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Report No. 97

**Bringing Total Quality Improvement
into the College Classroom**
with attachments

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March 1993

(revised version without attachments published in
Higher Education (April 1993) pp. 259-279)

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Bringing Total Quality Improvement into the College Classroom

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ABSTRACT

This paper describes a recent effort to infuse the Total Quality Improvement (TQI) approach, popularized by Deming and others, into an upper-division, junior-senior economics course at the University of Wisconsin-Madison. The process of infusing TQI into instruction has received relatively little attention. Most efforts to bring TQI into higher education focus on improving administrative operations and establishing courses and programs for students to learn how to apply TQI in their future jobs. The challenge is in using TQI to help students realize their potential for learning in traditional courses.

The TQI instruction approach developed for use in the course had three major elements. Customer Focus is represented by the proficiencies emphasized in the course and is expected of graduating economics majors. Student Involvement is represented by team-centered research projects whose purpose is to enhance the proficiency of creating new knowledge. Continuous Improvement is represented by on-going student evaluations of the course and instructor, and is carried out by a student team.

After discussing the motivation for adopting this approach and the independent development of the concept of proficiencies in the economics major, the paper moves on to discuss the planning, implementation, and execution of the course. Particular attention is given to discussing the operation of the teams and the development of a multi-faceted, on-going evaluation process to assess the effectiveness of the TQI Instructional Approach.

The evaluation results indicate strong student satisfaction with the TQI orientation of the course, while at the same time pointing out ways of improving what was done.

KEYWORDS: *Total Quality Improvement; TQI Instructional Approach; Continuous Improvement; Proficiencies; Team projects; On-going evaluation*

Bringing Total Quality Improvement into the College Classroom

W. Lee Hansen

To learn is to change. Education is a process to change the learner.

– Leonard (1968)

Quality... you know what it is, yet you don't know what it is. But that's self-contradictory. But some things *are* better than others, that is, they have more quality. But when you try to say what the quality is, apart from the things that have it, it all goes *poof*! There's nothing to talk about. But if you can't say what Quality is, how do you know what it is, or how do you know that it even exists? If no one knows what it is, then for all practical purposes it really doesn't exist at all. But for all practical purposes it *does* exist. What else are the grades based on? Why else would people pay fortunes for some things and throw others in the trash pile? Obviously some things are better than others . . . but what's the "betterness"? . . . So round and round you go, spinning mental wheels and nowhere finding anyplace to get traction. What the hell is Quality? What *is* it?

– Pirsig (1974)

INTRODUCTION

This paper describes a recent effort to use the Total Quality Improvement (TQI) approach, popularized by Deming and others, to teach an upper division, junior-senior economics course at the University of Wisconsin-Madison. Infusing TQI into instruction has received relatively little attention. Most efforts to bring TQI into higher education focus on improving administrative operations and establishing courses and programs for students to learn how to apply it in their future jobs.

This presentation is necessarily autobiographical. There are no manuals or road maps for developing and testing this application of TQI. As experience accumulates on attempts to infuse TQI into instruction, some generalizations and perhaps even principles will emerge to guide faculty members interested in improving their teaching and increasing what students learn in college courses. Based on my limited experience, it is obvious that TQI embodies an array of techniques and devices for encouraging and facilitating student learning. What may be special about TQI is the encompassing framework it provides for combining these techniques and devices, monitoring their effectiveness, and stressing continuous improvement.

In this paper I describe what motivated me to apply TQI to an individual course. I review the key elements of TQI, namely customer focus, student involvement, and continuous improvement. I then

show how each of these elements was operationalized: customer focus, through an emphasis on proficiencies in using customer knowledge; student involvement, through team-oriented research projects; and continuous improvement, through ongoing course and instructor evaluations. I then assess the results of these efforts and then distill what I learned.

THE CONTEXT

Criticism directed toward higher education institutions combined with the frustration of public officials as they attempt to assess the effectiveness of public expenditures on higher education has stimulated colleges and universities to improve and document the quality of what they do. TQI is seen by many as having enormous potential to respond to these challenges.

The TQI approach gained attention in the 1970s as a major force in Japan's emergence as a major economic power (Imai, 1986). Since the early 1980s, Deming has pushed for adoption of this approach here at home (Deming, 1986). Because of competitive pressures and the inner logic of the approach, it has been accepted by many American business leaders and is now being implemented in many U.S. firms (Walton, 1990). The resulting success stories have stimulated government and nonprofit organizations to adopt TQI (Sensenbrenner,

1991). Increasingly, academic institutions are demonstrating interest in TQI and frequently are adopting it (Miller, 1991; Sherr and Teeter, 1991; Spanbauer, 1992).

What it means to adopt a TQI approach is ambiguous. Most often higher education institutions have applied it to administrative operations such as physical maintenance, admissions, and other services. More recently, TQI has been applied to college and university management as an adjunct of strategic planning. Still largely untouched is the core activity of modern colleges and universities, namely, teaching. It is the knowledge and skills students gain that equip them to perform effectively in the labor market and to contribute to society. TQI must be integrated into the teaching-learning process, if the vast potential for quality improvement in higher education is to be realized.

Why has adoption of TQI lagged in higher education? Perhaps no more than 200 of the approximately 3,400 post-secondary institutions in the U.S. have used some form of TQI (*TQ Magazine*, 1992). There are so few adherents because many institutions regard TQI as the latest in a series of fads urged on higher education. Recall the enthusiasm for the long discarded MBO (Management by Objectives) approach of the 1970s and the now languishing strategic planning focus of the 1980s (Keller, 1983). Many institutions are therefore taking a "wait and see" attitude.

Another reason diffusion of TQI into instruction will be slower than its diffusion into other sectors arises because of differences in organizational structure. Colleges and universities lack centralized organizational structures and hierarchical control; they are more akin to worker-managed firms. They are composed of faculty members, sometimes working in groups but more likely alone, who create new knowledge, synthesize existing knowledge, and transmit new and existing knowledge directly to students and, less directly, to the general public. Difficulties arise because most faculty members do not view their work as contributing directly either to their institution's "output" or to the satisfaction of the institution's "customers," however customers are defined. Faculty members operate more like associates in large law firms, handling their activities with minimum supervision and control. In such a setting adoption of TQI cannot be commanded from above.

The challenge for higher education is to devise a strategy that provides multilevel leadership while simultaneously drawing independent-minded faculty

willingly into the TQI culture. This is not easy. Changing the traditional "culture" of academe may be more difficult than changing the "culture" of corporations. The trick is to discover how to devise incentives to overcome the barriers to change.

Meeting these challenges can occur at four levels. Institutional leadership can implement TQI programs in the nonacademic spheres of its operations; the major difficulty lies in developing a cadre of TQI trainers to launch these programs. TQI programs can be established in business and engineering schools to meet the growing demand for knowledge about TQI and for TQI trainers (Finster, 1991). Administrators can encourage their academic units to apply TQI in organizing their resources to facilitate high-quality teaching and research. Finally, and this is no doubt the most demanding task, individual faculty members can be encouraged to infuse the key ingredients of TQI to their own teaching and research.

Infusing TQI into the academic sphere is complicated because the role of faculty members differs so significantly from those of employees in most organizations. Individual faculty members produce courses that when aggregated make up what is commonly described as general education, the undergraduate major and eventually a college degree. They also engage in research and scholarly activities. Finally, they are involved in an array of public service activities that draw on their wide-ranging knowledge and skills.

To carry out research, scholarly activities and public service, faculty members draw on the existing body of knowledge, including their own. They identify gaps in knowledge that need to be filled through independent research. The resulting knowledge feeds directly back into their own instruction and research. Much of it also feeds into books and articles that constitute the body of knowledge which faculty members throughout academe use in their own teaching and research.

