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Jack W. Fellers
Drake University

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TEACHING TEAMWORK: AN EXPLORATION OF USING COOPERATIVE LEARNING TEAMS

Jack W. Fellers

College of Business and Public Administration
Drake University

ABSTRACT

The business world continues to change at a tremendous rate. We in the Information Systems field contribute to this rate of change and at the same time try to keep up with it. While the content in our field changes constantly, the way in which we attempt to educate our students (pedagogy) has not changed for some time. One means to change the way we teach our students is through the use of alternative pedagogical models, such as the cooperative learning model. Cooperative learning is defined as "the instructional use of small groups so that students work together to maximize their own and each other's learning" (Johnson, Johnson and Smith 1991b, p. 3). This paper presents an overview of the cooperative learning model, two examples of the model in use, and an exploratory assessment of the model. Additionally, limitations of this study, recommendations for future research and for practice have been provided.

1. INTRODUCTION

Hardly anyone who is familiar with American business in general, and the Information Systems (IS) field in particular, can deny that we are in a constant state of change. As we approach the year 2000, we see a tremendous uproar in the field of business with such initiatives as downsizing, outsourcing, re-engineering, TQM, and the advent of learning organizations. The old standard: "The only constant is change" is being changed, or replaced, with the new notion of what Handy (1990) calls "discontinuous change" — the idea of increasingly rapid, if not even exponential, rates of change taking place. This incredible rate of change is forcing all organizations, not just businesses, to re-evaluate the types of knowledge, skills, abilities and traits that will be required for their workers to compete in today's, as well as tomorrow's, rapidly changing global workplace. We in academia who are charged with helping to prepare the workers of tomorrow, as well as helping to retrain today's workforce, must begin to look at how we can best fulfill our responsibilities given the rate of change at which events are taking place.

As we look toward the future, we must first identify the skill set required for workers to thrive, not just survive, in our turbulent business world. Once these types of skills are identified, we must next identify the types of teaching methods (pedagogy) which will best meet these needs.

Boyett and Conn (1991) identify a number of skills that will be required for workers to be successful in the future. These skills include learning to learn, core competencies, communication, personal management, adaptability, group effectiveness, and influence. A recent study of skills required for IS professionals for the 1990s found interpersonal skills (e.g., listening, working with others, writing) to be the most important skill set required (Leitheiser 1992). Davis (1993) also discusses the importance of such skills as communications, management skills, business skills and teamwork for IS professionals. The importance of interdependence and teamwork are becoming commonplace in American businesses (Byrne 1992; *U.S. News and World Report* 1993). A recent study showed that 82% "of all U.S. organizations in which some employees are members of a working group identified as a team" (Gordan 1992, p. 60). The IS and business literature is brimming with articles on the importance, and use, of teams in business and industry.

While IS academics are trying to keep pace with these changes, and even lead the way in some areas, we must continue to bring the latest ideas and newest concepts to our classrooms. While we may be continually updating the **content** of our courses to reflect these changes, there is one thing that has probably not changed for decades, if not longer: that is our **pedagogy**, the way we teach our classes. This too must now change. Bartholome (1991)

points out the need for rethinking how business students are educated. Johnson (1992) points out the need for Business schools to not only change what they teach, but how they teach. While there have been some efforts to bring innovative teaching methods into IS education (e.g., Olfman and Bostrom 1992; Becker, McGuire and Medsker, 1992; Wilson, Hoskin and Nosek, 1993), Scriven (1991) points out the dearth of research in effective teaching methods in the Information Systems area and the need for additional research.

One method that has been proposed to better prepare students for the future is the cooperative learning model. Cooperative learning is defined as "the instructional use of small groups so that students work together to maximize their own and each other's learning" (Johnson, Johnson and Smith 1991b, p. 3). The cooperative learning model develops and reinforces active learning, learning how to learn, interpersonal communication and teamwork — skills that are in high demand for today's IS professionals. Cooperative learning has had tremendous success at all levels of teaching, from kindergarten through college (Johnson, Johnson and Smith 1991a). Cooperative learning strategies have been promoted for use in business education (Scaglione 1992), but very little research has been published in this area.

This paper presents an exploratory assessment of the use of the cooperative learning model by non-traditional MBA students in IS courses. The cooperative learning model is explained first. This is followed by a description of how the model was implemented in two MBA IS courses. An assessment of the effectiveness of the model is then presented. Finally, limitations of this study and recommendations for use of, and future research into, this model are presented.

