

CHAPTER 4

Making Cooperative Learning Effective for Economics

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Cooperative learning is one of the most versatile and researched interactive learning techniques. Well-constructed cooperative learning exercises have been demonstrated to be more effective than individual learning and, by appealing to a broader set of students, have the potential to increase diversity within the economics major. Students participating in cooperative learning exercises earn higher grades and better scores on tests for both volume and accuracy of material, long-term retention, and problem-solving and higher reasoning abilities (Johnson, Johnson, and Smith 1998).¹ In economics, Yamarik (2007) found that students scored four to six points higher on exams compared to students enrolled in a traditional, lecture format class after controlling for classroom, demographic and academic factors. Yamarik argues that this gain in examination scores can be linked to greater instructor-student interaction, greater likelihood of group studying, and enhanced interest in economics.

Despite these potential gains, cooperative learning still is not widely practiced in economics. Watts and Becker (2008) report that the median proportion of class time dedicated to cooperative learning is only six percent. The objective of this chapter is to promote increased use of cooperative

learning in economics by reducing implementation costs through describing key structures for success and methods for choosing among the wide variety of exercise formats. Three detailed examples then follow that showcase various choices made with respect to objectives, formats and logistical considerations within the cooperative learning structure, providing a glimpse into the versatility of cooperative learning.

I. STRUCTURES

Cooperative learning exercises entail more than simply placing students into groups and having them work together on a problem. Poorly structured group exercises are likely to promote free-rider behavior, allow for participation of under-prepared students and result in disgruntled students. Although cooperative learning experts differ in their specific descriptions of effective structures, a number of key elements consistently surface.

- **Positive interdependence** is achieved when individual and group successes are positively correlated (Kagan 1992, 4). Individuals are motivated to contribute to the group because their success is enhanced when the group achieves its goals. Ways to promote positive interdependence include: (1) having a single product produced by the group; (2) ensuring that each member of the group can explain the group's product; (3) having group members share resources to complete the task; and (4) assigning members distinct roles that are key to group functioning. (Smith and Waller 1997, 202)
- **Individual (and group) accountability** implies that both individual contributions and overall success of the group are evaluated. Typically, group members are assessed individually; however, the degree to which the group has achieved its goal has been shown to positively impact individual achievement (Webb 1983; 1991).
- **Equal participation** is achieved when each group member is encouraged to contribute during a cooperative learning exercise (Smith 1996, 74–76).
- **Simultaneous interaction** occurs when more than one participant is active at a time, as students within different groups contribute during the exercise, leading to more time per student for active participation.

Choosing a Cooperative Learning Format

Cooperative learning is “one of the most thoroughly researched of all instructional methods” (Slavin 1990, 52) in part because of the many forms it

can take, ranging from quick and informal formats to formats encompassing entire class periods (or more) with very formal components. Determining which format is most appropriate for a given set of circumstances requires matching objectives with appropriate cooperative learning exercise formats. Thus, a key step in the cooperative learning exercise development process calls for instructors to first identify their learning (skills) and content objectives for the course and then choose specific cooperative learning formats that will best achieve the specified objectives.²

Cooperative learning activities can be loosely categorized by content to be mastered or by the learning objective that each enhances. While such a method of classification is by no means strict (as some cooperative learning exercises are flexible enough to enhance a wide range of skills), it provides the instructor with a starting point for developing cooperative learning exercises grounded in identified objectives. For example, Barkley, Cross, and Major (2005) organize cooperative learning exercises by learning objectives, identifying categories of discussion, graphic organizers, writing, reciprocal teaching, and problem solving. What follows is a brief description of each category accompanied by a specific cooperative learning format and example that supports the learning objectives in that category. The reader will note that three of the described formats (roundtable for writing, learning cell for reciprocal teaching, and send-a-problem for problem solving) are exemplified in greater detail in the sections that follow.

One of the most commonly used and simple of all the cooperative learning formats falls within the discussion category. The think-pair-share format enhances discussion-related skills such as formulating ideas, practicing communication and developing listening skills. The think-pair-share exercise begins with students thinking independently about a problem or question. Each student then pairs up with another student and, taking turns, shares their thoughts. Students experience a low-threat environment in which to share their initial solutions and have the opportunity to reevaluate after hearing their partner's reflections before participating in the larger class discussion. Consider the following as a specific example of a think-pair-share exercise designed for the principles level course:

“After a lecture on sunk costs, the instructor raises the question: *You bought a ticket for a movie, and now discover that you lost it. Should you buy a second ticket, or should you go home?* Students first consider their answer individually, and everyone votes by showing thumbs up (buy the ticket) or thumbs down (go home). After viewing the distribution of responses, students are given two minutes to pair up and take turns explaining the reason for their answer to their partner.

Students reconsider their answer based on this discussion, followed by a re-polling of the class. A small sample of students may be asked to share their reasoning with the class. Learning is reinforced by formally connecting their responses to the economic concept of sunk costs.” (Maier, McGoldrick, and Simkins 2010, 159)

Graphic organizers provide students with a visual display that organizes and classifies information. Participating in a cooperative learning exercise of this nature helps students to discover patterns and relationships that might not otherwise be made explicit. The sequence chain format requires groups to determine and depict a series of events, actions, or decisions. The instructor provides the initial change and the ultimate outcome to be determined. Students begin with the initial event and show the logical progression of events, actions, and decisions that lead to the final outcome. Employing the sequence chain format in an introductory macroeconomics course, for example, provides a visual representation that fully identifies the chain of events that link an open market operation with changes in aggregate output: open market purchase → ↑ money supply → ↓ interest rates, etc. Students can then use this graphic organizer to frame their discussion of the impact of a monetary policy change.

The reciprocal nature of cooperative learning exercises encourages students to demonstrate understanding by presenting material to their peers, creates an opportunity to receive feedback on their exposition of this understanding, and generates multiple lenses through which to interpret material. Reciprocal teaching exercises create opportunities for students to learn from one another as facilitated through structured formats such as the learning cell. In preparation for this cooperative learning exercise, students read materials prior to class. During or prior to class, students are asked to (independently) prepare three questions (and answers) that address main points of the reading. While some can be factual questions, at least one should be interpretive (see Chapter 6). In the cooperative component of the exercise, students share their questions with group members who work together to develop an answer until the question author is satisfied. This process continues with the next student’s questions until all students have participated. A learning cell example for an introductory macroeconomics course is described in Section II.

Cooperative learning exercises developed in conjunction with writing assignments promote skills that enhance clarity of thought and the ability to organize and synthesize information. Using a round table format, for example, members of a group sequentially respond to a question. The first

student begins the response with a written point or two before describing these out loud and passing the question to the next student who repeats the process. After all students have responded, the group evaluates all responses, reorders, refines, etc., until their listing is complete. As described in Section III of this chapter, an alternative specification of the round table format can be integrated into a more comprehensive course project as students bring individually completed research topic worksheets to the group which then sequentially vets each member's worksheet content, synthesizing and enhancing related points of research, ultimately generating a single comprehensive output on which further project components are based.