Departmental units are disadvantaged in overseeing these activities because individual faculty members know more about what is taught and how it should be taught than do their colleagues, department heads, college presidents and boards of trustees. Thus, mandating TQI is not feasible for teaching. Faculty members must become convinced of the virtues of TQI before they can be expected to embrace it. One hope is that case studies of the kind presented here will capture their attention and stimulate more of them to explore the possibilities of TQI in their instruction and research.

THE MOTIVATING FORCE

My interest in applying TQI to teaching began, I suppose, when I first read Deming (1986). Additional stimulation came from a colleague and collaborator, Jacob Stampen, who was exploring how to apply TQI in education (Stampen, 1987). When in the fall of 1990 Stampen offered an informal faculty and graduate student seminar on applying Deming's theories to education, I participated and became more deeply interested. I realized that I already practiced many of the principles espoused by Deming. This led me to think about how to apply Deming's approach in my teaching. To deepen my knowledge, I arranged to sit in on a spring semester TQI course taught in the School of Business by Mark Finster.

In January 1991, I happened to hear that a colleague in statistics, Ian Hau, was presenting a seminar describing his experience applying TQI in a statistics course (Hau, 1991). While listening to his presentation I suddenly realized how I could implement several aspects of the TQI approach in an upper-division labor economics course I was preparing to teach. I could not offer a full-scale TQI-oriented course. Too much was already scheduled for the course to allow time for systematically imparting TQI management and planning tools (Brassard, 1989) or developing team skills (Scholtes, 1988). In view of the constraints, my focus had to be limited.

Some background on my approach to teaching may be helpful. In recent years I had been puzzling over how to build into my course a greater emphasis on the development of what I call the proficiencies that might be expected of graduating economics majors (Hansen, 1986). These proficiencies are outlined in Figure 1.

These proficiencies call for students to develop the ability to use their knowledge rather than merely display it in traditional academic fashion in exams. The only way to ensure this happens is through courses that give students opportunities to learn and practice.

My interest in proficiencies arose because of feedback obtained from department questionnaires sent out, usually in the year following graduation, to former undergraduate economics majors. The responses revealed that the jobs taken by these recent graduates almost always required well-developed speaking and writing skills, some sense for quantitative relationships, and the ability to complete large projects. As employees, they were required to work closely with fellow employees, often as members of teams, to resolve problems, clarify options and make decisions. Responding grads

frequently commented on how much they had gained from economics courses that gave attention to the elements of these proficiencies, i.e. writing assignments, oral presentations and statistical analysis. Many lamented the lack of opportunities to develop these proficiencies to any great extent.

Even before sketching out the proficiencies concept in 1986, I had begun redirecting my teaching to emphasize these proficiencies. Then and subsequently, the first four proficiencies always had prime attention. For example, homework assignments required students to locate, manipulate and interpret empirical data. Other assignments called on them to work through a number of articles in professional journals. Students were given a variety of short and sometimes longer writing assignments that tested their ability to express themselves and organize their ideas (Hansen, 1993). Some of these assignments required them to apply what they were learning to new and different issues. In short, I had developed a matrix of assignments designed to enhance these first four proficiencies.

Despite these efforts, I had done little to stimulate "creating new knowledge." The reason is obvious. With an enrollment of 50 to 100 students, the burden of supervising and grading individual research projects became impossibly large. Nor had I done much to help students gain experience working on team projects, a proficiency that was not on my list.

The following plan emerged. With only minor modifications in the nature and content of the course students would be organized into four- to six-person teams with each team working on one preselected research project that was directly related to the course. Each team would make a collaborative presentation of its findings to the class at the end of the semester. Shortly after the oral presentation each team would submit a collaborative written report. To help evaluate this approach one team would monitor the course, and another team would assess the scope of the proficiencies embedded in the structure of the course.

This plan can be translated into what I call a TQI Instructional Approach (see Figure 2). Its three components that are the hallmarks of TQI include: customer focus, student involvement, and continuous improvement.

CUSTOMER FOCUS

Identifying the customers in higher education is difficult. Who are the customers? Are they the students, their parents, taxpayers, prospective

Figure 1
Proficiencies for the Undergraduate Economics Major

GAINING ACCESS TO EXISTING KNOWLEDGE

- locate published research in economics and related fields
- locate information on particular topics and issues in economics
- search out economic data as well as information about the meaning of the data and how they are derived

DISPLAYING COMMAND OF EXISTING KNOWLEDGE

- summarize (for example, in a short monologue or written statement) what is known about the current condition of the economy
- summarize the principal ideas of an eminent living economist
- summarize a current controversy in the economics literature
- state succinctly the dimensions of a current economic policy issue
- explain key economic concepts and describe how they can be used

DISPLAYING ABILITY TO DRAW OUT EXISTING KNOWLEDGE

- write a précis of a published journal article
- read and interpret a theoretical analysis including simple mathematical derivations from an economics journal article
- read and interpret a quantitative analysis, such as regression results, from an economics journal article
- show what economic concepts and principles are used in economic analyses in newspapers and news magazines

UTILIZING EXISTING KNOWLEDGE TO EXPLORE ISSUES

- prepare a well-organized and well-written analysis of a current economic problem
- prepare a memorandum for a superior that recommends some action on an economic decision faced by an organization

CREATING NEW KNOWLEDGE

- identify and formulate a question or series of questions about some economic issue that will facilitate investigation of the issue
- prepare a five-page proposal for a research project
- complete a research study with a polished paper

Source: Hansen (1986)

Customer Focus – Proficiencies
 Student Involvement – Team Projects
 Continuous Improvement – On-going Evaluations

Figure 2. TQI Instructional Approach

employers? Or are they some combination of these groups?

The proficiencies approach resolves the question of external customers in an interesting and useful way. While the immediate customers of higher education are the students, the ultimate customers comprise several diverse groups who nonetheless have quite similar interests. One group is employers who must draw on the knowledge and skills of recent college graduates they hire. Another group is the parents of students who want their offspring to succeed in getting good jobs and living fulfilling lives. Still another group is made up of taxpayers who want to be assured that their tax money which goes toward higher education is well spent. What unites these three groups is their desire to see evidence that graduating economics majors possess a substantive knowledge of economics, are proficient in using that knowledge, and display the attributes of educated people.

What employers as customers want of graduating economics majors emerged in two ways. One was through responses from former economics majors to periodic departmental surveys of recent graduates. The other came through extensive discussions I had with many employers from large and small companies alike and from the private, public, and nonprofit sectors. What taxpayers as customers want is necessarily less sharply defined. Some generalized sense of these expectations emerges from survey data on public attitudes toward higher education, material in newspapers, and the writings of scholars who have explored the social benefits of higher education (Bowen, 1977).

In focusing on the customer it is important to strike a balance between what customers may want and what an institution can provide. To let customers dominate in determining the curriculum, for example, ignores the institution's strengths and capabilities. Thus mandates developed and imposed from outside may fail to achieve their goals even if these mandates reflect what customers want. If there are to be mandates, they need to be developed jointly with colleges and universities so they are not doomed to fail by asking for too much. At the same time, institutions must seek to meet the larger needs of the society that created them and now supports them. In this sense, colleges and universities can create new strengths in responding to change, much as the land-grant universities have long sought to do.

The proficiencies approach, then, views students as customers. It helps students themselves visualize the outside world of employers and the public as their customers whom they must serve. Students realize

that to do this effectively they must become customers of the knowledge and skills they are developing in college. Once students accept this view, they can more easily visualize themselves as customers of the instructional services I can offer them. In turn, I see them as customers of my instructional services which they need if they are to develop and sharpen their proficiencies. The implications are clear. Just as I must satisfy their expectations if they are to become valued employees, they must satisfy my expectations if they are to meet the expectations of the customers of their knowledge and skills. The advantage of this approach is that the customer focus becomes deeply embedded in the teaching-learning enterprise. This customer orientation contrasts sharply with the tendency for students and faculty members to think in the "currency" of higher education, namely courses, course credits and course grades. In doing so, they neglect the knowledge and skills these courses are directed to develop and whose grades are designed to measure progress in acquiring this knowledge and skills.

