not decline.

**Q.** *Can you provide some examples of the annuity payments from the MIT Plan in recent years?*

**A.** From July 1, 1988 to July 1, 1993 the starting single life annuity payments per \$100,000 of account book value (resulting from Fixed Fund balances) declined gradually for those reaching age 65 from \$12,391 (annualized) to \$11,176. This decline of 9.8% over five years reflected lower market interest rates which were partially offset by a higher market value adjustment. Because of the unusual market action in 1994, the single life annuity payment dropped by 13.7% to \$10,014, for those starting their annuities on July 1, 1994. The alternative formula now brings the annuity payments up to \$11,189, just slightly higher than it was on July 1, 1993.

### Other Information

**Q.** *There have been some recent changes in the Plan. Can we expect more?*

**A.** Members should expect continued enhancements to the Plan while the Institute also strengthens its commitment to service.

**Q.** *Where can members get more detailed information?*

**A.** The characteristics of the MIT Plan I have described are summaries of provisions that are quite detailed. I did not review many features of the Plan. The summary information in my comments does not alter the actual terms of the Plan, which are fully set forth in the Plan documents. The booklet, "Your MIT Retirement Plan," available from the Benefits Office, and the Summary Annual Report mailed to all members provide much helpful information. ❖

# Behind the 1994 Senior Survey

Norma McGavern and Alberta Lipson

In the November/December issue of the *Faculty Newsletter* an article by Irene Tayler (“Are Our Students Undereducated? They Think So”) drew attention to a comparison of data from an MIT survey of seniors with data from a similar survey conducted by the Consortium on Financing Higher Education (COFHE). What may not have been entirely clear in Prof. Tayler’s article was that the 1994 MIT Senior Survey was put together by MIT’s Educational Studies Working Group (ESWG), which had requested data from COFHE in order to compare MIT results with results from other schools participating in the COFHE survey. Our article is intended to clarify the sponsorship of the MIT survey and its relationship to the survey conducted by COFHE and to provide some background about the development of the MIT Senior Survey.

Every five years, COFHE member institutions (of which MIT is one) are asked to participate in a survey of seniors. In June 1993, MIT’s COFHE representative asked ESWG to consider participating in the upcoming COFHE survey. MIT declined to participate in the 1994 COFHE Senior Survey. ESWG believed MIT would derive greater benefit from conducting its own customized survey, since COFHE questions must be applicable to all member schools and would therefore, in many instances, not fit the undergraduate experience of MIT students. ESWG was mindful, too, of the strong desire on the part of our faculty and survey sponsor Dean Arthur Smith to make sure that data produced by a senior survey be directly useful to MIT’s understanding of the under-

graduate educational experience. To make comparisons between MIT and COFHE schools possible, however, MIT’s survey included some questions which were similar to, and a few which were identical to, the COFHE survey. Accordingly, at MIT’s request, COFHE shared aggregate comparative data from four of the 27 schools (Harvard, Cornell, Johns Hopkins, and Rice University) participating in the COFHE survey. In a separate

Committee on the Undergraduate Program), and with others who expressed an interest. A lengthy list of potential survey questions was circulated to the aforementioned groups. Key concerns were to make sure only relevant questions were asked, and to limit the survey’s length so it could be answered in 20 minutes or less. The survey instrument was pilot-tested with groups of students and underwent many modifications.

**ESWG hoped the survey would stimulate and focus discourse about the strengths and weaknesses of MIT undergraduate education, and indeed that has happened. With the dissemination of the overall Senior Survey results to committee chairs and academic departments and with the distribution of information to many departments about students who are their majors, and with the appearance of Prof. Tayler’s article about the MIT-COFHE comparisons, a number of discussions about undergraduate education have been taking place within academic departments and committees.**

addendum to the MIT Senior Survey report, COFHE and MIT data about improvement in knowledge and abilities and overall satisfaction with undergraduate education were compared.

ESWG began work on the Senior Survey in summer 1993 by getting input from throughout the Institute about important issues in undergraduate life and academics. Formal and informal discussions were held with groups of undergraduates, administrators, members of the faculty, individual deans, several Institute committees (in particular the

The final questionnaire was submitted for review to the Committee on the Use of Humans as Experimental Subjects (COUHES) and approved early in 1994. Simultaneous with the development of a paper survey, an electronic version was developed and placed on-line via Athena. The paper survey was mailed to all fourth year students at the beginning of April 1994 and was followed up by a second mailing in mid-April. The response rate was 42 percent.