Successful problem solving necessitates that students learn to develop strategies, recognize and understand applications, and critically analyze solutions. Cooperative learning exercises can implicitly develop these skills using multiple problems or do so explicitly by incorporating the identification of problem-solving steps into problem solutions. The send-a-problem format uses multiple problem solving which begins as each group is provided a different problem affixed to the outside of an envelope. The group works to solve the problem until time is called and they place their answer in the envelope and pass it to the next group. The second group attempts to answer the problem without looking at the first solution. When time is called, the second group's solution is added to the envelope and it is passed on to the third group. In the last stage of the exercise, the third group opens the envelope and evaluates both solutions, compiling a final solution which is then reported to the class (McGoldrick 2005). An example of this send-a-problem application for an intermediate microeconomics distance learning course is described in Section IV. Maier, McGoldrick, and Simkins (2010, 163-4) describe an alternative send-a-problem format in which a sequential problem-solving process is employed as students begin by completing the first stage of a problem, with subsequent groups building off this answer until all components are complete. For example:

Problem: The country of Econation is operating at full employment but policy makers believe the current inflation rate of 10 percent is too high to be consistent with economic efficiency and long-term economic growth.

1. *First group:* Provide a graphical presentation (along with a brief explanation) of current economic conditions in Econation.
2. *Second group:* You have been charged with recommending a policy change that would rectify the problem noted by policy makers. Provide a description of this change and a justification for using this as opposed to an alternative policy.

3. *Third group:* Show (and explain) this policy change using the graph completed by the first group.

Understanding the wealth of opportunities for cooperative learning in economics necessitates more than a discussion of structures, objectives, and exercise formats; it is best demonstrated through examples that illustrate these components. What follows are three examples that showcase various choices made with respect to objectives, formats, and logistical considerations within the cooperative learning structure, and provide a glimpse into the versatility of cooperative learning. The examples vary in application from principles to electives, in-class to distance learning, and in intensity of required resources (time).

II. UNDERSTANDING ECONOMIC POLICY USING LEARNING CELLS

Robert Rebelein

This exercise was developed for Introduction to Macroeconomics at Vassar College, a small, selective liberal arts college where enrollment averages 25–30 students per section. By the time I use this exercise, we have covered the basics of the business cycle including cyclical behaviors of GDP, inflation, and unemployment, and have constructed the AD–AS model to help students understand how these aggregate quantities are related to each other. We also have discussed basics of monetary and fiscal policy tools. Students will have seen some textbook examples of how to use monetary and fiscal policy tools and of their effects but, in my experience, most students do not yet have a full understanding of relationships between various macroeconomic aggregates and generally do not have a thorough understanding of how different policy tools will impact different aspects of an economy. This exercise is intended to help students develop their understanding of the richness of these concepts.

A key learning objective I have for students in this course is to learn to critically evaluate articles they might read in the popular press. My experience is that traditional teaching methods do not equip all students with the ability to perform this type of analysis. Working together in a cooperative process, however, enables them to learn from each other so that they can (hopefully) perform this type of analysis on their own in the future. The specific learning objectives for this exercise are for students to learn to:

1. identify and interpret economic content of statements made in press articles; and,
2. evaluate policy remedies for different types of economic situations.

Description of the Innovation

This exercise utilizes both independent and group activities. The group activity encourages reciprocal teaching through a “learning cell” in which students work together to answer a series of questions. The exercise proceeds in three phases; the first two occur outside the classroom and the third is conducted in class. The first phase requires the instructor to identify several relevant readings. The second phase requires students to read each article, select one, and prepare several insightful questions on that article. The third phase requires students to work together in small groups to answer questions written by their peers. Each phase is described in detail below. It is worth mentioning that I do not otherwise have students read articles for this course. Students are encouraged to pay attention to current events, and significant events are discussed in class, but this exercise provides students their first opportunity to receive feedback on their ability to critically evaluate popular press articles.

Phase 1 – Instructor preparation The first phase required identification of three articles appropriate for students to read. Ideal articles are from one to three pages long and do more than simply report facts. I selected an article about continued high inflation in India, an editorial recommending that the U.S. President and Congress focus on long-term economic policy goals, and an article describing steps taken by the European Central Bank to increase its key lending rate.³

Key to their usefulness for this exercise, each article discussed either government actions taken to address the issue or economic implications of the issue. For example, the first article provided a recent history of inflation in India and reported steps the Indian government had already taken and steps it was contemplating taking to address the problem. The article also reported specific consequences of persistent high inflation. The second article identified specific problems in the (then) current U.S. economy and offered relevant policy recommendations. The third article described stresses that were then confronting countries of the European Monetary Union and how raising interest rates might affect those stresses. In each article, the author(s) provided some, but not all, potentially useful information. Also, each article described some, but not all, implications of the discussed policy. Inclusion of some analysis allowed students to see connections between economic policy and outcomes in the economy while omission of other details gave students space to use their learning from the course to explore the possibility that news reports often leave out potentially significant points.

Phases 2 and 3 required student participation, so I prepared an instruction sheet to provide them information necessary to complete the exercise. This instruction sheet included details about what students were expected to do during each part of the exercise, including relevant deadlines. (Appendix 4A presents a sample instruction sheet.)

Phase 2 – Individual tasks The second phase began with distribution of the instruction sheet, which was then reviewed to ensure everyone understood the assignment. Each student was expected to read all three articles and then choose one to focus on for this phase. Using their selected article, students were asked to develop one question in each of the following categories:

- Factual – a question that can be answered objectively using information available in the article. An example of a student-generated factual question for the first article is: “According to the article, *why* has inflation jumped to a record level recently?”
- Interpretive – a question that requires analysis of information available in the article. An example of a student-generated interpretive question for the second article is: “The author states that the two most pressing issues currently facing the economy are the deflation in housing prices and the decline in the industrial sector. To what extent does the author believe the government’s current policy of tax cuts and high federal spending address these issues?”
- Connecting to other course material – a question that requires students to apply concepts learned in the course to the situation described in the article. An example of a student-generated connecting question for the third article is: “‘Higher [interest] rates typically strengthen a currency by attracting investors;’ how would one go about substantiating this statement using the concepts and ideas we have learned in class?”

My introduction to the exercise included guidance for constructing questions in each category. Students also were asked to prepare sample responses to their questions, as if the question had been asked on a homework assignment or exam, and to submit both questions and answers to me at least 24 hours before the third phase. I emphasized that they needed to carefully read all three articles even though they were focusing on just one article for this phase.

At the end of this phase I reviewed submitted questions and identified those I believed would best suit the learning objectives identified above. My goal was to have several questions from each category (factual, interpretive, and connecting to course material) for each article. Because a greater number

of questions were submitted than were needed for the third phase, this exercise also generated a set of questions suitable for future homework assignments, quizzes, or exams.

In preparation for the in-class exercise component, I divided the class into groups of three and assigned each a set of three questions, one from each category, for a single article. To broaden student learning, students were assigned a different article than the one for which they wrote questions. This required a little logistical coordination but, because several students developed questions for each article, it was not a problem to form such groups. In addition, when assigning students to groups, I sought to increase heterogeneity within groups by also considering economic skill levels of students and (to the extent known) their social skills.