The customer focus described above neglects the interdependence of the undergraduate curriculum. Even if an entire economics departments seeks to produce my list of proficiencies in their graduating majors, there is no assurance that the suppliers of freshmen-sophomore courses will have given students a start in building their proficiencies. In other words, instructors in lower division courses may fail to realize that instructors in upper division courses are their customers, i.e. that they should be supplying partially developed proficiencies in the students who pass out of their courses. The only way to ensure that internal customers are satisfied is to agree upon a sequence of courses that do indeed help students develop their general education proficiencies so courses in the major can carry on with the development of major-specific proficiencies.

Here the importance of the nonhierarchical structure of higher education becomes important. There is no top-down method of assuring that appropriate attention is given throughout the undergraduate program to the acquisition of proficiencies. Offsetting this structural differences is the notion of professionalism, that college faculty are accorded substantial power to determine what is appropriate and sound.

The elective system introduced at Harvard University almost a century ago may be the root problem. In its extreme form, the elective system presumes that learning is not cumulative. The opposite is the rigidly defined curriculum often found

in, say engineering, where courses not only build upon one another but are so numerous that few students have any time for elective courses. While most institutions lie somewhere between these extremes, the wide choice of courses available to undergraduates would make it exceptionally difficult to develop systematically any set of proficiencies.

It should be apparent that no single course, such as mine, can produce major gains in student proficiencies. Instead, the entire undergraduate curriculum must be organized and integrated so that step by step through four years of college students steadily build their knowledge and skills. Currently, as part of a major push by the Association of American Colleges to promote "learning in depth," the economics profession is focusing renewed attention on what it should be teaching to undergraduates (Siegfried, 1991).

Despite the obstacles, I view my effort as justified, if for no other reason than to demonstrate what can be done. As other faculty members adopt this approach, it should be possible to move toward the vision of a quality undergraduate education that is integrated around the concept of proficiencies (see Figure 3).

STUDENT INVOLVEMENT

University teaching is dominated by the lecture approach or, in the case of large introductory courses, lectures supplemented by discussion and/or laboratory section meetings led by teaching assistants. Even in small classes, faculty members typically find it easier to lecture than to engage students in probing discussions that help students learn how to think broadly and deeply about the subject matter. This practice continues despite mounting evidence that students benefit from active involvement in the learning process (Light, 1990, 1991). Professors know from experience that collaborating on research, testing ideas in seminars and public lectures, and teaching itself are powerful ways of learning and clarifying one's thinking. Some of us also learned that closer interaction with students in the classroom makes teaching a more interesting and challenging enterprise. Moreover, the research indicates that active involvement appropriate for students is beneficial and that companies wanted new employees who carry out projects with other employees.

How do we transfer this approach to the classroom? Small discussion groups within the existing curriculum can help strengthen the first four proficiencies. Promoting the more difficult

proficiency, "creating new knowledge," can be done by organizing students into teams to undertake joint research projects. Fewer projects and papers will need to be supervised and evaluated, thereby making it possible to promote this proficiency in larger classes.

Once the team approach is adopted, the task is to formulate a series of feasible projects, think through the process by which the teams will operate, and decide how to evaluate the success of the teams in both producing a tangible product and enhancing the ability of students to create new knowledge.

CONTINUOUS IMPROVEMENT

Knowing how well the needs of both the immediate and ultimate customers are being met is difficult under our conventional approach to instruction and evaluation of instruction. One, or at most two, within-semester examinations enable students and faculty members to assess what is being learned before the final examination. Such infrequent assessments do little to pinpoint the problems experienced by both students and professors. Unless teachers require other assignments, they have little sense of what and of how well their students are learning. The same problem arises with evaluating teaching effectiveness. End-of-semester course and teacher evaluations provide feedback that is useful in improving *next* semester's course; they do nothing to help this semester's students and teachers.

Two approaches to continuous assessment are possible. One is a series of increasingly complex assignments that monitor how well students are mastering the subject matter and developing the proficiencies set out for the course. Because acquiring more complex knowledge and higher level proficiencies requires mastery of what necessarily precedes them, this approach makes it easier to spot learning problems as they occur. The other is an ongoing program of feedback on course and teacher effectiveness. Most colleges and universities require end-of-semester evaluations but few go beyond that. Ongoing evaluations enable faculty members to respond quickly and effectively to problems.

Because continuous improvement and customer focus are so intimately linked, it seemed useful to expand the scope of ongoing assessment in the course. This called for a process that not only evaluated the course and the teacher, but also monitored student gains in proficiencies. It proved to be relatively easy to push ahead with continuous improvement and customer focus on proficiencies inasmuch as I had been building an integrated set of

Figure 3

assignments on proficiencies and I had already experimented with more-frequent evaluations.

AN EXPANDED VIEW OF PROFICIENCIES

Without my realizing it, the development of this TQI instructional approach added two new proficiencies.

One was learning how to work in teams. The other was learning how to think and act like a customer by providing constructive feedback on the teaching-learning process. During the introductory sessions of the course I tried to emphasize the importance of these two skills to the success of the course.

PLANNING AND IMPLEMENTATION

With this background, we turn to the planning and implementation of this approach to a specific course.

COURSE DESCRIPTION

Economics 450, Wages and the Labor Market, is an upper-division course taken mostly by undergraduate economics majors. It also includes a sizeable contingent of master's degree industrial relations students, and a smattering of students from other fields. Typically, about 50 students enroll – 20 to 25 from economics, 15 to 20 from industrial relations, and 5 to 10 graduate and undergraduate students from related disciplines, ranging from sociology to industrial engineering. The purpose of this course, which assumes an intermediate knowledge of economics, is to help students learn how to apply the knowledge they are acquiring rather than simply regurgitating it in examinations.

The course content is best represented by the texts of Ehrenberg and Smith (1991) or Kaufman (1989). The text is supplemented by several "real books," not textbooks (Hansen, 1988) that report on current research, such as Freeman (1976), Bawden and Skidmore (1989), and Burtless (1990). There is also a reading packet that includes journal articles, policy-oriented materials, and newspaper articles, all selected to help students see how to apply their knowledge. Considerable attention is given to written assignments as a way of helping students learn economics and demonstrate their ability to use this knowledge (Hansen, 1993). Several homework assignments require students to think about and work with actual data.

Typically, students regard the course as a demanding one. During the 15 years I have taught this course it has evolved away from formal lectures and textbook learning. Much more emphasis is given to involving students in the learning process and using a wider array of reading materials and instructional approaches. The major components of the course are shown in the familiar fishbone diagram in Figure 4.

PLANNING

At the start of every course, I ask students to view themselves as customers by asking them to indicate what they hope to learn in the course, their interest in particular topics, and background information about them that might be pertinent to the course (see Attachment A). This information is helpful in

tailoring the course to the characteristics and interests of the students. In fact, the scope for doing this is limited because the broad contours of the course have already been established by the need to create a syllabus, order textbooks and prepare a reserve book list for the library. Some fine tuning, however, is still possible with respect to subject matter and emphasis on proficiencies.