2. OVERVIEW OF THE COOPERATIVE LEARNING MODEL

Table 1 contrasts the traditional approach, or old paradigm, to teaching with the cooperative learning model, or new paradigm (from Johnson, Johnson and Smith 1991a). The traditional approach is the "accepted standard" of teaching as it has been for the entire century. Each of these elements will be discussed in detail. (There is a large volume of research on cooperative learning. The interested reader is referred to the books in the references which provide an excellent summary of the extensive research in this area.)

2.1 Knowledge

The traditional perspective on teaching is that knowledge is to be transferred from the faculty member to the student. The faculty member possesses all the knowledge in the field and as Johnson, Johnson and Smith (1991a) put it: "The faculty's job is to give it. The student's job is to get it" (p. 1:4). Students are then expected to memorize and "regurgitate" that information back to faculty on a test (often multiple choice).

As the amount of information available continues to expand, one must challenge the assumption of the ability for any one faculty member to possess the breadth and depth of knowledge that exists in the IS field (or nearly any field today). Further, by the time students graduate and leave school, the amount of new knowledge in a given field has continued to expand. Unless students have been prepared to continue to gather and assimilate new knowledge about a given field, they will have a difficult time integrating new information into their existing model of an area.

Table 1. Comparison of Old and New Paradigms of Teaching

	OLD PARADIGM	NEW PARADIGM
Knowledge	Transferred from faculty to students	Jointly constructed by students and faculty
Students	Passive vessels to be filled by faculty's knowledge	Active constructor, discoverer, transformer of own knowledge
Faculty Purpose	Classify and sort students	Develop students' competencies and talents
Relationships	Impersonal relationships among students and between faculty and students	Personal transaction among students and between faculty and students
Context	Competitive/Individualistic	Cooperative learning in classroom and cooperative teams among faculty
Assumption	Any expert can teach	Teaching is complex and requires considerable training

The cooperative learning approach sees knowledge as something to be constructed, discovered, transformed and extended by students. The faculty member becomes less of a “presenter of information” (“The Sage on the Stage”) and more of a facilitator, one who creates an environment and constructs a set of experiences that will enable students to learn on their own (“The Guide by the Side”). Instead of having students simply “cram” information into their memories, this approach stresses the integration of new information with existing cognitive structures. This will enable students to acquire new information initially (e.g., in class) and then later on throughout their lives, by continuing to expand and build upon their initial cognitive model.

2.2 Students

The traditional approach to teaching views students as “passive, empty vessels” that are to be “filled with the knowledge” of the faculty members. The knowledge is the property of the faculty member — who gives it out bit by bit to students who are to memorize and regurgitate it.

The cooperative learning approach views students in a far more active role. Students are to be active discoverers, constructors and transformers of their own knowledge. As Johnson, Johnson and Smith (1991a) put it: “Learning is conceived as something a learner does, not something done to the learner” (p. 1:7). Students must be active participants in the learning process. They must understand how the new information they are exploring fits in with what they already know and may need to develop new understandings pertaining to new material and its relationship to existing information.

2.3 Faculty Purpose

Traditionally the role of faculty has been to sort and classify students into categories, usually based upon the grade a student receives. Under this approach, college has traditionally been a place to “weed out” students. The often accepted traditional view of “there have to be as many F’s as A’s” has shaped the future of many students while simultaneously ignoring their potential for growth and development. These grades can then have tremendous impact on which students get internships, jobs, graduate, go on to graduate school, etc.

In the cooperative learning model, the role of faculty is geared to developing students’ competencies and talents. This is based on the belief that a student’s abilities and talents are not fixed, rather that they can be developed and improved by the education process. College is not a place

to “weed out” students, but a place for students to learn and grow.

2.4 Relationships

In the traditional model the relationships between students and faculty, and relationships among those students, could best be classified as impersonal, with little or no contact outside of class, and often very little contact actually occurring in class.

Johnson, Johnson and Smith (1991a) sum up the viewpoint of the cooperative learning model by stating that

learning is a social process that occurs through interpersonal interaction within a cooperative context. Individuals, working together, construct shared understandings and knowledge. Learning proceeds more fruitfully when relationships are personal as well as professional. Long-term, persistent efforts to achieve come from the heart, not the head, and the heart is reached through relationships with peers and faculty. Love of learning and love of each other are what inspire students to commit more and more of their energy to their studies. The more difficult and complex the learning, the more important are caring relationships to provide the needed social support. (p. 1:11)

Astin (1993), in his recently published landmark study on student development and learning for undergraduates, stresses that “the student’s peer group is the single most potential source of influence on growth and development during the undergraduate years” (p. 398). Astin goes on to point out that in addition to interaction with peers, the amount of interaction a student has with faculty members also plays a key role in the student’s learning and development.

