

103 Campbell Ave.
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July 27, 1996

Ms. Iris C. Rotberg
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Dear Ms. Rotberg:

We recently returned from a year in Beijing and in the process of catching up with back issues of Science, I read your article on test score comparisons. I would like to add one observation in addition to what you presented so well in your article.

Few tests adequately determine the student's ability to think creatively, to use factual knowledge to solve problems in either the work place or at home, or the motivation and/or interest to want to do either. Education involves much more than the memorization of facts which school achievement exams test most successfully.

I have recently been exposed to the limitations of educational practice which depends heavily, almost exclusively, on rote learning. On the other hand, I have also been impressed with the advantages of the accumulation of facts gained through rote learning for those few who can go beyond that training and use the information creatively.

I have spent 10 months as a volunteer teacher, lecturing on US customs to post high school students in Beijing China. In the process I have learned something about the typical academic preparation of Chinese students. My students were of three general groupings: 1) students in two year college level technical programs whose English language skills represented five years of junior and senior middle school instruction and whose test scores on the exams taken at the end of senior middle school did not qualify them for university, 2) Masters and Doctoral students in science whose English language skills represented 9 to 12 years of instruction and whose graduate work was in some field of social, physical, biological or medical science, and 3) students who were sent by their work units to the Academy of Science English Language Center to study English. These last students had to pass both a oral and a written test, a test I have not seen, in order to be accepted for the intensive four month program. They usually had university degrees in some field of science and had been working in their fields for a number of years.

My comments have to do with the brightest and best prepared of these students - the Ph.D. students who have completed at least 5 years of English instruction before university and 4 to 5 more in university. They take two more semesters in graduate school. Many complained that even after 10 or more years of study of English, they could not use the language. I can attest to that. Many had difficulty understanding English, most had difficulty pronouncing words in a way intelligible to a person comfortable with both American and English accents, and few could consistently put together a coherent sentence, either spoken or written.

The students told me that they usually begin to learn English in junior high school classes of 40 or more. In these classes, students seldom had a chance to speak in class except as the teacher asked a set question and the students in unison responded with a set answer. University level classes are commonly of a more reasonable size - 25 to 28 students. Instruction even at the university level was rarely by a native speaker of English. The Chinese born instructors, many victims of the Cultural Revolution when universities were closed, had been inadequately trained and many were teaching by assignment, not by choice. So much for background.

Of more importance to the questions raised by test score comparisons are the goals of the educational system and the teaching methods used. The goals appear to be, out of necessity, to teach as many students as possible with inadequate funds using the available but too often inadequately trained teachers. Rote memorization was the standard teaching method used and the students were whiz kids at learning this way. I was

amazed to learn that the students I worked with were assigned by their Chinese born instructors up to 100 words a night to learn. They could and did complete their assignments, but they knew neither how to pronounce the words they learned nor how to use them.

Getting students to ask questions in class was an impossible task. I learned that children in China learn early not to ask questions, of adults, and definitely not of teachers. It is safer that way. An inquiring mind, an analytical mind, is dangerous in a society which even today, though much more relaxed than 20 years ago, still punishes dissent expressed in public. As this applies in the classroom, asking questions or stating opinions in class are not student options I was told. First - a student who requests clarification of a point not understood shows his ignorance and is open to ridicule by his teacher and classmates. Initiating or participating in a discussion presumes that the student knows as much or more than the teacher, a real no-no. Second - the student may ask a question the teacher can not answer, presenting the teacher with the choice of losing face or making up a plausible but not necessarily accurate response. Very small children learn these prohibitions early and the pattern continues on through the years of schooling and into adult life in the working world. A fortunate few escape being permanently deformed by this mold.

Learning to think is not easy. Where I taught, the Chinese teachers of English depended on the American teachers to teach the students critical thinking, recognizing that they can't do it since they themselves were never trained to think critically. One Ph.D. student commented about his classes in oral and written English, taught by an American teacher, classes in which no tests and no grades are given, "I have never worked so hard in my life. Memorization I have been taught to do, thinking I never have had to do. It's hard work."


The ability to analyze, to have new ideas, to stick one's neck out and to try new ways, to function without a consensus, to take a risk, to think independently, are not skills easily measured by standardized tests but they are essential results of a good educational system. The rote learning style serves to pass information to large numbers of people at a small cost, it permits inadequately trained and uninspired teachers to function at some level especially if provided with books containing the information to be memorized, and it is a useful method of preparing students for those fearsome tests which at every stage of educational advancement determines if or where the Chinese student will get his next level of instruction.

A few bright students develop analytical skills despite everything, and these are a joy to work with. There are not enough of them for the good of their country nor for the long term safety of the world community.

My husband who was a volunteer senior advisor for a physics lab in Beijing saw the end result of the Chinese educational system. He was discouraged by the inability of too many of the graduate students and professional physicists when faced with a problem with the research equipment to establish a method for trying to understand the problem, to take necessary measurements, and then go on with continued measurements until the nature of the problem was understood and solutions found.

It should be obvious that people who choose one teaching method over another should be clear about the goals to be reached and the possibility of reaching them. The goals of American education should be different from the goals of other countries. Our culture is different, our needs are different. The simplistic insights obtained by comparing test scores are of little or no help in defining our goals, or selecting our teaching methods. Such comparisons are useful for gloom and doom soothsayers but of little help to thoughtful educators and policy makers.

Sincerely yours,


Nancy C. Tigner
(Mrs. Maury Tigner)