Phase 3 – In-class component The in-class component began with a review of instructions, followed by group assignments and distribution of questions. I emphasized that each student was expected to know and understand all their group's answers. To reinforce this expectation, I told them I would randomly choose a member to report their group's answers to the class. The possibility that any of them could be called upon to share their group's answer increased positive interdependence. To ensure sufficient time for class discussion, I allowed only 20 minutes to develop answers.

The students separated into groups and began their work. Each group recorded an answer for each of their assigned questions and, to encourage students to think carefully about their answers, was required to turn in written responses at the end of the exercise with the implication that these would contribute to their grade.

During the group work, I circulated to observe and listen to each group, evaluating how each group was functioning and the progress they were making. If a group seemed to be doing fine, I moved on. If a group was headed in a wrong direction or was considerably behind other groups, or if a group member was dominating (or not participating), I intervened. This intervention took different forms including asking leading questions, asking students directly what they thought (particularly useful when there is a nonparticipating group member), or asking other group members if they had solicited everyone's opinion. Groups that finished their task early were asked to develop a diagrammatic illustration of their answers.

After about 20 minutes (and a time warning), I brought the class back together for the final exercise component, during which each group reported its answers to the class. I selected an article and randomly called on representatives of groups with questions on that article to recite their answers

to the class. To stimulate discussion among students, I invited other students to comment on the answers and I asked questions designed to get students thinking about each other's answers. For example, I asked one student her opinion (accurate or not, complete or not) of the analysis reported by another group. Her group had answered questions on the same article, so she was familiar with the issues even though her group had different questions than the reporting group. Sometimes I asked the question's author to comment on the group's answer and to compare it to his or her sample answer. If there was disagreement between the author and reporting group, I would turn back to the group for a defense of their answer. As the exercise progressed and students realized I really did want to hear their thoughts on the issues, they became more willing to speak up and express their views. Eventually, students were talking more to each other than to me – something I had hoped would happen because it was more likely to lead to continued discussions outside the classroom.

I found that different groups tended to reach similar conclusions, even though they had different questions to answer. However, sometimes groups emphasized different aspects of the situation in reaching their conclusions, which presented an opportunity for discussion. For example, one group focused on a policy's effect on consumers while another group focused on the effect on producers; because some policies that help consumers harm producers and vice versa, this provided an opening to discuss appropriate goals of government policies.

Lessons Learned and Teaching Notes

The exercise can be used in any course requiring students to synthesize significant amounts of information, as is typical in policy applications associated with international trade, money and banking, or public finance. The exercise is best conducted after students have a basic understanding of concepts and theories required for the course. Incorporating the exercise near the course conclusion helps students understand how to use concepts they have learned. Students reported learning a lot and enjoying discussion of real-life applications and that part of the benefit came from hearing other students' thoughts about the articles and the questions they had written.

This exercise need not be run in exactly the manner described above. An instructor must consider his or her course objectives and student abilities and tailor the exercise to their specific situation. The following are some things to think about when preparing to use this exercise.

- Each article must describe some aspect of an economic situation in a country, a possible fiscal, monetary, or regulatory action the government might take, and at least suggest the expected results of that action.
- Most often, appropriate articles can be drawn from the popular press; other possible sources include policy think tanks or *The Economist's Voice*.
- Choosing three articles provides sufficient topical variety for students to choose one of interest, whereas using more articles can become difficult to manage in later phases.
- The articles do not have to be about the U.S. economy. In fact, it can be helpful to show students that principles learned apply to other economies and many students enjoy learning about other countries.
- The choice of three students per group was motivated by a desire to keep group size small to reduce the potential for free-riders while also wanting groups large enough to generate a diversity of ideas and opinions.
- To minimize the risk of free-riding, each student could be assigned a role, such as scribe, taskmaster, and time-keeper.
- It is important to limit the amount of time allotted to small-group work so as to allow sufficient time for each small group to report answers and to have time for discussion. Twenty minutes usually will be sufficient for groups to formulate good answers.
- A more-sophisticated version of this exercise would require students to locate appropriate articles. This would require that students be provided guidance about what to look for in selecting articles, which could be done as part of an earlier exercise.
- Variants on the timing of when students submit and answer questions are also possible. For example, students could submit their phase two questions further in advance of phase three. The instructor could then distribute all questions to all groups prior to phase three. Providing all questions to everyone encourages students to come prepared for the broader class discussion without reducing the actual cooperative group component.
- Because groups work at different speeds, it is best to have a complementary task available for groups that finish quickly. Having students illustrate answers graphically often works well.
- All questions and student answers can be posted online for the entire class to see. If desired, the instructor could add comments to incorrect or incomplete answers.

One challenge of using cooperative learning techniques is determining whether or not students achieved the desired learning objectives. An advantage of this learning cell exercise is that it generates a number of sources for assessment, including questions and model answers written by each student, answers generated by groups, and observations of group functioning. A primary criterion for determining whether or not the exercise was successful should be the quality of student answers. These answers can be evaluated based on their thoroughness, including the use of article evidence, and the degree to which they incorporated theories and concepts discussed throughout the semester. Group answers should be more comprehensive than individual answers because they reflect the work of several people.

III. INVESTIGATING HEALTH CARE REFORM⁴ USING A ROUND TABLE EXERCISE

Jennifer K. Rhoads

The months leading up to the 2008 United States presidential election were filled with extensive debates between the principal political party nominees, Republican Senator John McCain and Democrat Senator Barack Obama, over topics including immigration and the war in Iraq. Another topic that attracted heightened interest during this campaign was U.S. health care reform. Given that concerns about the existing health care system and proposed changes were complex and often controversial, it seemed likely that this discussion would persist for years into the future regardless of who won the election. To help students become educated participants in the ongoing discussion, the health care reform debate was integrated into my health economics course during the fall semester of 2008 at the University of Illinois at Chicago (UIC). The course was an elective taken primarily by seniors and economics majors. To capture the many interrelated issues involved in the topic of U.S. health care reform, a cumulative project was developed as a substantial part of the course. This project interwove cooperative and individual learning activities over a five-week period with both in- and out-of-class components.

The first step in developing this project was to carefully consider the desired learning and content objectives. Since the U.S. health care reform debate was likely to evolve over time, it was important for students to go beyond simply identifying current key points of Senators McCain's and Obama's reform proposals, although this was an important content-centered objective. They also needed to develop skills associated with researching key facts, synthesizing arguments, and communicating multiple positions on an

issue. The round table cooperative learning format, which falls within the writing category of cooperative learning exercises, was selected as a starting point for developing this project since it provides a process for groups of students to organize and synthesize complicated information. This exercise was enhanced through the addition of other project components including individual research and writing, and group oral presentations.

Description of Innovation

A brief overview of the project components and objectives was included in the course syllabus (see Appendix 4B) to set expectations of both time commitment to and quality of the project (signaled by 20 percent of the course grade allocated to the project). A more detailed handout distributed on the first day of the project outlined each step and associated deadlines. The class of thirty-nine students was divided into nine groups of four or five. Each group was assigned one of the following health care reform debate issues: pre-existing conditions, portability, insurance mandates, public health care programs, tax credits and subsidies, medical malpractice jury awards, electronic medical records, government-sponsored insurance pools, and pharmaceuticals. At the beginning of the semester students indicated their political party affiliation (if any) on a pretest. Formal cooperative learning groups were created using this information to ensure that a wide range of political perspectives were represented within a group and that the subsequent analysis would include all viewpoints.

