

Insights & Ideas for Teaching & Learning

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ARE THERE ANY QUESTIONS?

As a Graduate Teaching Associate in the Department of Mathematical Sciences, I have the advantage of being both student and instructor. I occasionally sit through lectures that I don't fully understand, and I know the frustration of spending hours trying to complete a confusing assignment. A classmate once asked me how I was able to ask questions in class. I explained that asking the right questions helps me understand the concepts being taught. As an instructor, I find that many students do not ask those questions. In this note, I will discuss a technique which professors at Harvard University have found helpful in encouraging students to ask questions.

In Overcoming Math Anxiety, Sheila Tobias writes about the problems students have asking questions. She notes that women in particular are afraid to ask questions for one of two reasons:

One of the reasons we did not ask enough questions when we were younger is that many of us were caught in a double bind between a fear of appearing too dumb in class and a fear of being too smart.... The young woman who is frightened of seeming too smart in math must be very careful about asking questions in class because she never knows when a question is a really good one. "My nightmare," one woman remembers, "was that one day in math class I would innocently ask a question and the teacher would say, 'Now that's a fascinating issue, one that mathematicians spent years trying to figure out.' And if that happened, I would surely have had to leave town, because my social life would have been ruined."¹

Tobias also comments, "Ironically, fear of being too smart may lead to such passivity in math class that these girls also develop a feeling that they are dumb."² I suspect that

this is not just a feminist issue; boys who are too smart are considered "nerds."

Questions are as important for the instructor as they are for the students. They provide valuable feedback about what students are actually getting from the lecture or discussion. Learning theory suggests that we improve our efforts on the second attempt by adapting to feedback from the first attempt. As an instructor, I need to know that the methods I use to present a topic effectively convey the whole concept. Teaching MTH 100 as part of the Academic Opportunity Program has challenged me to adapt my teaching methods to a wide variety of student backgrounds. In researching ways to improve my teaching, I found The Harvard Assessment Seminars, a study that Harvard University made of its effectiveness as an educational institution. This 1990 report discusses a simple technique that some Harvard professors have used to improve their effectiveness as instructors:

Patricia Cross, now at the University of California at Berkeley, suggests a simple device called the one-minute paper. The idea is to conclude a regular lecture or discussion a minute or two before the end of the class time. Then ask each student to write down brief answers to two questions:

- (1) What is the big point you learned in class today?
- (2) What is the main unanswered question you leave class with today?³

The report concludes that the one minute paper has many benefits:

- It requires more active listening from students.
- It helps to identify students who need special help or who may lack adequate preparation for the course.
- It improves student writing. Responses during the last weeks of a class are longer and more thoughtful and articulate than during the early weeks.
- It helps to document for the students that they are indeed learning something in the course.⁴

And of course, it allows a student to ask a question semi-anonymously.

In instituting this idea, I found that I needed to make it a regular and formal part of the class. I handed out a green mimeographed form at the beginning of each class:

Name _____ Date _____
Main point of today's lecture-most important idea
A question I still have

I convinced my students that this was an important part of the class by telling them that it was my method of taking attendance. Some handed in blank forms for the first few weeks. Asking questions in a math class was a new experience for many; they felt that mathematics is about ANSWERING questions, not ASKING them. Gradually, more and more students began responding, especially to the question part of the form. As an incentive to respond to the "Main Point of Today's Lecture - Most Important Idea", I began awarding homework points to the most perceptive answer each day. The responses to both parts of the feedback form improved immediately, and the responses began to focus on HOW to get the answer rather than WHAT is the answer.

There were days when the questions on the feedback form let me know that the words I used - which seemed very clear and unambiguous to me - did not create the same clear and unambiguous concept in their minds. For example, questions about the use of parentheses in mathematical expressions helped me to explain the distinction between -2^2 and $(-2)^2$ in a manner that took into consideration the secondary school algebraic notation for signed numbers. Many students come to college writing signed numbers as numbers preceded by a tiny dash, $\bar{2}$, instead of (-2) . The distinction between $\bar{2}^2$, meaning $(-2)^2$, and -2^2 is a major one in mathematics. In this case, I needed to convince students to replace the confusing old habit, $\bar{2}$, with an unambiguous new habit, (-2) .

The application problems which are part of every mathematics course got everyone responding to the question part of the feedback form. Often the questions were of the form, "I

am totally confused." or "HELP!" But, many were able to specify the problem.

I enjoyed the positive feedback:

You answered my question.

Thank you for explaining subtraction of integers.

I understand now.

I understand a lot because I participated today!

(HOORAY)

But there were also complaints and criticism:

PLEASE slow down!

When you begin a problem, please finish it.

Why are test problems 10 times harder than the homework?

The "one-minute paper" idea has two advantages. It encourages my students to focus on the concepts which are unclear. Stating what is not understood helps the student begin the learning process, and that in itself is often enough to clarify the misunderstanding. This encourages an active approach to learning. The feedback forms also improve my teaching by increasing my awareness of how students are responding to instruction. My lectures on some topics now include a discussion of what not to do and why not.

This simple device has also encouraged students to come to me after class and during break with individual questions. I agree with Harvard's assessment: the "one-minute paper" yields a big payoff for a small investment of time and energy. Are there any questions? There will always be questions, and they will always be part of my instruction.

-- Charlotte Fischer

¹Sheila Tobias, *Overcoming Math Anxiety*, Houghton Mifflin, Boston, MA, 1978.

²Tobias.

³Richard J. Light, *The Harvard Assessment Seminars: Explorations with Students and Faculty about Teaching, Learning and Student Life*, Harvard University, Cambridge, MA, 1990.

⁴Light.