Although ESWG had been in existence since April 1988, the Senior

*(Continued on next page)*

## Behind the 1994 Senior Survey

*McGavern and Lipson  
from preceding page*

Survey was ESWG's first group project. ESWG had its origins in the late Dean for Undergraduate Education Margaret MacVicar's wish to have educational researchers, faculty, and administrators who were closely linked to the undergraduate academic experience collaborate and exchange information. Upon Dean MacVicar's death, the Undergraduate Education Office and the Office of the Dean for Student Affairs merged. ESWG is now based in Undergraduate Academic Affairs under Travis Merritt; the conveners are Norma McGavern and Alberta Lipson from Undergraduate Academic Affairs. This merger has helped to provide a stronger focus for ESWG, one result of which has been ESWG's undertaking of the MIT Senior Survey.

Membership in ESWG has both changed and grown with time. At present, members are Bette Johnson (Admissions Office), Bob Weatherall (Career Planning and Placement), Gary Dryfoos (Computing Support Services), Andy Eisenmann, Peggy Enders, Travis Merritt, Jeff Meldman, and Les Perelman (from sections of the office of the Dean for Undergraduate Education and Student Affairs), Vicky Diadiuk (Office of the Registrar), Lydia Snover (Planning Office), and Stan Hudson and Collins Mikesell (Student Financial Aid). These people form the core working group and have contributed large amounts of time to the Senior Survey.

ESWG hoped the survey would stimulate and focus discourse about the strengths and weaknesses of MIT undergraduate education, and indeed

that has happened. With the dissemination of the overall Senior Survey results to Committee chairs and academic departments and with the distribution of information to many departments about students who are their majors, and with the appearance of Prof. Tayler's article about the MIT-COFHE comparisons, a number of discussions about undergraduate education have been taking place within academic departments and committees.

tells us how seniors feel from their present perspective, only a survey of freshmen (or first semester sophomores) concerning their first year will reveal. Having established a baseline with the 1994 Senior Survey, we will be able to conduct a similar survey of the same students as alumni, and learn if their views of their MIT undergraduate experience and their perceptions of their improvement in knowledge and abilities have changed

**Looking to future ESWG efforts, results of the survey have stirred interest in further investigation of specific issues which were raised. Answers to questions about the freshman year experience indicate that seniors feel negatively about the first year, even though their later experience may be positive. Whether this response actually tells us about how the freshman year is experienced, or whether it just tells us how seniors feel from their present perspective, only a survey of freshmen (or first semester sophomores) concerning their first year will reveal.**

It is still too early to determine whether any changes will result from publication of the survey data, but interest in the findings continues unabated.

Looking to future ESWG efforts, results of the survey have stirred interest in further investigation of specific issues which were raised. Answers to questions about the freshman year experience indicate that seniors feel negatively about the first year, even though their later experience may be positive. Whether this response actually tells us about how the freshman year is experienced, or whether it just

with time and further educational and professional experience. A regular Senior Survey might be repeated at intervals of two or four years. In addition, there is active support for ESWG's undertaking a graduate student survey. Preliminary exploration of this area, one of much interest to the Alumni Association and to many faculty, is currently under way. ESWG welcomes comments about the Senior Survey and suggestions for future studies and invites interested members of the MIT community to participate in its ongoing work.♣

## TEACH TALK

### Newsletter Introduces New Regular Feature

*Breslow, from Page 1*

progress in science is the product of systematic, collaborative inquiry, so can teaching profit by learning from the knowledge and experience of others. Thus, topics for future columns will be based on what is occurring in MIT classrooms, as well as reports from outside the Institute on innovative curricula, novel classroom techniques, and research on how learning in the sciences is best achieved.

.....

Starting last summer and continuing through the fall semester, I observed almost 30 classes at MIT in ten different disciplines. For me, the experience was akin to reading the liveliest, most engaging issue of *Science*, only here the information was coming alive in the reality of the classroom. But as much as I was fascinated by what I was learning in the courses I was attending, I was confused – and sometimes even dismayed – by the climate in those classrooms.

I thought the best way to give you an idea of what disquieted me was to describe what I saw as an all too familiar scene. What follows is a composite drawing of those 30 classes I attended.

#### **The Silence Can Be Deafening**

Professor X walks into the classroom where a smattering of his students have already gathered. The professor arranges his notes on the table, makes sure there's chalk on the chalk tray, and perhaps writes an agenda on the board. More students saunter in and take their seats – the challenge being, as I take it, to sit far enough back to be out of the professor's immediate sphere of influence. (More on this below.)