This U.S. health care reform project was designed using three sequential phases: individual, cooperative group, and then individual again. The first phase required students to work individually for one week to complete a worksheet compiling information about their assigned issue (see Appendix 4C). This worksheet included sections for key background information, illustrating examples, and summaries of how Senators McCain's and Obama's proposed policies addressed the issue. This first phase of the project promoted individual accountability by ensuring that each student was prepared with adequate background knowledge before participating in the second, cooperative, phase of the project.

The round table exercise in the cooperative phase of the project was conducted during a fifty-minute class period devoted to in-class group work. In addition to completing the fact-gathering worksheet, each group member was required to bring at least two resources to class to share with the other group members. This aspect of the project enhanced positive interdependence through the use of shared resources. Students met in small

groups to discuss, synthesize and compromise until they had generated a group version of their individually drafted worksheets. Specifically, the round table format required group members to begin by sequentially sharing research contained in the background information section of the worksheet. The group then evaluated and synthesized the responses and referred to their additional shared resources to resolve inconsistencies until a consensus was reached. This process was repeated for the remaining examples and policy sections of the worksheet. This round table exercise simultaneously enhanced positive interdependence (through roles) and equal participation because each group member served as leader for one section while the other group members sequentially shared their responses for each section.⁵ While the groups were working, I circled the room to assess each group's level of activity. When the students were actively involved in the round table process, I simply made my presence known in case there were any questions. If the process seemed stalled or the discussion was off task, I reiterated how the round table format should be conducted and prompted the students to engage in the relevant discussion.

At the end of the class period each group submitted a single group worksheet, which I reviewed and provided groups with feedback that identified elements for improvement or elaboration. Groups then had one week to work together outside of class to further develop their responses and to create an associated ten-minute oral presentation. Group members were assigned at random to present information associated with each worksheet section.⁶ Since students did not know in advance which section they would present and the group's grade was based on the presentation as a whole, each group member had an incentive to ensure that all members fully understood material associated with every worksheet section. This arrangement promoted strong positive interdependence (output goal and learning goal interdependence) and group accountability while promoting equal participation and individual accountability.

The final, individual, project phase provided students the opportunity to demonstrate their mastery of learning and content objectives through a comprehensive paper. The unique aspect of this project phase was that students were required to synthesize and evaluate information presented by all groups. Students were asked to put themselves in the role of a third party presidential candidate and to discuss their position on each health care reform issue presented by groups in phase two of the project. Given that students were required to write about all issues presented but had only researched one issue intensely, they had to rely heavily on information presented by other groups. This project design helped students understand the importance of

creating effective presentations and of paying close attention to peer presentations. Students also were motivated to ask clarifying questions after each group's presentation. Therefore, this project not only emphasized positive interdependence among group members within a group, but also among groups.

Student performance was assessed on the individual worksheet, group worksheet, oral presentation, and final paper. Allocation of the 100 project points reflected the cumulative nature and increasing expected quality of the students' work: individual worksheet (10 points), group worksheet (20 points), oral presentation (20 points), and final paper (50 points). Overall, the students' performance revealed that they met quality expectations and achieved the learning and content objectives set for this project. For example, in the final phase, students effectively utilized information presented by other student groups to write thoughtful and cohesive individual papers defending their positions on each issue, demonstrating mastery of the objective to communicate key aspects of health care reform issues. Further, discussions went beyond restatements of facts and were generally of equal quality for a student's assigned issue and for issues presented by other groups, illustrating that students understood and could explain economic reasoning behind each of the issues. Finally, most students selected positions that were not consistently aligned with a particular political party, indicating that they were able to evaluate the issues by applying their own knowledge rather than defaulting to a particular political party's stance.

As an additional mode of assessment, pre- and posttests measured changes in students' knowledge of the health care reform issues and interest level. Although this was optional and did not count toward the students' course grades, every student in the class completed both the pre- and posttests. Results provide further evidence of the positive impact on student outcomes. The class mean score for the content portion of the tests increased significantly, from 64 to 86 percent. Further, 90 percent of students in the class responded that their interest in health care reform policy increased as a result of the project.⁷

Written feedback from students helps illustrate benefits from the student perspective. Students felt they learned a great deal about issues involved in health care reform, and were pleasantly surprised at how much they learned from their classmates. Students wrote that the project was a way to "learn more and retain it instead of only memorizing for a test" and that "the project helped me make an informed decision on who [sic] to vote for." In terms of project design, one student noted that "worksheets helped me organize my thoughts" and another stated that "every portion was a step towards

understanding more about the topics.” Further, one student commented that the most beneficial aspect of the project was that he “learned new relevant information from fellow students” which for him was “something new.” This last comment especially highlights the value of cooperative learning.

Lessons Learned and Teaching Notes

Although this project was designed within the context of the 2008 U.S. presidential election and health care reform, it is flexible enough to implement in a wide range of contexts. For example, this project design could be implemented in an economics of education course in which groups could discuss the use of vouchers, charter schools, teacher pay and incentives, or effects of increased funding on student performance. Alternatively, consider a law and economics course where each student group is assigned a case, and presentations focus on background facts, results or final ruling, and the economic reasoning used in the case. Generally speaking, any topic with multi-faceted issues would lend itself well to this project design.

Additionally, this project could be modified to accommodate a wide range of class sizes. The most straightforward adaptation would be to expand or contract the number of groups (and thus issues covered). Alternatively, the number of worksheet sections (and resulting length of each presentation) could be expanded or contracted. Regardless, to uphold underlying mechanics of this project, the number of groups must match the number of issues assigned for analysis. Also, group size must match the number of sections in worksheets (and thus the number of sections in subsequent oral presentations).

This project was conducted over a five-week period, with roughly one week for independent research, one week for group research and presentation preparation, one week for in-class presentations, and two weeks for writing final individual papers. The time frame for this project is flexible and can easily be altered to allow for increased time within or between any project phases. When determining project deadlines it is important to consider the complexity of the topic being researched and logistical considerations faced by your students. Since U.S. health care reform is a complicated topic and many UIC students commute rather than live on campus, the time frame used for this iteration of the project may have been too condensed. For example, since meeting outside of class is more difficult to arrange among students who commute, allocation of more than one week to prepare for group presentations would likely have been helpful. This was reinforced by post-project feedback where some students indicated that they needed more time

to prepare for presentations. Further, due to the intricate nature of issues researched, groups may have benefited from more in-class time working on group worksheets in the round table exercise. Finally, students indicated they would have preferred more time to work on their final individual papers.

Because so much of the final paper depends on oral presentations of other groups, this aspect of the project would be enhanced by adding a “group check-in” with the instructor during the project phase when group members are working together outside of class to prepare presentations. Arranging a short group meeting would allow the instructor to assess how well group members were working together, and help mediate or redirect the group if necessary. In fact, one of nine groups performed poorly in the oral presentation. It was apparent that group members did not communicate clearly and that they tried to minimize preparation time by dividing the work without any group feedback or collaboration. This group’s attempt to ignore the cooperative nature of the project ultimately inhibited performance. Meeting with groups would have revealed these challenges and provided the opportunity to assist the group in developing a plan for working together to produce a more effective oral presentation.