The first task in the new TQI-oriented version of the course involved identifying a dozen or so research topics of interest to students and amenable to completion within the semester (see Attachment B). There were two kinds of substantive topics. One involved updating the results of various empirical studies referenced in the course materials, such as the impact of union membership on earnings, the magnitude of salary disparities for female workers, earnings differences by level of educational attainment, and an analysis of the recent wage settlement for unionized postal workers. The other involved working at a more conceptual level; how to think about a topic and how to establish its empirical dimensions. Among these topics were the following (recall that the course began in January 1991); what is the likely impact of the current recession on employment and wages in Wisconsin? How would you try to assess the impact of the obsolescence of skills on the earnings of workers? If the Gulf War required mobilizing additional forces and re-imposition of a military draft, how could the military draft be integrated with the volunteer force?

Two other quite different topics were needed, one to establish and implement a continuous assessment of the course, and another to review and refine the proficiencies in the major. Though not directly related to the subject matter, these topics were of direct concern to me as a teacher. In particular, I thought that one team could profit from reviewing the proficiencies and trying to establish different levels for them. Out of their review, I hoped to sharpen the focus on proficiencies and thereby improve the quality of subsequent offerings of this course.

After the list of topics was compiled, I prepared a brief elaboration on each topic for distribution to the students. Students were then asked to rank order their interest in the topics so that I could assign them to the various team (See Attachment C).

Special arrangements had to be made for students working on the first set of topics. Doing empirical work requires the availability of pertinent data sources, access to computers and knowledge of software programs. A data extract of the March 1988 Current Population Survey was created by the Social

Figure 4

Science Data and Computation Library. Arrangements were made for students to use the Social Science Micro Computer Laboratory for their data processing and the Industrial Relations Research Institute's Micro Computer Laboratory for word processing. The staff of the Social Science Micro Computer Laboratory provided technical assistance to teach teams how to use SPSS software to carry out their analyses.

IMPLEMENTATION

Getting a series of team projects launched requires considerable time and effort. A start had to be made immediately to convey that the course was not operating on a business-as-usual basis. Accordingly, a heavy time investment was made in the early part of the course to set the stage.

Much of the first class period on Monday was devoted to explaining the nature of the course and my plan to experiment, as I described it, with the team approach. I explained that everything possible would be done to assure that the approach went smoothly; that my interest was in having students involved in the substantive aspects of their topic rather than getting bogged down in, for example, learning computer programming; that I would try to honor the preferences of students for the various projects; and that in grading the team projects I would try to differentiate between their efforts and those of their teammates. I went over the list of topics and asked for their top three preferences by Wednesday so that teams could get started in the Friday class.

On Friday we met in a large conference room where, after our general session, teams could meet in different parts of the room to figure out how to organize themselves and proceed. The team assignments were announced and a few students indicated a desire to move to different teams. A couple of trades were arranged on the spot. I then instructed the teams on the essential ingredients of successful teamwork. My comments drew on the contents of *The Team Handbook* (Scholtes, 1989). I supplemented these comments with a brief handout on working in teams. I also emphasized the value of the team approach to learning. Finally, I sought to reassure students that they would be graded fairly. These steps were critical because the course departed so substantially from the traditional format.

With these matters out of the way the teams convened and began discussing how to define and attack their topics. Once this process began, I moved from team to team to answer questions, clarify the nature of the topic and offer encouragement. I could

not help but be impressed by the vigor with which team members interacted. Students seemed genuinely excited at the prospect of working together. They liked the idea of being placed in a problem-solving situation where there was no single correct approach and where answers were to be developed through their collective efforts.

The following Friday we met again in the informal setting of a large lounge. Students took up where they left off the previous day. I continued making the rounds of the groups, offering guidance as seemed appropriate. At the end of the class most teams seemed to have developed a plan of action and to be off to an auspicious start.

On Friday of the third week the teams met again. It was clear that most of them had decided what needed to be done, as several concluded their meetings quickly and left to carry out individual assignments. Several weeks later the teams met during the last 20 minutes of class. Meanwhile, individual students and the teams often discussed their work before or after class, and sometimes during my office hours as they struggled to work together and figure out how to deal with difficulties. On several occasions the last half-hour of the class was set aside so that teams could meet to monitor their progress and assess what needed to be done next.

EXECUTION

Everything did not go smoothly. The task of getting the data organized in a way that would be computer-friendly for the student teams proved to be a much bigger task than expected. Because the student computer laboratory assistant was not conversant with the analytical tools that would be used, some additional time was required to prepare the data. As a result, students were not able to get to the computational aspects of the assignment until the second half of the semester. A further complication arose because of the heavy demands made by other students on the computer lab. To ensure that the lab's computers would not be tied up cranking out regression results, I greatly reduced the size of the data samples. This compromised one project, and that team's members were moved to another team.

When the data were ready, two class meetings were scheduled in the laboratory so that students could become familiar with the computer system and learn how to use SPSS. Most teams had to spend considerable additional time in the lab, largely because they did not know how to use SPSS.

As the frustration level grew among the teams carrying out the empirical replications, I devoted

considerable effort to calming nerves. Meanwhile, the other teams were moving ahead, although several experienced other frustrations. As the difficulties of the various teams became known, everyone became more understanding about the problems that are inevitable in team research projects.

PRESENTATIONS

To prepare the teams for the end-of-semester oral presentations, I offered suggestions about how the reports should be organized and presented. Each team had 15 minutes to make its presentation with an additional 5 minutes to respond to questions from the class. With nine teams, three 75-minute class periods were devoted to these presentations.

The presentations, though varying in sharpness and polish, turned out well. In one case, a student acted as a moderator and wove together in integrated fashion the contributions of fellow team members. In other cases, each student presented a portion of the team's report. Members of the class were highly attentive and asked probing questions. In several instances, students gathered at the end of class to ask further questions of teams or team members.

The written reports also varied, reflecting the nature of the topics and the abilities of team members. I promised the teams written comments on both their oral presentations and their written reports. These were distributed at the next class. I did not give grades until all the team reports had been turned in.

TEAM PROCESSES

Inasmuch as the team projects differed, their processes necessarily differed somewhat while still fitting into the Plan-Do-Check-Act Cycle of Shewhart/Deming. The nine teams working on substantive questions followed what might be called an investigative cycle. The steps can be broken out as follows: Plan (define the question, plan the analysis), Do (carry out analysis), Check (assess the results, reformulate the analysis), Act (proceed with the analysis, check the results and report the results) (see the top panel of Figure 5). These steps are similar to the sequence of steps in the well-known scientific method (Beveridge, 1950).

The flow of activity for all teams except the Evaluation Team is detailed in Figure 6.

EVALUATION TEAM

The Evaluation Team met with me during the second week to discuss an ongoing program of evaluation

surveys that would provide feedback to me and thereby help me improve the course and my teaching of it. Team members were provided copies of various course evaluation forms. They then went off to develop their own evaluation survey form. They decided to adapt the traditional course evaluation form and to administer it both before and after the midterm. A similar form would be used at the end of the semester. In addition, more-selective responses would be sought periodically from a few students rather than the entire class. The details of later evaluations were to be worked out as the process evolved. Even before the first evaluation, team members were informally picking up various student reactions and conveying their interpretations of them to me but without stating names. I found this informal feedback useful and looked forward to the results based on responses to the pre- and post-midterm surveys.

As to the mechanics, the team began by devising a survey for administration during the fifth week of the course. After reviewing the survey with me, they administered it and analyzed the results (see Attachment C). We then met before the next class to go over the results. The most prominent concerns were the fast pace of the course, some difficulty with concepts, and a sense that class discussion was not always sharply focused. I relayed these comments to the class, and indicated my intention to be responsive to these customer concerns. It was obvious from their reactions that the students were intensively interested in the feedback from the survey and in my reaction to the results.

It also became evident that the mix of students created difficulty. Undergraduate economics students were more technically adept in economics while the master's level students were more knowledgeable about real-world labor market and wage phenomena. This uneven mix has always been of concern and represents one of the challenges of teaching this course. These results prompted efforts on my part to bridge this gap (more details follow).