Shortly, the professor clears his throat or makes some other kind of gesture that

signals he is about to begin. With that, a quietude settles over the classroom that I can only compare to the hush I've witnessed in places of worship when the holiest of rituals are being enacted. The stillness of the classroom is interrupted only by the professor's voice and the sound of the chalk working its way across the board.

on a concept he has introduced. Or, he may simply have said, "Do you have any questions?" (Although, as my colleague in Urban Studies and Planning Mark Schuster suggests, a better way to phrase that is, "What questions do you have?")

It is then that a tension settles in over the classroom that is almost palpable. Eyes shift downward. Lips that may

**And then it happens – Professor X stops, turns to the class, and asks A QUESTION....It is then that a tension settles in over the classroom that is almost palpable. Eyes shift downward. Lips that may have been slack as their owners were engaged in thought clamp closed. The only time I have seen people less willing to answer a question is in old World War II films where the enemy, having captured one of our guys, asks him for information that will betray his comrades. But even then, the captor is willing at least to reveal his name, rank, and serial number.**

Often, the professor begins with a review of material covered during the last class period. (By the way, the use of an agenda and a summary of previous material are both excellent teaching strategies. The former gives students a framework in which to place the day's lesson, and the latter effectively links old information to new, a sound pedagogical technique.) Professor X then launches into the new material for the day, whether it is explaining a new concept or working a new problem. The students sit shrouded in silence – eyes shifting from board to notebook, pencils gliding over paper in constant motion.

And then it happens – Professor X stops, turns to the class, and asks A QUESTION. He may ask class members to do a calculation, explain an idea they are hopefully familiar with, or expand

have been slack as their owners were engaged in thought clamp closed. The only time I have seen people less willing to answer a question is in old World War II films where the enemy, having captured one of our guys, asks him for information that will betray his comrades. But even then, the captor is willing at least to reveal his name, rank, and serial number.

The professor's eyes dart around the room desperately trying to make contact, looking as uncomfortable as a newly divorced person at his/her first singles event. Here, I can only imagine that the students are silently congratulating themselves on how clever they were to sit beyond the first few rows—as if those rows were a kind of Maginot Line that would protect them from the advancing forces.

*(Continued on next page)*



## TEACH TALK

### Newsletter Introduces New Regular Feature

*Breslow, from preceding page*

Professor X shifts his weight. He may manage a tight smile or try a pleading glance. He asks the question again, perhaps rephrasing it slightly. Still it falls on deaf ears. Sitting there, I feel as if the question has died a thousand deaths between the time it has left the professor's mouth and the sound waves have reached the far corners of the room.

Now at this point, I have seen people resort to a variety of strategies to try to get themselves out of this fix. Typically, they might:

- A. Simply pretend they haven't asked a question and continued lecturing;
- B. Answer the question themselves;
- C. Cold call a student (in other words, ask a student who has not raised his/her hand to answer the question);
- D. Ask another question – sometimes a simpler version of the first.

Although each of these options may work to get the class talking in the short term, unfortunately, each has its own drawbacks as a more permanent solution.

If Professor X pretends he hasn't asked the question and goes on talking, he risks undercutting his own credibility in the situation. In communication theory, this is called "disqualifying the communication," referring to a way of communicating in which the speaker invalidates his/her own message, denying it or devaluing it at best.

If Professor X answers the question himself, he lets the students off the hook and tells them he will bail them out if need be. Students are like most of us – they are perfectly willing to take the path of least resistance if one is available – and by answering the question himself, Professor X offers that option *gratis*.

Cold calling can work if the instructor has instituted it as a norm at the beginning

of the semester, if he calls on students equally over the course of the term, and if he helps students save face if they can't answer a question or answer a question incorrectly. But to begin to cold call out of the blue simply to get out of a difficult situation is changing the rules of the game on the students, which, I believe, is patently unfair.

question about the old material. True to type, his students looked at him as if he were speaking a strange foreign language known only to a handful of tribesmen who have been isolated for centuries in a remote Brazilian jungle. He repeated the question with no more luck. But at this point, Professor Y did something I had yet to see in another MIT class:

**It was the second week of class, and Professor Y was still getting to know his students. He began the class with a five-minute review, quickly throwing out a question about the old material. True to type, his students looked at him as if he were speaking a strange foreign language known only to a handful of tribesmen who have been isolated for centuries in a remote Brazilian jungle. He repeated the question with no more luck. But at this point, Professor Y did something I had yet to see in another MIT class: He engaged in a kind of "metacommunication" – that is, communication about communication – with his students.**

Finally, changing the question – especially breaking it down into its component parts or simplifying it – can work, assuming the students are not answering because they don't know the answer. But I am convinced from informal conversations with both faculty and students that often that is not the case – that the causes of silence in the classroom are not due to ignorance but to the dynamics of classroom interaction.