Many economic topics, such as U.S. health care reform policy, can be daunting for students. This project provided a unique learning experience where students shared the burden of research, learned how to synthesize complicated issues within a small group, became experts on a particular issue, and developed their ability to communicate this information to their peers. As a capstone for this project, students used their newly acquired knowledge to evaluate and effectively defend their chosen positions for each of the U.S. health care reform issues included in the project.

IV. LEARNING INTERMEDIATE MICROECONOMICS WITH A SEND-A-PROBLEM EXERCISE Sue Stockly

Fostering active student engagement presents special challenges within a distance-learning environment. Students taking courses through remote broadcasts are physically separate from the instructor and from the majority of their classmates. Opportunities to participate in class discussions and in group work are limited and lack of structure can lead to distractions from the lecture. The following offers an example of how cooperative learning techniques can be implemented in classrooms where some students are enrolled in off-campus sites.

This particular exercise was conducted at Eastern New Mexico University (ENMU) in an intermediate microeconomics course delivered to students in the classroom and in two remote sites. The main ENMU campus in Portales serves a large rural area and relies on instructional television (ITV) to broadcast lectures to students in other towns, some as far as 200 miles away. The delivery technology allows for only one camera view at a time. Students in remote sites see either the instructor or lecture slides, but never both simultaneously. These students can hear the lecture and can be heard by activating microphones in their respective remote-site classrooms. Thus, audio is two-way and video is one-way.

The audio configuration in remote sites, however, is not conducive to engagement in classroom activities. Students cannot be heard unless they intentionally activate individual microphones. Though they are encouraged to ask (or answer) questions during lectures, students are reluctant to do so because it entails interrupting the instructor. In addition, there are significant lags as sound is relayed through the broadcast system. As a result, remote-site students rarely participate in any type of classroom dialogue.

Moreover, instructors have the general perception that students in ITV sites take the lecture less seriously than students in regular classrooms. Facilitators in remote sites report that the fact that students cannot be heard by the instructor leads to lots of conversations unrelated to class materials. On average, students who take courses off-campus earn lower grades than those in the regular classroom.

The microeconomics course in which cooperative learning was integrated was non-calculus-based and offered via ITV. I introduced cooperative learning techniques with the goal of more fully engaging students from remote sites with course material and with other students. Course enrollments consisted of 13 students in the on-campus classroom, three in one off-campus site (Remote Site 1) and four in another off-campus site (Remote Site 2). Six cooperative learning groups were formed: four in the classroom and one in each remote site. Throughout the semester students were frequently asked to work problems in groups. What follows is a description of one such activity that was formally structured as a cooperative learning exercise.

Planning the Exercise

Development of this innovation began with formulation of a learning objective centered on problem-solving skills needed to succeed in intermediate microeconomics. The exercise was implemented two-thirds of

the way through the semester with a focus on having students help each other understand basic steps needed to use an economic model. They were to demonstrate that understanding through mathematical calculation, graphical illustration, brief written descriptions and oral presentations. During previous semesters, I found that students struggled with production optimization problems and thus chose this material as the basis for the following content objectives. Using numerical data, students were expected to learn how to:

- Sketch an isoquant map and corresponding isocost curves,
- Identify optimal levels of production,
- Trace a long-run expansion path,
- Trace a short-run expansion path that a firm would take to move from one point on the long-run path to another, and
- Summarize the relationship between the long run and the short run depicted.

In order to promote interaction within and among groups (and thus engage students in the remote sites) the send-a-problem format (associated with the problem-solving category) was chosen as the framework for this cooperative learning exercise. Implementation of the send-a-problem activity would allow all students, including those in remote sites, equal participation and simultaneous interaction – introducing key elements of cooperative learning into an environment that did not previously foster this level of student engagement.⁸ Barkley, Cross, and Major (2005) suggest that this form of exercise is particularly useful in helping students to develop strategies, understand applications and produce critical analysis of solutions.

“Sending” the problems was feasible because classroom and broadcast sites had fax machines, telephones and a facilitator who could coordinate the sending of problems among groups. Thus students in remote sites and on campus could send and receive problems as well as offer and receive feedback in a timely manner.

A number of preparatory steps were taken to ensure a smooth facilitation process. Three similar problems were developed – A, B and C. The problems were designed to help students practice using budget constraint and isocost equations to solve for unknown input prices, input quantities or costs and to sketch short-run and long-run expansion paths. Also required were brief written explanations of expanding production in the short run and long-run returns to scale.

Envelopes were prepared that contained one problem and three answer sheets for students to use in each of three rounds. Facilitators in remote sites were provided three separate envelopes – one with problem materials for each

round. They were also given instructions as to which faxed solution was to be placed in which envelope before it was given to remote site students. Fax connections were tested by facilitators to ensure proper operation and telephone conversations clarified each person's role in the exercise. Because of the nature of coordinating across three sites, providing clear guidance to students and facilitators was critical to the successful operation of the exercise. Appendix 4D includes a handout with step-by-step instructions used while the exercise was in progress.

Group formation necessitated oversight only in the regular classroom since each remote site was constrained by student enrollment. The four campus groups were constructed to ensure some skill heterogeneity. One more-advanced skill student, as determined by performance to date in the class, was allocated to each classroom group. Fortunately, there also happened to be at least one more-advanced student at each remote site.

To further prepare students for the activity, the previous class included an introduction to these types of problems. One problem was demonstrated step-by-step and students were asked to include these steps in their notes. A similar problem was assigned for homework with the stipulation that it was to be turned in at the beginning of the send-a-problem class.

Implementing the Exercise

On the send-a-problem class day, students were directed to turn in their homework and to sit with their groups; remote-site students handed the facilitator their assignment to be faxed to the instructor later. Each group was asked to assign the role of scribe to one group member.

Table 4.1 lays out the distribution of problems and their progression among groups during the exercise. For example, in round one, on-campus Groups 1 and 1a received problem A. The other two problems were distributed among remote sites and the remaining on-campus groups. Note that each of the three problems was distributed to two groups in each round. Restricting the number of problems to match the number of rounds ensured that each group had the opportunity to work on all three problems prior to the full class discussion. Making only one copy available to each group also enhanced positive interdependence.

In order to better observe student work during the exercise, the classroom camera was turned toward students during each round. This also enabled a time signal for the end of the round to be easily incorporated by reorienting

Table 4.1: Send-A-Problem Progression

Group	Site	Round 1	Round 2	Round 3
1	On campus	A	C	B
1a	On campus	A	C	B
2	Remote site 1	B	A	C
2a	On campus	B	A	C
3	Remote site 2	C	B	A
3a	On campus	C	B	A

the camera back to the instructor. Sound in the classroom was not broadcast while students were working on problems (though remote-site students were able to activate their microphones and ask questions at any point). While students worked on problems, the instructor circulated among classroom groups to answer questions. Students in the remote-site groups were contacted by telephone to check to see if there were any questions. During each problem-solving round, all students in the class appeared fully engaged in the activity and were on-task the entire time. It was more difficult to assess the level of engagement for remote-site students, though each time the instructor called, students in those groups stated that the problem solving was going well and that there were no questions.