Because students are always apprehensive about the midterm, the evaluation team prepared a follow-up survey to be administered immediately after the exam (see Attachment D). The nature of the negative feedback was not unexpected; the exam contained too many questions. This is a frequent complaint. Students reported feeling pressured by the number and variety of questions and to some extent by the difficulty of being required to apply rather than regurgitate their knowledge. I responded by reducing slightly the number of questions on the final exam. As a general rule, however, I believe it is better to ask

Figure 5

Figure 6

more rather than fewer questions because it gives me a better sense of each student's mastery of the variety of subject matter.

After the post-midterm survey, the evaluation team announced that it would continue to serve as a conduit for student comments and suggestions about the course. The team produced quick response sheets available at the entrance to the classroom so that students could jot down their reactions to each day's class (see Attachment E). Members of the class were encouraged to speak directly with team members if that seemed more efficient. Because there was a high level of satisfaction with the course, participation was not extensive. In any case, the various responses were summarized by the team which alerted me to emerging problems and concerns before the next class. This feedback proved to be enormously effective as teams ran into unanticipated difficulties with their projects and were reticent to approach me directly.

The evaluation team operated differently than the other teams because of the special task. Rather than using the PDCA cycle, we used Hau's SIAM cycle: Study the current situation, Identify vital problems, Act on problems and Monitor progress (bottom panel of Figure 5).

EVALUATION

As the end of the semester drew near it became important to coordinate the information-gathering because four evaluation instruments were to be used. A flow chart of the full schedule of evaluations is shown in Figure 7. A major objective at this time was to maximize the effectiveness of the information-gathering and minimize the time needed to complete the surveys. The surveys were designed to evaluate the course, assess the impact to the teams, monitor gains in proficiencies, and appraise the value of the ongoing evaluation process. Members of both the evaluation and proficiencies teams were asked to assist in developing the surveys; members of the class were asked to offer advice to me or team members on survey content.

EVALUATING THE TEAMS

Students obviously wanted feedback on their work as team members. They were also interested in their grade on this part of their course work. Though Deming may argue that team participants should be rewarded as a group rather than individually, the reality of needing a final course grade for each

student necessitated this approach. As noted earlier, students had been told that they would be evaluated both for their performance as a team member and their individual contribution.

Evaluating the work of the teams and individual members was complicated. Not only did the input of individual students vary, but some students were obviously more capable than others. Moreover, the team projects differed in complexity and difficulty. Rather than attempting to infer exactly who did what, I decided to involve the team members in the process.

I began by preparing a team evaluation sheet which asked each student to apportion among the various team members, including themselves, the total time and effort devoted to the team project, or at least their perceptions of that effort (see Attachment F). Thus, if a team's four members made approximately equal contributions, each member would be assigned 25 percent of the credit going to the team. If the contributions of individual team members differed, as was often the case, the allocation of individual rewards also varied.

These evaluations yielded two interesting results. One was general agreement among team members about the relative amount of work of other team members as well as its quality. Another was the similarity of

their assessments with my perceptions of their contributions. My perceptions were formed by observing team members at their meetings (at least those held during class periods and sometimes those held after class), talking with students, and knowing how students were performing in other course activities, such as writing assignments. With this information and my evaluation of each team's oral presentation and written report I assigned a grade to each team's project. I recorded this grade and then indicated on a special form for each student the extent to which their individual grade deviated from the overall team grade. Thus, the team might have earned a grade of AB on its project, with individuals receiving grades ranging from A to as low as BC.

In a final effort to be as fair as possible, I allowed students to indicate if they wanted their grade on the team project to carry somewhat more or somewhat less weight in their grade on class assignments which in turn would filter into the course grade. As might be expected, students who scored low on the team project opted to have more weight put on their other work, and vice versa. Generally, students were satisfied with the evaluation of their projects.

Figure 7

EVALUATING STUDENT PROFICIENCIES

Information on proficiencies came from two sources. One was the already-mentioned team evaluation form that I devised in consultation with both teams. It asked team members the level of proficiencies they had drawn on in working on their team project. The other was the proficiencies questionnaire developed by the proficiencies team (see Attachment G). It asked students what particular skills they had developed and/or utilized in connection with each of the proficiencies.

END-OF-COURSE EVALUATION

The traditional formal procedure for evaluating teachers and courses is through the department's end-of-semester course evaluation survey. In addition to that survey (see Attachment H), the Continuous Improvement Team wanted to administer its own survey which was patterned after its first survey (see Attachment I). Since there was some overlap in the two questionnaires students were asked not to respond to some of the questions in the developmental survey.

EVALUATING THE ON-GOING EVALUATIONS

The evaluation team asked, with the help of open-ended questions, for reactions to the ongoing evaluation process, exemplified by its several surveys and reaction sheets (see Attachment H, Question 17).

LINKED RESPONSES

At the end of the semester students were given three surveys: the evaluation team's survey, the proficiency team's survey, and the economic department's course evaluation. I had worked with both teams to be assured that the overall evaluation of the course would be comprehensive and at the same time minimize the overlap among the other evaluation instruments. Students were asked to use a four-digit number to permit matching the survey information for the analysis I had planned to do after the semester ended. Since the team evaluation form had to be administered earlier, it was not coded as were the other end of semester surveys. Students were assured anonymity by having the department retain the several surveys until after I had submitted the final grades.

The linking of student responses at the end of the semester proved useful in giving a more complete picture of what had happened. Immediately after the

course ended I had all of the responses entered on a disk so the data would be available for analysis.

WHAT WAS LEARNED

The most important thing learned is that this course, with its multiple goals and objectives, emphasizes the instructor's role as a manager of resources. The many different activities designed to achieve the goals and objectives of the course require a well-thought-out, semester-long plan of action, continuing coordination of these activities, and flexibility in adapting to problems as they arise. The team projects made me particularly conscious of students' time constraints. Because students have a heavy workload in other courses, it is important to see that their limited time is well used.

Of direct interest is student reaction to the proficiencies approach, team projects and on-going evaluation. As noted, a series of questions probed for feedback on each of these topics. Most of these responses were qualitative because it was not clear how to structure and phrase objective questions.

PROFICIENCIES

The information on proficiencies can be grouped into several categories: open-ended comments about the skills gained in dealing with each of the proficiencies; a numerical rating of the extent to which team projects drew upon each of the proficiencies; and miscellaneous comments scattered through the surveys.

In their open-ended responses, students seemed impressed with the improvement of their proficiencies. Because of the structure of the questions, the responses proved to be far more specific and revealing than those I have received in previous course evaluations. It was apparent that students were thinking about the gains they achieved. I came away with the sense that students had been pushed to develop their proficiencies, and that they had not only done so but were also able to assess their gains.

The extent to which students drew upon these proficiencies in their team projects varied substantially. Based on a scale of 5 for high and 1 for low, the highest rating went to the second proficiency "displaying command of existing knowledge" with a 3.9 average (see Table 1). The averages for the other proficiencies were closely clustered at 3.5. The proficiency "creating new knowledge," which the team projects were designed to highlight, also earned

a somewhat disappointing score of 3.5. Indeed, this proficiency received the highest number of scores below 3.0. Closer inspections of the responses showed that almost half of those giving creativity a low score participated in the two projects that were largely computational and not entirely successful. This suggests that the certain projects were too narrow even if the concept of using teams to explore previously unanswered research questions was on target.

Table 1
Average Utilization of Proficiencies

<i>Proficiencies for the Undergraduate Economics Major</i>	<i>Mean Scores*</i>	<i>Range of Team Average</i>	
		<i>Low</i>	<i>High</i>
Gaining access to existing knowledge	3.5	1	4.3
Displaying command of existing knowledge	3.9	1	4.5
Displaying ability to draw out existing knowledge	3.5	1.7	4.0
Utilizing existing knowledge to explore issues	3.5	2.6	4.0
Creating new knowledge	3.5	2.7	4.0

* Based on rating scale 1 (low) to 5 (high) on utilization of proficiencies.