#### The Value of "Relationship" Messages

Let me tell you how I saw one young physics instructor deal with this problem in his classroom.

It was the second week of class, and Professor Y was still getting to know his students. He began the class with a five-minute review, quickly throwing out a

He engaged in a kind of "metacommunication" – that is, communication about communication – with his students. Let me explain.

Professor Y's response to the stony silence was a simple, "Don't be shy – come on – anyone" delivered with the kind of enthusiasm that only a high school cheering squad can manage even when the home team is getting solidly trounced. By calling attention to the lack of response and encouraging his students to overcome it, I believe Professor Y demystified the phenomenon and forced them to address it. The "don't be shy" repeated twice more indeed got Professor Y an answer.

Still, Professor Y had not gotten the class rolling. A subsequent question –  
*(Continued on next page)*

## TEACH TALK

### Newsletter Introduces New Regular Feature

*Breslow, from preceding page*

this time one that could be answered by a simple “yes” or “no” – again elicited no reaction. So Professor Y told his students, “You need to shake your head to let me know what you think” as he nodded his head vigorously himself. And the students followed suit although it is true that many seemed to do so a bit self-consciously.

This coaxing, encouraging, pushing, cajoling continued throughout the class. Right answers were greeted with enthusiastic kudos; partially correct answers got a “you’re on the right track” or “that’s close, but . . .”; students who were stuck were bolstered with a “that’s O.K., can someone help us out here?” A question from a student got a hearty, “What an excellent question,” and those who responded but did so in a hesitant way were told to “sing out.”

By the end of the hour, the class was a buzz of activity with some students admitting they were “lost” and others volunteering to help. The slightly chaotic atmosphere that resulted might not be comfortable for everyone to deal with, but there is no doubt that it stood in dramatic contrast to the listlessness characteristic of the class at the beginning of the hour.

The strength of Professor Y’s strategy lies in what I call the “relationship” messages that he brought into the classroom. He focused not only on the material to be learned, but also on the dynamics of the classroom, for which he publicly asked each student to take his/her share of responsibility.

There is an axiom in communication theory that says all communication takes place on both the content and relationship levels. (The classic example given in the literature is of the husband and wife who have a fight because the husband has

invited an out-of-town friend to stay at the couple’s home. On the one hand, the two are fighting about the invitation [the content level]. On the other hand, they are fighting about whether or not the husband has the right to make that kind of decision without consulting his wife [the relationship level].) The axiom

to the class can also be effective, assuming there is time to devote to in-class teamwork. But in any class, it is the faculty member’s responsibility, I maintain, to lead the charge, as the enthusiasm and goodwill of the instructor in the classroom can go a long way toward breaking the code of silence that

**Now this is not to make the case that nothing will get taught in an MIT classroom unless the “relationships” in the class are functioning, but it is to say I believe the students in Professor Y’s class became willing to participate because he dealt with both the content and the relationship aspects of his interaction with them. In that way he strengthened the basis of all good teaching – the ability to communicate.**

further states that until things are harmonious on the relationship level, nothing will get resolved on the content level.

Now this is not to make the case that nothing will get taught in an MIT classroom unless the “relationships” in the class are functioning, but it is to say I believe the students in Professor Y’s class became willing to participate because he dealt with both the content and the relationship aspects of his interaction with them. In that way he strengthened the basis of all good teaching – the ability to communicate.

Nor am I making the case that Professor Y’s method of teaching is the only effective one. It no doubt suited his personality, but it might not be right for everyone. There are other strategies. As I mentioned, cold calling can bring about results if it is introduced and accepted as a class norm. Teaming students and having team representatives report back

seems to plague many of the classrooms at MIT and many of our students who inhabit them.♣

If you have questions, concerns, or comments regarding teaching (or learning) experiences at MIT that you would like to share with the MIT community, we encourage you to reach us at the *Faculty Newsletter*. As always, we also encourage submissions on any topic of interest to the MIT community.

Our address is 38-160; telephone x3-7303; FAX x3-0458; or e-mail [fnl@athena.mit.edu](mailto:fnl@athena.mit.edu).

If you would prefer a more private communication, Professor Breslow can be reached at her office, E53-411, x3-3780; or by e-mail, [lbreslow@mit.edu](mailto:lbreslow@mit.edu).