EDITORIAL INFORMATION

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SUPPLEMENTAL INSTRUCTION

Supplemental Instruction (SI) is a nationally certified program that provides academic support for students in high risk classes. During the 1991-1992 academic year SI was offered to students in specific sections of MTH 012, MTH 121, MTH 122, MTH 154, MTH 155, MTH 256, and ACC 200. SI Leaders who are OU students trained to participate in this program, attended the classes for the section they were leading, took lecture notes, did all the homework, and then conducted two to three study sessions each week for students from the designated sections who wanted to attend. Of the 777 students registered in these classes, 41% (321 students) attended at least one SI session. With the exception each semester of one section of MTH 121, students who attended 1/3 of the math SI sessions earned at least a half-grade higher than those who did not attend as often. In all math and accounting SI sections both semesters, students who participated in SI earned higher grades than those who did not with the exception of one section of MTH 121 in the fall. In this section the grade for both groups was the same. The program continues to be offered this fall for two sections of MTH 012, MTH 121, and ACC 200, and one section of MTH 122, MTH 154, and MTH 155.

The Enhanced Studies Program (ESP) began in the fall semester of 1991 with 70% of its funding from the Office of Minority Equity (OME) of the State of Michigan and 30% matching funds from the university. The purpose of the program is to increase the rate of acceptance into majors and the graduation rates of African-American, Hispanic-American, and Native-American students, particularly in business, engineering, science, and mathematics. All students in the target population who entered fall 1991 were invited to participate in the program, along with returning students. 37% of the ESP students were freshmen, 31% sophomores, 26% juniors,

and the rest seniors. The heart of the program is the system of organized study sessions led by Peer Study Leaders who are OU students trained with the Academic Skill Center's SI Leaders prior to each semester. By the end of the winter 1992 semester, 134 students had been active in peer study groups for the following courses: ACC 200, BIO 190, BIO 200, CHM 144, CSE 125, MTH 012, MTH 121, MTH 122, MTH 141, MTH 154. Professors J. Curtis Chipman, Egbert Henry, and Addington Coppin, along with Special Instructor Jerry Marsh are Faculty Liaisons to the program. They assist in identifying, hiring, and training Peer Study Leaders, work with their departments to implement the Early Warning System of grade reports from the instructors of ESP students, and mentor students in the program. The students who attended more than 1/3 of the study sessions each semester averaged a 2.65 in the ESP courses. OME and the university have funded the program again this year and thus far 133 students are actively participating in the study sessions.

-- Lynn Hockenberger

BREAKING OLD PATTERNS WEAVING NEW TIES

In any setting where members of different groups try to work together, uncomfortable feelings, anger, mistakes and great difficulty are bound to arise in sorting out what is at the root of any particular problem. It's important to learn about one another so that we become sensitive to the many realities in which people live, avoiding the dynamics that hold domination in place despite our best intentions. In a certain sense, people in dominated groups have always known about their dominators. Survival often depends upon not making a mistake which would upset those who control the resources needed to survive. As a result, those on the outside have a much clearer understanding of those on the inside than those on the inside have about the experiences and sensitivities of "outsiders." The more privileged people are, the more ignorant they are likely to be of the experience of others, so the more narrow their reality is. In whichever

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ways we each have privilege, we need to educate ourselves about the history, culture, struggle and everyday obstacles that must be contended with by people different from ourselves. Otherwise, their experiences remain invisible. Literature and art serve as powerful resources to educate us.

All of us also need to become aware of our assumptions which support our own power and privilege, and how these distort our view of the contributions, capabilities and options of others. These assumptions are cultivated in countless ways by the dominant culture. By understanding the particularity of the many different oppressions in this society, we begin to see how much our day-to-day interactions are fraught with divisiveness and the perpetuation of domination. For example, it is not uncommon to hear people talk about Native Americans in the past tense, refer to their clothing as costumes, or their religions as primitive. Whenever people speak of the family, they assume heterosexuality. A person with a physical disability is treated as if she/he is incapable in areas totally unrelated to the particular disability. Needless to say, each of these instances distorts the experiences of whole groups of people. If any members of these groups are present, chances are they won't stick around for long.

As we become aware of the multiple hidden realities in any situation, it becomes increasingly impossible to remain silent. We find ourselves compelled to point out aspects of people's lives which have been made

invisible in the dominant monoculture. When these undercurrents are named--from interpretations of history, to ways of doing everyday things, to access to resources--what is often the content of silence in settings made up of people from diverse backgrounds, becomes part of the reality with which everyone grapples. The narrow norm is broken.

When naming of ignored realities is done by someone with privilege, it avoids provoking the dynamics of guilt and blame. For example, white people who have previously been unable to respond to comments from people of color--both because of their racism which denies legitimacy, and because of their guilt, which paralyzes their minds--can begin to look at issues more clearly. When the content of what has been silent is named, more often than not, people begin to share thoughts which they had previously censored.

When going against the tide and naming the invisible currents, one tends to feel disruptive, out of order and inappropriate--not "nice." The power of naming breaks the taboo. Differences are explored, not denied. Choices can be made collectively, based on a vastly expanded understanding of what is taking place. Naming opens reality and makes room for our varied experiences. We are all forced to deal with the impact of our actions.

Changing the political culture in which we work is essential, but it is not enough. If we are to create a life-affirming society, we need to take a stand against domination and accommodation wherever we are. The silence that eats away at our humanity grips us while standing in lines, or while overhearing casual remarks by strangers and friends. We will restore our integrity only when we break the tyranny of niceness and speak up in these situations which our culture teaches us to endure or ignore. When we refuse to remain silent in all public, family and community settings, we transform the dehumanizing climate on which institutional abuse depends.

--Shea Howell

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