At the end of round three, one classroom group and both remote site groups presented final solutions for each of the problems. All group members contributed to their presentations, fielding a variety of questions from students across all sites.

Overall, student participation in every step of the send-a-problem activity, regardless of location, indicated a good level of positive interdependence.

Evaluating the Exercise and Summary of Lessons Learned

Various assessment formats were designed to measure the impact of this innovation. Although the small class size did not allow for tests of statistical significance, the instruments used are described to provide the reader with a range of potential evaluation techniques.

The homework problem provided a benchmark against which final group solutions at the end of round three of the exercise could be compared, thus insuring both individual and group accountability. Individual homework and the three group problems were assigned a total of 20 possible points. When

these were graded, 92 percent of students on campus and 57 percent of ITV students earned higher group scores compared to individual scores.

Immediately after the cooperative learning exercise, students were required to complete and submit an evaluation form by email. Two of the questions asked them to rank how well they understood the material before coming to class and how useful they felt the exercise was. Seventy-five percent of students on campus and 57 percent of remote-site students had higher scores on the second question than on the first question, indicating that students perceived their learning was enhanced by participating in the activity. The evaluation form also included a question designed to measure general interest in this active learning format, asking if students would like the class to include other exercises during the semester. All the students on campus answered “yes” to this question (100 percent) compared to 57 percent of the remote-site students.

A final assessment compared performance of students who participated in the collaborative learning activity to students who took the course one semester earlier. The percent of correct answers on similar exam problems for in-class students was 80 percent the previous semester and 88 percent after the send-a-problem exercise; correct answers for remote-site students increased from 73 percent to 84 percent.

Evidence provided by these assessment strategies was mixed. The first three measures indicated that remote-site student perceptions about the exercise were less positive than those of on-campus students. Nonetheless, a majority of students, especially those in remote sites, did show improvement on graded exam problems.

There were several lessons learned through implementation of this specific cooperative learning format within a distance-learning framework. Student comments revealed that technical details were not entirely clear in the remote sites; these students might need additional instructions or checks on their understanding prior to implementation of cooperative learning activities. In general, the exercise did demonstrate that it is possible to use the send-a-problem activity within an ITV delivery system. Giving students the opportunity to work on problems and to present solutions in groups did result in higher levels of active learning – especially for students in remote sites who were accustomed to very low levels of engagement during class.

This cooperative learning exercise was feasible due to the specific distance education delivery system in place as remote students were able to fax solutions to other sites and to give presentations to the entire class. Delivery systems vary quite a bit from institution to institution ranging from online-only courses that use classroom management systems such as Web-CT or

Blackboard, to video conferencing with two-way video and audio, to digital recordings of lectures subsequently posted online, to desktop web-conferencing programs such as WIMBA or WebX. The send-a-problem activity could be modified for implementation in any of these delivery systems. For example, students could be assigned to groups that communicate with each other through email or discussion boards and problems could be sent asynchronously with deadlines set for each round. A synchronous activity could require students to “attend” class through personal computers in campus computer labs, public libraries or from home. Group work and presentations could be completed using email, discussion boards, chat rooms or web-cams. My experience has been that implementation of cooperative learning techniques in a distance education environment is no more time-consuming than in traditional classrooms and that the benefits of enhanced learning through increased student engagement are well worth the costs.

V. FURTHER CONSIDERATIONS

As is both implicit and explicit from these three examples, constructing and planning a cooperative learning exercise requires more than just identifying objectives and selecting a category and format. Attention to logistical details and ensuring the exercise adheres to key structures described above enhance probability of success. Special attention should be paid to introducing the exercise, creating groups, assigning roles, monitoring student work, providing closure, and choosing assessment tools.

Introducing the exercise to students involves describing the activity itself, identifying objectives, providing key definitions, outlining procedures, giving examples, and then questioning to verify student understanding (Johnson, Johnson, and Smith 1991, 64–65; Barkley, Cross, and Major 2005, 69–70). Cooperative learning exercises often include both descriptive and informative handouts. Descriptive handouts reinforce the exercise introduction and can be an excellent guide for groups to remain on task. Informative handouts include key content-driven materials necessary to complete that specific exercise. Positive interdependence can be encouraged by distributing only one copy of the descriptive handout per group and/or providing different, complementary informative handouts to each group member (Johnson, Johnson, and Smith 1991, 62).

After a clear understanding of the exercise is achieved, the class is broken up into cooperative learning groups. There are three group types: informal (quickly formed, single concept addressed, nonrepetitive pairings), formal

(more careful formation, more complex topic, membership consistent for any single exercise but may change across exercises), and base (very careful formation, multiple topics over entire semester, membership constant over all topics). Objectives and exercise format choice can help define which group type is most appropriate. For example, instructors who wish to pursue the objective of enhancing students' communication and listening skills might use informal groups to implement a think-pair-share exercise. Alternatively, if the objective is to develop students' ability to demonstrate understanding or receive feedback on their exposition of this understanding, a learning cell exercise with formal or base groups might be more appropriate.

In forming groups (particularly formal and base groups) instructors need to consider the extent and form of member heterogeneity, group size, and the process of group creation. Research on the effectiveness of cooperative learning exercises suggests that heterogeneous groups (based on academic ability and individual characteristics such as attitudes, ethnicity, gender, etc.) generate "more elaborative thinking, more frequent giving and receiving of explanations, and greater perspective taking in discussing material...all of which increase the depth of understanding, the quality of reasoning, and the accuracy of long-term retention" (Johnson, Johnson, and Smith 1991, 60–61). While there is no hard and fast rule for group size, typically three to five members are recommended (Millis and Cottell 1998, 49). Larger groups require more resources (such as time) in completing tasks and may not be appropriate for less complicated exercises. Smaller groups may not lead to as rich an outcome as one member might dominate. Barkley, Cross, and Major (2005, 45–50) describe a number of processes for constructing groups such as random selection (e.g., odd-even, count off, and playing cards) or instructor selection (including student sign-ups, data sheets used to collect student characteristics or skills, test scores, and learning styles).

Once groups are formed, the instructor can ensure incorporation of many of the key elements of cooperative learning exercises through the assignment of individual roles. Commonly used roles include that of facilitator, recorder, reporter, and time keeper. For larger groups, additional roles of summarizer or encourager could be developed. Each role provides the opportunity for students to participate actively, keep the group on task, and reinforce positive contributions. Furthermore, assigning specific roles helps to filter out less constructive behaviors. Instructors incorporating cooperative learning exercises into their courses for the first time could begin by assigning the roles of recorder and/or reporter, and then introduce additional roles as they increase the degree of exercise complexity.