## Letters

To The Faculty Newsletter:

A wise faculty member once told me on graduation that if I left appalled at my ignorance (which I was) then I had received a good education. By this criterion, the low confidence in themselves, their academics, and their creativity reported by the 1994 seniors (Page 28 of the November/December *Newsletter*) attests to the high quality of an MIT education. As I stumbled up the professional engineering ladder, I was always impressed by the confidence with which my MIT colleagues accepted even the most difficult tasks, and carried them to completion with a minimum of fuss and feathers and always with a touch of humor. Which would indicate that self-esteem is rapidly regained when our graduates have a chance to work in industry with colleagues from other universities. But hopefully, they will always keep that sense of awe at how much we don't know. This will stand them in good stead when Nature takes care of their further tutelage. Another wise faculty member, this time at MIT, was fond of saying that engineering is

one of the most honest professions, not because engineers are moral, but because Nature can never be fooled.

Incidentally, as a non-MIT graduate, I was attracted to MIT not only because of my experience with its graduates in industry, but also because they seemed to gravitate to the top. In one organization I have been associated with, a division of one of our largest aerospace companies, the president, vice-president for engineering, chief engineer, and many of the department heads were all MIT graduates.

I applaud the aspirations for our students voiced by Irene Tayler in the same *Newsletter*. For many years of my half century at MIT I have tried to broaden the view of our undergraduates, not very successfully, and have finally concluded that this broadening is best done mainly on-the-job while we do primarily what is best done in University – teach the disciplines of our profession. These disciplines are not easily learned, except by a few who seem to absorb them by a form of mental osmosis. For most of us, a true understanding is achieved only by

hard work and much sweat, a process which is not always enjoyable. It would be a mistake to suggest to our students that it could ever be otherwise. Unfortunately, in the U.S. and the U.K., scientific illiteracy is all too often worn as a badge of honor, and frequently better paid, with the result that less than 10% of university students elect to subject themselves to the rigors of a science-based education. In the rest of the developed world, France, Germany, Russia, Japan, etc., the percentage is closer to 30-40%, and their engineers are highly respected leaders. Yet the U.S. and the U.K. have the largest number of Nobel prize winners in the sciences and an enviable record of technological advances. Our “nerds” have a dedication and creativity which the rest of the world has trouble matching. Maybe, as we tinker with our curricula, we should be careful not to throw out the baby with the bath water.

**R. H. Miller**  
**Professor Emeritus**  
**and Senior Lecturer**  
**Aeronautics and Astronautics**

## Electronic Distribution/Bulletin Board For Newsletter Considered

As the information superhighway grows exponentially, more and varied forms of electronic communication offer increasing opportunities for expanded distribution of the *MIT Faculty Newsletter*, as well as means for improved discourse among the members of the Institute community.

Topics under discussion by members of the Editorial Board include establishing a World Wide Web page for electronic distribution of the *Newsletter*.

Readers would be able to read the current issue on their computer in the identical form as that distributed in hard copy. All graphics, charts, etc., would be available. In the future, hypertext links to external documents would be added.

Another possibility would be making current and past issues of the *Newsletter* available on the network in a form that would allow downloading to an individual computer, as well as providing search features for locating specific articles, topics, or authors.

There is also discussion about establishing a *Faculty Newsletter Bulletin Board*. This would permit electronic interaction among the MIT community, as well as serve as a resource for questions (and answers) posted to the *Newsletter*.

Editorial Board members are seeking feedback from the faculty and other community members regarding these ideas. If you have an opinion, they'd love to hear it. Information for reaching us is available on Page 2. ♣

**M.I.T. Numbers**  
**Student Enrollment**  
**1994-95**

**Undergraduates\***

Architecture and Planning	83
Engineering	2,086
Humanities and Social Sciences	141
Management	103
Science	899
Whitaker College	----
<b>Total Undergraduate Students</b>	<b>4,472</b>

\*MIT students do not enroll in an academic department until their sophomore year. Total undergraduates include 1,104 first-year students, 42 undeclared second-year students, and 14 third-year special students.

**Graduates**

	<u>Regular</u>	<u>Non- resident</u>	<u>Special</u>
Architecture and Planning	439	42	26
Engineering	2,359	10	76
Humanities and Social Sciences	280	62	3
Management	703	3	23
Science	1,063	8	13
Whitaker College	121	----	71
<b>Total Graduate Students</b>	<b>5,302</b>		

**Source:** *MIT Facts 1995*, prepared by the Office of Communications, Resource Development