

A CHALLENGE TO MAKE SCIENCE EDUCATION INTERESTING AND RELEVANT:

A CASE STUDY IN FOOD SCIENCE AND NUTRITION FOR NONMAJORS

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Abstract

This is a case history of the development of a course in food science and nutrition for non-food science majors. The course enrolls 2,600 students per year. Exams are deemphasized and interest in science is promoted. The hazards of this approach involve primarily interaction with the instructor's peers and with competing departments. The course material relates to everyday living and is well accepted by the students.

The Paddock brothers wrote a book entitled **Famine—1975!** Whether they were right or wrong in their predictions is a disturbing thought to a food science department (and that is probably the academic understatement of the year).

We in the United States were disturbed by the rash of "gloomers and doomers" in the 1960s whose sentiments obviously were directed at countries other than our own. Yet there were many worrisome developments associated with food in our country. The organic food movement was gaining strength; macrobiotic diets were popular; everyone knew that the large food companies were poisoning the populace with various additives; reducing diets were claiming millions of dollars from the American pocketbook; students at universities were clamoring to have "natural" food lines in their cafeterias.

It was then and still is popular to attack the commercial food suppliers. A small but vocal minority reaped great financial reward by writing books expounding how really terrible the food supply was. The environmental movement was getting into full swing and demanded environmental impact reports on new and existing developments. (Economic impact reports were not deemed necessary at the time.)

Spokesmen for the food industry and many academics were reluctant to enter the arena of public information for many reasons. One was the natural hesitation of scientists to speculate on scientific issues. Perhaps this analogy is appropriate: The sales manager and research

director of a large company were traveling together. The sales manager looked out the window of the auto and commented, "I see they are shearing sheep." The research director looked out and replied, "Well, they are shorn on this side, at least." The reticence to draw conclusions on skimpy evidence is not shared by those who write sensational articles for the public press. They need not be accurate, only sensational. Conventional scientists are reluctant to debate such writers on television or radio because they usually end up by appearing to be "squares." In reality, the truth may not make good copy. It is much easier to be entertaining if one is not constrained by having to be accurate.

This was the atmosphere in which we at the University of Massachusetts decided that, as academicians, we should speak out and provide at least part of the "other" side of the story. We based our decision on the premise that students are intelligent and quite capable of making up their own minds if given the chance. Actually, it is difficult for interested laymen to get authoritative opinions on nutrition, food composition, and food supply. They can get plenty of opinions, which sell periodicals and are right much of the time. But how can a layman acquire the judgment to sift out from the mass of opinion the 25 percent or so that is nonsense? This is not easy!

Course for Non-Food Science Majors

We decided to offer an elective course for non-food science majors that would provide what we believe to be honest answers to food questions. We had two research scientists on our staff, both with conventional and actually similar food science backgrounds. Both had bachelor's degrees in science and master's degrees in food chemistry from the University of Toronto, Canada, and Ph.D. degrees in food science and technology from the University of Massachusetts. Dr. F. M. Clydesdale was to teach the first half of the course, which involved elementary nutrition, food composition, food processing, sanitation, additives, food fads, and so on. Dr. F. J. Francis was to teach the second half, which involved the current world food supply, new sources of food, and technical ways of increasing food supply. The latter included nitrification, genetic engineering, novel processing and so on. We decided several years ago that the students really wanted more "relevant" nutrition, so we reduced the food supply portion to 35 percent and added a third facet to the course, to be taught by a third faculty mem-

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ber, Dr. W. W. Nawar. Also a conventional research scientist, with a specialty in lipids, he was to teach lipid involvement with heart disease, obesity, and so on, and also would share the protein supply lectures.

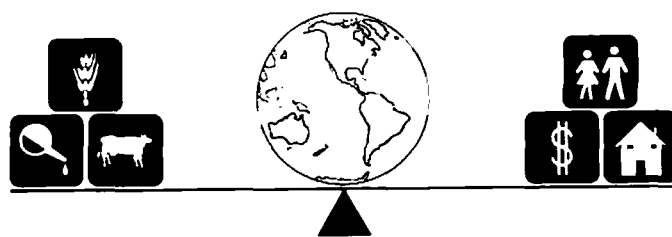
What to Do With 2,500

The response to the course was beyond our fondest hopes. We first offered the course in the spring of 1971 with no previous publicity. The first lecture drew about fifty students. It was a 3-hour-per-week, 3-credit course (Monday, Wednesday, Friday). Every day the numbers increased and we ended the semester with 264 students. The following semester the news spread by word of mouth and we enrolled 950. The next semester we had 3,700 students preregistered. Two sections were scheduled in the largest lecture hall on campus which would hold just over 500. We accepted 1,300 students on the supposition that they would sit in the aisles, on the platform, and in the window wells, and they did (fire marshalls are asked please not to read this!). Yet there were 2,500 others who were not admitted. Did you ever try to refuse enrollment of 2,500 students in one course? It's an experience we don't recommend! Student petitions to the administration to install closed-circuit television created considerable discussion. Some lectures were taped for trial purposes but the administration decided against closed-circuit TV. Actually this practice was not pushed, because of the dehumanizing effect, and we believe this decision was correct because a possible analogy with the students' usual TV viewings might have caused some problems. (We have jokingly suggested to Dr. Clydesdale that part of his success comes from being a cross between Billy Graham and Flip Wilson.) However, if and when the technical backup for TV production is available, we may reopen the question of televised lectures.

For the past three years we have settled on an enrollment of 2,600 per year, involving two sections of 650 students each for two semesters. We take only freshmen and seniors and there is a long waiting list. Since the freshmen we had four years ago have now graduated, we thought that we would have filled the pipelines. There are currently about 19,000 undergraduates on campus, so we are reaching about 60 percent of the total undergraduate student body in one course.