The averages of the teams varied much more widely from lows of 1 for the first two preferences up to 2.7 for creating new knowledge. At the same time some teams gave relatively high averages to all the proficiencies, with none of those averages falling below 4.0; one team gave a 4.5 rating to the second proficiency.

Several suggestions for improvements emerged. First, greater care needs to be taken in framing the research projects. Projects that I thought emphasized creating new knowledge were often perceived by the teams as not serving that purpose effectively. Second, the statement of proficiencies needs to be revised to make it applicable to this course. The phrasing of the "creativity" proficiency, which emphasizes somewhat different outputs than the team research projects, was cited most frequently. Broadening the creativity proficiency to include working on team projects seems advisable. Third, one or more proficiencies may need to be added to the list. The proficiencies team suggested including a proficiency dealing with the manipulation of symbols and data. The additional proficiencies of knowing how to participate in a team

might have reduced some of the problems students cited and knowing how to respond to evaluation surveys might have elicited more useful feedback from students.

STUDENT FEEDBACK

One further illustration of the value and also the mystery of teaching emerges from a question on the thought-provoking quality of the lectures.

Though many of the class meetings were not given over to lecturing, information was gathered on student responses to the lectures. As Figure 8 shows, students' views about the lectures differed considerably for undergraduate and graduate students in the first evaluation and also between the first and final evaluation. What explains these patterns is difficult to know. The nature of my presentations changed over the course of the semester becoming less formal and, I hoped, more illuminating as we discussed particular research papers and policy issues. Differences between the responses of graduate and undergraduate students are also interesting to observe. More illumination on these differences and on other patterns is provided by the extensive written comments that are not easily quantified.

TEAM INVOLVEMENT.

Information on team involvement came from open-ended questions asking what was positive and what was negative about the team projects. Students were almost unanimous in favoring continuation of the team projects. At the same time, they qualified their responses by suggesting various improvements, among them better organization of the projects (particularly those involving data tapes and computers).

What students found positive about the projects was working with others, discovering complementary strengths among team members, exchanging ideas about the project, and acquiring the team skills. The negatives divided into two categories. One focused on teams: the diversity of knowledge, skills and interest among team members; the team's lack of structure and organization; the unwillingness of some team members to participate fully; and difficulties in scheduling team meetings to carry on the work. The other category concerned the projects, centering on their difficulty and/or ambiguity, lateness in getting the data ready for the computer, and problems in mastering the computer software needed to manipulate the data.

These generally favorable views indicate that

team projects should be continued but the projects need to be more sharply defined and the data and computer setup need to be better organized. More important, the comments indicate that much more attention must be given to improving the

effectiveness of the teams. I sensed a need for this but the pressure of doing so many other things prevented me from following through. A more elaborate handout on the essentials of teamwork from Scholtes (1989) would be helpful in giving structure to such a

Figure 8. Thought-Provoking Lectures

presentation, and a session explaining what makes for an effective team would be a logical follow-up.

ON-GOING EVALUATIONS

Students liked the process of ongoing evaluation. Their only complaints were that some of the surveys were too long and that in the final surveys, there was some duplication. What they liked best was the opportunity to register their concerns and to see that these concerns were not only considered, but some changes and adjustments took place. Several students commented that they felt they had a more important stake in the course because they were viewed as customers.

CONCLUDING COMMENT

The special focus on the proficiency of creating new knowledge made the course more challenging to students and seemed to energize them in new ways. I found this focus satisfying as I watched students work as team members in carrying out their research projects, and I had a sense that students performed better than usual in the final exam.

Much remains to be learned about how to infuse TQI into individual courses. The most immediate task is deciding how much to emphasize instruction in teamwork and use of the seven key tools of the Deming approach in a course that is already packed with content and assignments. The longer-run task is to develop more effective methods for enhancing student proficiencies and for assessing the level of proficiencies they attain. Only then will it be appropriate to urge colleagues to consider this approach in their teaching.

ACKNOWLEDGMENT

The author is grateful to Jacob O. Stampen and Mark Finster for helping him learn about TQI and to Ian Hau whose seminar stimulated this effort to infuse TQI into the classroom.

Helpful comments on a draft of this paper came from Jacob O. Stampen, Maury J. Cotter, Charles A. Liedtke, William Steinke, Paul Weiss and Michael L. Williamson.

Special thanks for generating much of the underlying data go to the Evaluation Team of Kevin Brumm, Kimberly Klatt, and John Kittilstad, and to the Proficiency Team of Evan Anderson, Deana Lynn Grobe, and Tom Yale.

Iiona Loser and Kris Feggstad assisted in

assembling the results of the surveys. Suzanne Vinmans handled the typing, Vicki Szypulski made the visuals, and Elaine Moran provided helpful editorial suggestions. Laura A. Guy, of the Data and Program Library Service, facilitated access to the Current Population Survey tape used by several teams, and Kurt Neuwirth, of the Social Science Microcomputer Laboratory, created a user-friendly approach to the Current Population Survey data.

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Attachment A

Instructor's Student Information Sheet

University of Wisconsin-Madison
Department of Economics

Economics 450
W. Lee Hansen

3. Are there any particular topics you would like to see covered in the course?

Student Information Sheet

Your
Name

Your
Status

(Please print)

(e.g. LS4)

(Hometown)

Undergrad GPA

1. What knowledge of this subject do you hope to have mastered by the end of the semester?

4. Note any information about your background, work experience, and/or interests that may be pertinent to this course.

2. What skills do you hope to have improved by the end of the semester?

5. List titles of economics, business, and statistics courses you have taken, and when and where you took them.

Attachment B

List of Team Projects and Preference Sheet

Dept. of Economics
University of Wis-Madison

Spring 1991
W. L. Hansen

(Print last name, first name)

ECONOMICS 450 TEAM PROJECT PREFERENCE SHEET

Please indicate by number (1 through 10) your preferences for working on the team projects which are described briefly below. Take notes as we review these projects in class today. This sheet will be returned to you with your team assignment on Wednesday; the first meeting of the teams will be held on Friday in Social Science 8417 during the regular class hour.

<i>Pref. #</i>	<i>Proj. #</i>	<i>Brief Descriptions of Projects</i>
_____	1.	What has happened to the size of the union wage differential during the 1980s and what explains the change? K-12, 29, 33
_____	2.	Based on an updating of the Asher-Popkin analysis, what would be an appropriate wage increase for postal workers in 1991? RP-31
_____	3.	Based on an updating of the Perloff-Wachter analysis, what would be an appropriate wage increase for postal workers in 1991? RP-32
_____	4.	What is the likely impact of increased postal rates (induced partly by expected wage increases) on employment and wages in the postal and postal-related sectors?
_____	5.	How did the internal rate of return to different levels and amounts of schooling change during 1980s? K-7, RP-25-26
_____	6.	What are the current earning differentials between males and females overall, and between males and females in male-dominated, female-dominated, and integrated occupations? K-7-8, Fuchs
_____	7.	What are the possibilities of learning more about the rate of human capital depreciation or obsolescence for workers in different industries and/or occupations who may be subject to different rates of technical change? K-7
_____	8.	What are the current prospective effects on the recession on wages and labor markets in the state of Wisconsin? K-4
_____	9.	What is the likely impact of the Gulf War on wages and labor markets in the U.S. and particularly in the state of Wisconsin?
_____	10.	If a military draft is re-instituted, how might it be integrated with the present all-volunteer system in which people are paid a market wage. RP-34-36
_____	11.	What kind of system of feedback and response can be developed to ensure that Economics 450 is a high quality course, responsive to student interests and potential, and to the challenges of the subject matter?
_____	12.	What can be done to flesh out the current and operational meaning of the concept of "proficiencies in the major" and to specify different levels of these proficiencies? RP-1