Once students are set on task, the instructor's role as "sage-on-the-stage" changes to "guide-on-the-side." Monitoring groups during a cooperative learning exercise is active work requiring the instructor to gauge the degree of necessary interaction, and providing direction and reflection for different groups, depending on how they are progressing. Students (and to a large degree, instructors) are accustomed to and comfortable with the instructor authority role, but for cooperative learning exercises to be successful, students must rely on one another and instructors should limit comments to clarifying instructions and goals, providing positive reinforcement as to progress achieved and raising questions to motivate further progress. Kagan (1992) suggests using the 'three before me' strategy, requiring students to interact with three other sources before asking the instructor, as one method of reinforcing equal participation. Instructors also should monitor for group dynamic problems such as no leader, too many leaders, inequitable participation and general off-task behaviors. Upon encountering such problems, instructors should play the role of mediator (as opposed to director) to promote a collaborative effort that will build equal participation. Successfully monitoring groups and giving appropriate feedback are skills most instructors will need time to develop and hone.

Providing students with a predetermined 'quiet signal' (such as flickering classroom lights) facilitates the end of the group discussion but not the exercise. Cooperative learning exercises include a reporting out of group results/conclusions. Such activities can be immediate (in class directly after the exercise) or delayed (at the start of a future class meeting), informal (conversational sharing) or formal (written or oral report) and graded (at the individual or group level; by the instructor, peers, or self) or not. Regardless of the structure, reporting out provides opportunities to reinforce positive interdependence and both individual and group accountability.

Examples of potential reporting out techniques are too numerous to provide a detailed account here.⁹ Note, however, that during reporting out students share their findings and conclusions, obtain feedback on their work, and participate in a summarization of learning achieved. For example, the three-stay, one-stray technique facilitates informal reporting out across cooperative learning groups. In a group of four, one student would rotate to a new group, report conclusions of their work, obtain feedback and then communicate a summary of this interaction back to his or her original group. Alternatively, a randomly chosen student could formally represent his or her group in a report to the whole class. While this group-by-group report may consume more class time, it allows for more collective interaction and instructor intervention.

Assessment is another important component of designing cooperative learning exercises. Not all activities need be directly assessed if there is a clear indication how they contribute to learning and thus to grades achieved through other activities (quizzes, exams). That said, it is not always easy to convince students of this value and instructors may choose to grade cooperative learning exercises more comprehensively when first introduced. Individual assessment tools can include worksheets completed during the exercise, a closely related follow-up homework assignment or a quiz in a subsequent class period. Grading comprehension at the group level can rely on traditional techniques applied in more creative ways. For example, to motivate students to contribute to effective group learning (positive interdependence), bonuses can be provided to all members of a group if individually they all meet some minimum standard level of performance on follow up assignments or quizzes. Alternatively, Bartlett (1995) suggests randomly choosing an individual from each group to be assessed; the grade earned by one is earned by all in the group.

It is important to provide opportunities for students to raise unanswered questions. Students could even record questions raised during the exercise for use in subsequent discussion, encouraging students to recognize the validity of their questions. It also is useful for instructors to point out common errors in the graded component of the exercise and to summarize key material. Finally, linking material to past and future lessons as well as more broadly defined course objectives serves to reinforce the importance of the cooperative learning exercise.

Paying careful attention to these logistical details, in addition to key structures that underlie cooperative learning exercises, will help ensure that the economic exercises developed by the instructor are more effective in meeting identified objectives. The wide range of potential cooperative learning exercises allows for both incremental implementation and the ability to adopt in all economics courses. Instructors may initiate their use of cooperative learning with the more basic think-pair-share format, gaining experience before moving towards a more involved format such as the send-a-problem exercise. Examples provided herein demonstrate the versatility of this active learning technique as it may be incorporated into a wide range of economics courses from introductory to intermediate to elective courses.

NOTES

1. Johnson and Johnson (1990, 32), in a meta analysis of nearly 200 studies over 50 years find that “cooperative learning promotes higher individual achievement than do... individualistic ones (effect size = 0.53). Effect sizes of this order describe significant, substantial increases in achievement. They mean, for example, that...students who would score at the 53rd percentile level when learning individually will score at the 70th percentile when learning cooperatively.”
2. For those unfamiliar with learning theories or how they help instructors develop course objectives and improve their teaching, see Saunders (1998) and Gronlund (1995).
3. The specific articles used were: “Inflation Continues to Rise,” in *The Times of India*, February 15, 2007 (<http://timesofindia.indiatimes.com/articleshow/1617538.cms>); “Investing wisely; Bush and Congress have a chance to focus on long-term economic policy. They should seize it.” Editorial, *Los Angeles Times*, January 4, 2007, p. A14; “European Central Bank Raises Key Rate,” by Joellen Perry, *Wall Street Journal*, March 9, 2007, p. A2.
4. Full details including student handouts and worksheets for this project can be found on the Starting Point: Teaching and Learning Economics website (<http://serc.carleton.edu/econ/index.html>).
5. Groups with five members were instructed to choose one section from the worksheet to break into two parts so there were five sections to discuss.
6. Groups of five members were instructed to break one section of the presentation into two parts so that there were five sections in the group presentation.
7. For a full discussion of the pre- and posttest results, the reader is directed to the working paper entitled, “Cooperative Learning in a Health Economics Course: 2008 U.S. Presidential Campaign and Health Care Reform,” on the University of Illinois at Chicago Center for Economic Education website (<http://cee.econ.uic.edu/workingpapers.html>).
8. See the fifth page of this chapter for the instructions for the send-a-problem activity.
9. For examples, see Barkley, Cross, and Major (2005, 79–80), Mills and Cottell (1998, 105–109), and Kagan (1992, 12:5–12:6).

REFERENCES

- Barkley, E.F., K.P. Cross, and C.H. Major (2005), *Collaborative Learning Techniques: A Handbook for College Faculty*, San Francisco, CA: Jossey-Bass.
- Bartlett, R.L. (1995), "A flip of the coin – A roll of the die: An answer to the free-rider problem in economic education," *Journal of Economic Education*, **26** (2), 131–39.
- Cooper, J.L., and R. Mueck (1990), "Student involvement in learning: Cooperative learning and college instruction," *The Journal on Excellence in College Teaching*, **1** (1), 68–76.
- Gronlund, N.E. (1995), *How to Write and Use Instructional Objectives*, (5th ed.), Englewood Cliffs, NJ: Merrill/Prentice-Hall.
- Johnson, David W. and Roger T. Johnson. 1990. "Cooperative Learning and Achievement." In Shlomo Sharan, ed. *Cooperative Learning: Theory and Research*. New York: Praeger: p. 23-38.
- Johnson, D.W., R.T. Johnson, and K.A Smith (1991), *Cooperative Learning: Increasing College Faculty Instructional Productivity*, ASHE-ERIC Higher Education Report No. 4, Washington, D.C.: The George Washington University, School of Education and Human Development.
- Johnson, D.W., R.T. Johnson, and K.A. Smith (1998), "Cooperative learning returns of college: What evidence is there that it works?," *Change*, **20** (4), 26–35.
- Kagan, S. (1992), *Cooperative Learning*, San Juan Capistrano, CA: Resources for Teachers, Inc.
- Maier, M., K. McGoldrick, and S. Simkins (2010), "Implementing cooperative learning in introductory economics courses," in B. Millis (ed.), *Cooperative Learning in Higher Education: Across the Disciplines, Across the Academy*, Sterling, VA: Stylus Press.
- McGoldrick, K. (2005), "Cooperative learning categories and exercises," Teaching Innovations Program documents.
- Millis, B.J., and P.G. Cottell, Jr. (1998), *Cooperative Learning for Higher Education Faculty*, Phoenix, AZ: American Council on Education and Oryx Press.
- Saunders, P. (1998), "Learning theory and instructional objectives," in W. Walstad and P. Saunders (eds), *Teaching Undergraduate Economics: A Handbook for Instructors*, Boston: Irwin McGraw-Hill, 85–108.
- Slavin, R.E. (1990), *Cooperative Learning: Theory, Research and Practice*, Boston, MA: Allyn and Bacon.