The Course Approach

The approach to this course differs from that of most science courses. The undergraduate curriculum requires that students in arts and sciences take a specified number of courses in each of three broad areas. One area is natural sciences and mathematics. Conventional science courses for nonscientists are usually watered-down versions of science courses for majors. These are usually inappropriate and students obviously rebel against them. We offered an "awareness" course deliberately intended to deemphasize exams and promote interest in science. We said, "Come and listen — you will enjoy what you



hear and you will learn some useful scientific concepts." We emphasized that three conventional scientists would teach the course and we would be accurate, not sensational. We added that we do not endorse fads and would actually deal harshly with some of them.

The students accepted this philosophy wholeheartedly. Such feedback as we get from the student newspaper tells us that the students like the course and find it relevant. Recently a former editor of the University of Massachusetts daily paper *The Collegian* was explaining to Dr. Clydesdale a change in attitude of the students to the course. Four years ago, he said, students would comment, "That course is easy and some of it is interesting." The current comment is, "That's a fascinating course," and then with some pride, "and I aced it." Some faculty find it hard to accept the fact that if you work for and with students, not against them, you can achieve wonders.

Problems Identified

Yet there are some problems. We cannot use the conventional route and require term papers from each student. It is impossible, with the time and effort at our disposal, to mark this number of papers. It is also impossible to handle conventional exams so we have gone to two machine-marked true-false or multiple-choice term tests each semester. We would like to stimulate individual learning but, again, it is difficult. We do try to interpret current trends and refer to current journals, but current popular magazines such as *Time* are more feasible because they are readily available. It is even difficult to get enough Xerox copies of selected articles from journals such as *Science*. We lack an adequate textbook, and the obvious answer to this predicament is to write a textbook ourselves. Admittedly we are remiss in not having done this sooner, but the book is nearly complete and should be available in 1975. We have not been pushing to provide a book, desirable as it may be, because the student senate provides a note service by sending a stenographer to each lecture and reproducing the notes for sale to the students. This is a money-maker for the student senate and it provides students with a good set of notes. With these, they can stay away in droves if they please, but they don't.

A course such as we have described is not without its hazards for a young faculty member. He had better have the courage of his convictions because his peers are likely to criticize him for "lowering academic standards." This may be particularly true of those who boast of how many

students they fail. The younger faculty member must be assured of full support from his superiors or he may be unable to withstand this pressure.

The "Stick" or "Carrot"

It is, of course, easy to succumb and make the conventional demands on students. In our case, it would involve breaking the class into discussion groups of 25 students and assigning term papers, and so on. This would require 500 teaching assistants at \$4,000 each, for a total of \$200,000. We wish we could have one-tenth of this support. This raises the obvious question, should we have large courses that make little demand on the students? Should we use a carrot or a stick? Should one be able to graduate in "awareness"? Obviously we do not support the last statement. We can go too far, but the simple fact is that the "stick" approach in traditional science training for non-science majors has not worked. We believe that the "carrot" approach is likely to be much more successful. Please note that the carrot approach does not mean an "easy A." We adjust the grading level, making it difficult to earn an A yet not difficult to pass. Students can take the course on a "pass-fail" basis if they wish and we do not know which students elect this option.

The concept of an "awareness" course has other ramifications. We set up Food Science and Nutrition 101

as a freshman course for non-science majors. We soon found that we were attracting seniors in the "hard" sciences. After several years, even our own food science and nutrition majors wanted to take the course as an extra. They said it was the only place they could get an overview of the whole field. That was a compliment we failed to anticipate. Other departments were not so complimentary, particularly when we discussed, for example, the realities of food production versus environment. They are also concerned when we draw the bulk of the students.

Faith in the Approach

We believe that our approach to teaching science to nonmajors is a good one. We had enough faith to launch a second course (FS&N 102, World Food Habits) which attracts about 800 per year. Our faith extended to a third course (FS&N 140, Basic Nutrition), which currently has 1,800 students per year and is growing rapidly. The interest in human nutrition is gratifying and we like to think that we are contributing to a very necessary public education program. Our students will remember what they have learned and, we hope, be better informed on nutrition and food supply. We hope we are also helping to combat the spread of misinformation. It is a tremendous job and we should start now.

THE WORLD FOOD PROBLEM

A "Course" of Action for the Future

T. P. Labuza

Abstract

The world food situation, though confusing, has an impact on consumer food choices because of costs and feelings toward consumption of certain products. Through misinformation from the media and self-appointed activists, the consumer is further misled to believe that processed food has no place in today's world. This article discusses some of these concerns and points to courses of action that teachers in the field of agriculture can use to better communicate the facts to the average consumer. A discussion of the basis for a college level food consumer course is also given.

In recent years the consumer has been deluged with so many warnings about his food that he faces a major dilemma every time he goes to the market to purchase food. He has heard that cyclamates cause cancer, that

diethylstilbestrol (DES) which is used for beef cattle is a possible carcinogen, that pesticides and PCB's have been found in food, that canned foods are being recalled because of botulism, that swordfish contains mercury, and that filth such as rodent hairs and insect fragments is allowed in some of his foods. The growing list of potentially dangerous additives has led the consumer to question the quality of the food supply along with the ethics of the food industry which supplies it. These questions are generally raised (perhaps blown up is a better choice of words) by activists and the press — people who usually have little professional knowledge of nutrition and food processing.

Concern for food safety is exacerbated by the periodic pronouncements of many activist organizations, legislators, and authors of popular books concerning the nutritional quality of the U.S. diet. Many groups decry the loss of nutrients during processing. Medical practitioners recommend drastic reductions in meat, egg, and milk consumption because of a purported link between

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