Attachment C

Continuous Improvement Team: Six Week Evaluation Survey (#1)

DATE: _____
 YEAR IN SCHOOL (CIRCLE ONE) UNDERGRADS 1 2 3 4
 GRADUATE 5
 SPECIAL 9

MAJOR OR EXPECTED MAJOR: _____
 EXPECTED GRADE ON EXAM #1 A AB B BC C D F PASS
 REASON FOR TAKING COURSE: REQUIREMENT, ELECTIVE OR _____

By comparison with other University courses which you have had, this course is: 1 - much worse, 2 - worse, 3 - about the same, 4 - better, 5 - much better in terms of:

THE LECTURES

1. The usefulness of the professor's lectures to learning the course subject matter
 1 2 3 4 5

THE PROFESSOR

2. The professor's command of the course material 1 2 3 4 5
 3. The responsiveness of professor to student questions, suggestions, and interest 1 2 3 4 5
 4. The openness of professor toward views different from his/her own 1 2 3 4 5
 5. The ability of the professor to stimulate your interest in the course 1 2 3 4 5

THE COURSE ITSELF

6. The organization of the course 1 2 3 4 5
 7. The usefulness of the assignments and readings to this course 1 2 3 4 5
 8. How much this course has increased your ability to think, criticize and create 1 2 3 4 5

9. How many times this semester have you unsuccessfully tried to see the professor during his/her office hours?

1. 5 or more times
2. 3-4 times
3. Twice
4. Once
5. Never, I was always able to see the professor
6. Not applicable. I have never tried to see the professor.

10. By comparison with other university courses, how does this compare in terms of difficulty?

1. Much less difficult
2. Less difficult
3. About the same
4. More difficult
5. Much more difficult

11. By comparison with other university courses, how does this course compare in terms of amount of work required per course credit hour?

1. Much less work
2. Less work
3. About the same
4. More work
5. Much more work

12. Would you recommend this course to a friend?

1. Definitely not
2. Probably not
3. I don't know
4. Probably
5. Yes, definitely

13. Would you recommend this professor to a friend?

1. Definitely not
2. Probably not
3. I don't know
4. Probably
5. Yes, definitely

WHY:

14. About what proportion of the professor's lectures (classes) have you attended this semester?

1. Almost none (10%)
2. Few (25%)
3. About half (50%)
4. Most (75%)
5. Almost all (90%)
6. All (100%)

Attachment C

Continuous Improvement Team: Six Week Evaluation Survey (#1)

15. Of those lectures you have attended, what proportion were well-prepared and clearly presented?
1. Almost none (10%)
 2. Few (25%)
 3. About half (50%)
 4. Most (75%)
 5. Almost all (90%)
 6. All (100%)
16. Of those lectures you have attended, what proportion were interesting and/or thought-provoking?
1. Almost none (10%)
 2. Few (25%)
 3. About half (50%)
 4. Most (75%)
 5. Almost all (90%)
 6. All (100%)
17. How useful are the assigned readings in the Kaufman text?
1. Not at all useful
 2. Slightly useful
 3. Of average usefulness
 4. Better than average usefulness
 5. Extremely useful
18. How useful are the assigned readings in the reading packet?
1. Not at all useful
 2. Slightly useful
 3. Of average usefulness
 4. Better than average usefulness
 5. Extremely useful
 6. I have not used this text
19. How useful are the assigned readings in the Fuchs text?
1. Not at all useful
 2. Slightly useful
 3. Of average usefulness
 4. Better than average usefulness
 5. Extremely useful
 6. I have not used this text
20. How useful is the McCloskey text?
1. Not at all useful
 2. Slightly useful
 3. Of average usefulness
 4. Better than average usefulness
 5. Extremely useful
 6. I have not used this text
- Comment on those specific readings you considered particularly satisfactory or unsatisfactory.

This information will be shared with the professor for improvement in his/her teaching. Be as specific as you can in discussing and evaluating any phase of the course, e.g., presentation, responsiveness to questions, command of material, organization, mannerisms, teaching aids, assignments, accessibility, preparation for class, etc.

Attachment D

Continuous Improvement Team: Post-Exam Evaluation Survey (#2)

PLEASE BE SURE TO FILL IN ALL INFORMATION COMPLETELY!

DATE:

YEAR IN SCHOOL (CIRCLE ONE) UNDERGRAD 1 2 3 4
GRADUATE 5
SPECIAL 9

MAJOR OR EXPECTED MAJOR:

EXPECTED GRADE ON EXAM #1: A AB B BC C D F PASS

GRADE RECEIVED ON EXAM #1: A AB B BC C D F PASS

REASON FOR TAKING COURSE: REQUIREMENT, ELECTIVE OR _____

1. How well did exam #1 reflect what the course lectures, assignments and assigned readings had covered up until that point?

1 2 3 4 5
poor excellent

Now that you have taken the exam, please reflect on the following:

2. How useful were the assigned readings in the Kaufman text in preparing for the exam?

1 - not useful at all
2 - somewhat useful
3 - of average usefulness
4 - of more than average usefulness
5 - very useful

3. How useful were the assigned readings in the reading packet in preparing for the exam?

1 - not useful at all
2 - somewhat useful
3 - of average usefulness
4 - of more than average usefulness
5 - very useful

4. How useful were the assigned readings in the Fuchs text in preparing for the exam?

1 - not useful at all
2 - somewhat useful
3 - of average usefulness
4 - of more than average usefulness
5 - very useful

5. How useful were the lectures in preparing for the exam?

1 - not useful at all
2 - somewhat useful
3 - of average usefulness
4 - of more than average usefulness
5 - very useful

6. Prior to exam #1, how much time per week, outside of lecture, did you spend preparing for this class?

1. one hour or less
2. 1 to 3 hours
3. 3 to 5 hours
4. 5 to 7 hours
5. 7 to 9 hours
6. 9 to 11 hours
7. more than 11 hours (how many? _____)

7. After taking exam #1, how many hours per week, outside of lecture, do you plan to spend preparing for this class?

1. one hour or less
2. 1 to 3 hours
3. 3 to 5 hours
4. 5 to 7 hours
5. 7 to 9 hours
6. 9 to 11 hours
7. more than 11 hours (how many? _____)

Attachment E

Continuous Improvement Team: Daily Evaluation Response Form (#3)

DATE:

YEAR IN SCHOOL (CIRCLE ONE) UNDERGRAD 1 2 3 4
GRADUATE 5
SPECIAL 9

MAJOR OR EXPECTED MAJOR:

REASON FOR TAKING COURSE: REQUIREMENT, ELECTIVE OR

EXPECTED GRADE ON EXAM #1: A AB B BC C D F PASS

Please comment, discuss and/or evaluate any aspect of this course (positive or negative). If referring to something specific about a lecture, please indicate the data of the lecture.