- Smith, K.A. (1996), "Cooperative learning: Making 'group work' work," in T.E. Sutherland and C.C. Bonwell (eds), *Using Active Learning in College Classes: A Range of Options for Faculty. New Directions for Teaching and Learning, No 67*, San Francisco: Jossey-Bass, 71–82.
- Smith, K.A., and A.A. Waller (1997), "Cooperative learning for new college teachers," in W.E. Campbell and K.A. Smith (eds), *New Paradigms for College Teaching*, Edina, MN: Interaction Book Company, 183–209.
- Watts, M., and Becker, W.E. (2008), "A little more than chalk and talk: Results from a third national survey of teaching methods in undergraduate economics courses," *Journal of Economic Education*, **39** (3), 273–86.
- Webb, N. (1991), "Task-related verbal interaction and mathematics learning in small groups," *Journal of Research in Mathematics Education*, **22**, 366–89.
- Webb, N. (1983), "Predicting learning from student interaction: Defining the interaction variable," *Educational Psychologist*, **18**, 33–41.
- Yamarik, S. (2007), "Does cooperative learning improve student learning outcomes?" *Journal of Economic Education*, **38** (3), 259–77.

APPENDIX 4A

Policy Applications Exercise

Governments have a variety of fiscal and monetary policy tools that they can use to influence the economy. Now it is time to see how those tools are used in practice. A great deal of discussion goes into deciding what policy is the right one for a government to use in each particular situation. This exercise will help you to determine what issues should be addressed in such discussions, and to evaluate an example of this kind of discussion. The assignment is broken into two parts. In the first part, your task is to read each of the articles from the popular press listed at the bottom of the page. Next, choose one of the articles and develop several insightful questions on that article. You are to develop one question in each of the following categories:

- Content-based
- Interpretive
- Connecting to other course material

Note that the categories involve increasing degrees of complexity. After writing your questions, you are to construct model answers for each of your questions. Your questions and model answers should be submitted to me via email no later than 11am on (the day before the exercise).

The second part of this exercise will occur in class. I will divide the class into groups of three students. Each group will be given three questions to answer on one of the articles listed below. These questions will be drawn from those submitted by students. Each group will formulate its own answer to each of the questions. These answers will then be shared with the class and compared to the model answer submitted with the question.

Each student is expected to contribute to and understand each of the group's answers. I will randomly select one student from each group to report their answer(s) to the class. Answers will be evaluated on their thoroughness and on their proper use of the economic concepts discussed during the semester. Students will also be evaluated on their individual knowledge of the answers to the questions their group received.

The following articles are used for this activity:

- "Inflation Continues to Rise," in *The Times of India*, February 15, 2007, available at <http://timesofindia.indiatimes.com/articleshow/1617538.cms>
- "Investing wisely; Bush and Congress have a chance to focus on long-term economic policy. They should seize it." Editorial, *Los Angeles Times*, January 4, 2007, A14.
- "European Central Bank Raises Key Rate," by Joellen Perry, *Wall Street Journal*, March 9, 2007, A2.

APPENDIX 4B
U.S. Health Care Reform Project:
Introduction Included in the Syllabus

By utilizing the forthcoming presidential election, we will be examining and discussing specific issues pertinent to the U.S. health care system. We will do this through examination of the health care reform proposals of Senator McCain and Senator Obama. You will perform preliminary independent research on one health care reform issue being currently debated. You will then work in a small group to prepare an oral presentation that showcases your group's refined understanding of its health care issue. Group members will be chosen at random to present the various sections of the presentation. As a capstone for this project you will be responsible for writing a 6–8 page paper. For this paper you will be asked to consider yourself a new presidential candidate and then choose and defend your position on each of the health care issues presented in class.

This project will be worth 100 points and will count as 20 percent of your overall grade. Since this project has the same weight as an exam in your overall grade, a significant amount of time and effort is expected. Below is a list of the pertinent dates for this project. Your attendance is mandatory on these days in order to satisfy the requirements of the project.

September 29 – Introduction and group formation

October 6 – Group work in class

October 15, 17 – Group presentations

November 3 – Final paper due

APPENDIX 4C
U.S. Health Care Reform Project:
Sections Included in Individual/Group Worksheets

Section 1:

- a) Define and explain your issue. Provide some background knowledge about your issue. Why is it important? Who does it affect?
- b) Describe the current status of your issue in the U.S. health care system. For example, is it already present in the current system? If yes, to what extent? Include statistics if possible.

Section 2: Provide 2 examples that illustrate your issue. These can be actual cases that you find in your research or hypothetical examples.

Section 3: Discuss how Senator McCain's health care reform proposal addresses this issue. Who would be affected by this proposal and in what way?

Section 4: Discuss how Senator Obama's health care reform proposal addresses this issue. Who would be affected by this proposal and in what way?

APPENDIX 4D
Send-A-Problem Process Instructions
 (75-Minute Class)

Beginning of class (10 minutes):

- Students sit in groups as they come in to class.
- Students turn in problems to instructor or to facilitators to fax to office
- Each group assigns scribe with blank paper and pen.

Round 1 (15 minutes):

- Hand out problems
- Students have 10 minutes to complete a faxable copy of solution
 - At end of Round 1
 - Group 1 gives A to instructor, Group 2 opens A
 - Group 1a sends A to Group 2a
 - Group 2 faxes B to classroom, Group 3 opens B
 - Group 2a sends B to Group 3a
 - Group 3 faxes C to instructor to include in envelope to Groups 1
 - Group 3a sends C to Group 1a

Round 2 (15 minutes):

- Facilitators hand out problems in the remote sites, plus Group 1 opens C
- Students have 10 minutes to complete faxable copy of solution
 - At end of Round 2
 - Group 1 faxes C to Group 2
 - Group 1a sends C to 2a
 - Group 2 faxes A to Group 3
 - Group 2a sends A to Group 3a
 - Group 3 faxes B to Group 1
 - Group 3a sends B to Group 1a

Round 3 (15 minutes):

- Students have 10 minutes to review solution and complete faxable copy
- Group 2 faxes C to classroom
- Group 3 faxes A to classroom

Presentations (15 minutes):

- Problem A by Group 3 Input from Group 3a
- Problem B by Group 1 Input from Group 1a
- Problem C by Group 2 Input from group 2a

Note: Instructor projects Group 2 and Group 3 solutions while students in remote sites explain their answers. Students in Group 1 project and explain solutions in the classroom.

Wrap-up and preview of the next class (5 minutes)