Attachment F

Instructor's Team Project Evaluation Questionnaire

TEAM PROJECT:

DATE:

YEAR IN SCHOOL: UNDERGRAD 1 2 3 4
GRADUATE 5
SPECIAL 9

REASON FOR TAKING COURSE: REQUIREMENT, ELECTIVE OR _____

THIS QUESTIONNAIRE CONCERNS THE TEAM PROJECTS

1. Please indicate to what extent the members of your group (including yourself) participated in the team project using percentage terms totaling 100%, (i.e., Sally 65%, John 25%, Mary 10%)
2. Using a scale of 1 (low) to 5 (high), rate the extent to which your participation in the team project caused you to do the following:

Gain access to existing information/knowledge: for example, locating information on particular topics and issues in economics or other fields, or searching out data as well as information about the meaning of the data and how they are derived. _____

Display command of existing information/knowledge: for example, summarizing (orally or in writing) what is known about broad issues such as the current state of the economy or a current controversy in the economic literature. _____

Display the ability to draw out existing information/knowledge: for example, reading and interpreting a theoretical analysis, reading and interpreting a quantitative analysis (including regression results) or showing what economic concepts and principles are used in economic analyses (as in articles from daily newspapers and weekly news magazines). _____

Utilize existing knowledge/information to explore issues: for example, preparing a decision memorandum for a colleague that recommends some action on an economic decision. _____

Create new knowledge: for example, identifying and formulating a question or series of questions about some economic issue that will facilitate investigation of the issue, or preparing a proposal for a research project and completing the project. _____
3. What did you find positive about the team projects?
4. What did you find negative about the team projects?
5. What improvements or changes do you suggest for future team projects?
6. Should team projects be continued in future semesters of this course? Why or why not?
7. Please comment on any other aspect(s) of the team projects.

Attachment G

Proficiencies Team: Skills - Proficiencies Questionnaire

1. What skills involved in locating economic data and research have you improved as a result of Economics 450?

2. What skills involved in displaying command of existing knowledge have you improved as a result of Economics 450?

3. What skills involved in the ability to understand and draw out existing economic knowledge have you improved as a result of Economics 450?

4. What skills involved in exploring issues in economics using existing knowledge have you developed as a result of Econ 450?

5. What skills involved in the creation of new knowledge have you developed as a result of Econ 450?

6. What other skills have you developed as a result of Econ 450?

7. What other skills do you wish that Econ 450 would have helped you develop?

Attachment H

Economics Department: End-of-Course Evaluation

DEPARTMENT OF ECONOMICS Course Evaluation Faculty/TA

Professor's Name _____

TA's Name _____ Course No. _____

None of this information will be given to your professor before the course has been completed and the grades have been turned in. The results of this survey will be used by the Department of Economics in making decisions on faculty and TA assignments, budgets, promotions, and scheduled course offerings.

Please use No. 2 pencil only. Mark your response (only one) in the corresponding bubbles to the right of each question.

I. STUDENT DATA

1. What year are you in school?
 - 1 - Freshman
 - 2 - Sophomore
 - 3 - Junior
 - 4 - Senior
 - 5 - Graduate
 - 6 - Special
2. Are you or do you expect to be an economics major or do graduate work in economics?
 - 1 - No
 - 2 - Yes, an undergraduate major
 - 3 - Yes, graduate work
3. Which of the following best describes the relation of this course to your degree requirements?
 - 1 - This course is an elective in my major
 - 2 - It is an elective outside my major
 - 3 - It is required for my major, but I wanted to take it anyway
 - 4 - This course is required for my major; I would not have taken it otherwise
 - 5 - I am not in a degree program (e.g., a Special Student)
4. About what proportion of your professor's lectures (classes) have you attended this semester?
 - 1 - Almost none (10%)
 - 2 - Few (25%)
 - 3 - About half (50%)
 - 4 - Most (75%)
 - 5 - Almost all (90%)

II. FACULTY EVALUATION

5. Of those lectures by the professor you have attended, what proportion were well-prepared and clearly presented?
 - 1 - Almost none (10%)
 - 2 - Few (25%)
 - 3 - About half (50%)
 - 4 - Most (75%)
 - 5 - Almost All (90%)
6. Of those lectures by the professor you have attended, what proportion were interesting and/or thought-provoking?
 - 1 - Almost none (10%)
 - 2 - Few (25%)
 - 3 - About half (50%)
 - 4 - Most (75%)
 - 5 - Almost All (90%)
7. How useful were the assigned readings?
 - 1 - Not at all useful
 - 2 - Slightly useful
 - 3 - Of average usefulness
 - 4 - Better than average usefulness
 - 5 - Extremely useful
8. How well done have the explanations measured knowledge of the course material?
 - 1 - Very poorly
 - 2 - Less well than usual
 - 3 - About average
 - 4 - Better than usual
 - 5 - Extremely well
9. How does this course compare with your other university courses in terms of difficulty?
 - 1 - Much less difficult
 - 2 - Less difficult
 - 3 - About the same
 - 4 - More difficult
 - 5 - Much more difficult
10. Would you recommend this course to a friend with similar interests?
 - 1 - Definitely not
 - 2 - Probably not
 - 3 - Not sure
 - 4 - Yes, probably
 - 5 - Yes, definitely
11. All in all, in comparison with other instructors you have seen at UW-Madison, how would you rate the professor's performance in this course?
 - 1 - Poor
 - 2 - Fair
 - 3 - Average
 - 4 - Good
 - 5 - Excellent

Attachment I

Continuous Improvement Team/Department of Economics: End-of-Course Survey (#3)

DATE:

YEAR IN SCHOOL (CIRCLE ONE) UNDERGRADS 1 2 3 4

GRADUATE 5 SPECIAL 9

MAJOR OR EXPECTED MAJOR:

EXPECTED GRADE ON EXAM #1 A AB B BC C D F PASS

REASON FOR TAKING COURSE: REQUIREMENT, ELECTIVE OR _____

THIS QUESTIONNAIRE IS SIMILAR TO THE FIRST ONE WE GAVE YOU. WE NEED YOUR THOUGHTFUL RESPONSE IN ORDER TO DETERMINE THE EFFECTIVENESS OF THE EVALUATION/FEEDBACK SYSTEM THAT WAS INTRODUCED THIS SEMESTER.

By comparison with other university courses which you have had, this course is: 1 - much worse, 2 - worse, 3 - about the same, 4 - better, 5 - much better in terms of:

THE LECTURES

1. The usefulness of the professor's lectures to learning the course subject matter
1	2	3	4	5

THE PROFESSOR

2. The professor's command of the course material
1	2	3	4	5
3. The responsiveness of professor-to-student questions, suggestions and interest
1	2	3	4	5
4. The openmindedness of professor toward views different from his/her own
1	2	3	4	5
5. The ability of the professor to stimulate your interest in the course
1	2	3	4	5

THE COURSE ITSELF

6. The organization of the course
1	2	3	4	5
7. The usefulness of the assignments and readings to this course
1	2	3	4	5
8. How much this course has increased your ability to think, criticize and create
1	2	3	4	5
9. By comparison with other university courses, how does this compare in terms of difficulty?
1. Much less difficult	4. More difficult
2. Less difficult	5. Much more difficult
3. About the same	
10. By comparison with other university courses, how does this course compare in terms of amount of work required per course credit hour?
1. Much less work	4. More work
2. Less work	5. Much more work
3. About the same	

11. Would you recommend this course to a friend?

1. Definitely not	4. Probably
2. Probably not	5. Yes, definitely
3. I don't know	

12. Would you recommend this professor to a friend?

1. Definitely not	4. Probably
2. Probably not	5. Yes, definitely
3. I don't know	

13. About what proportion of the professor's lectures (classes) have you attended this semester?

1. Almost none (10%)	4. Most (75%)
2. Few (25%)	5. Almost all (90%)
3. About half (50%)	6. All (100%)

14. Of those lectures you attended, what proportion were well-prepared and clearly presented?

1. Almost none (10%)	4. Most (75%)
2. Few (25%)	5. Almost all (90%)
3. About half (50%)	6. All (100%)

15. Of those lectures you have attended, what proportion were interesting and/or thought-provoking?

1. Almost none (10%)	4. Most (75%)
2. Few (25%)	5. Almost All (90%)
3. About half (50%)	6. All (100%)

16. **Please comment with your thoughts about the evaluation/feedback system introduced this semester and about any other aspect of this course.