2.5 Context

The traditional model of teaching revolves around an individualistic, competitive environment. Each student competes against all other students in order to achieve the best grade they can. Grades are viewed as scarce resources with a limited number of “good” grades to be achieved. As a result, the amount of communicating, sharing and helping that goes on between students is minimized. Other students, and even the faculty, can be viewed as the “enemy” when this approach is taken to the extreme.

The cooperative learning model views all participants — students and faculty — as collaborators, not competitors. Faculty create learning situations that enable students to work together in a positive environment. This opens up the channels of communication and allows for sharing of ideas, development of new ideas, and the encouragement of others. This can lead to the development of the types of skills being deemed necessary for tomorrow's employees. Ultimately, the previously mentioned points of the cooperative learning model can *only* be achieved within a cooperative context.

2.6 Assumption

The widely held belief is that anyone who has expertise in a given field (e.g., a Ph.D. or high level of experience) can teach, even without ever receiving training in teaching. This belief is based on two premises: (1) that the content to be taught is what is key and (2) that process is not (as) important. As the amount of knowledge in the IS field continues to grow, and the skills required by our graduates continues to change, it is time that the IS field carefully examined this assumption.

From the standpoint of the cooperative learning model, Johnson, Johnson and Smith (1991a) indicate that "teaching is assumed to be a complex application of theory and research that requires considerable instructor training and continuous refinement of skills and procedures" (p. 1:12). A faculty member has to understand a lot more than just the content knowledge to teach: he/she has to understand the process of teaching in the cooperative learning environment to make it work.

Johnson, Johnson and Smith (1991a) sum up the new paradigm of teaching as a way "to help students construct their knowledge in an active way while working cooperatively with classmates so that students' talents and competencies are developed" (p. 1:12).

3. ELEMENTS OF THE COOPERATIVE LEARNING MODEL

There are five elements to the cooperative learning model that are essential for it to succeed (Johnson, Johnson and Smith 1991a). Each element will be briefly addressed.

3.1 Positive Interdependence

Students must realize that their performance is tied to the performance of others (a "sink or swim" mentality). Each individual student can only succeed if all members of the

team succeed. Instead of each person "looking out for number one," a team-oriented outlook is created.

3.2 Face-to-Face Promotive Interaction

One of the roles students undertake in cooperative learning teams is that of a teacher, helping other group members to learn new concepts and skills. Given that students usually have similar backgrounds and experiences, it is often easier for a student to learn something new from a peer, who possibly just learned it themselves, as opposed to learning it from a faculty member who has had mastery over a subject for some time. Students are also to provide support and encouragement for other members of their team and other class members as well.

3.3 Individual Accountability

Work that is completed by individuals is evaluated and returned to the individual and the team. This allows everyone to see the level of performance of their team members, while also enabling teams to determine the extent of assistance needed by some of the team members. Some means of providing individual accountability for a team include having the team receive as a their score for an assignment the average score of all team members, the lowest score of all team members, or the score of one team member selected at random.

3.4 Social Skills

While we often stress such necessary skills as "communications skills" and "teamwork," we often take for granted that students will have "picked up those skills somewhere along the way." Many students have limited experience in working with teams and have not yet developed the necessary skills for dealing with the types of situations that develop with teams (e.g., communication, decision making, conflict resolution, leadership). Cooperative learning teams provide both a need for these skills and an environment in which they can be taught and further developed.

3.5 Group Process

Developing the ability to work with others in teams is just one step, the ability to foster and maintain healthy relationships while working with others is the next step. Group maintenance, the ability to maintain a positive working relationship with the group, can take a considerable amount of time. Teams must also be aware of how well they are accomplishing their goals, providing feedback to one

another, and learning more about both teamwork and the tasks at hand. It is critical for the instructor to help each team to process each learning experience after it occurs. This group processing enables teams to work together and learn from one another in a more positive and productive manner. The importance and use of teams in business and industry continues to grow, and the cooperative learning model works well to teach students the skills they need to work successfully in teams.

The combination of these elements, within the cooperative learning model described above, creates an environment that will enable learning to take place and cooperative learning teams to be successful. Astin (1993) points out why he believes the cooperative learning model to be so powerful a learning tool:

Classroom research has consistently shown that cooperative learning approaches produce outcomes superior to those obtained through traditional competitive approaches, and it may well be that our findings concerning the power of the peer group offer a possible explanation: cooperative learning may be more potent than traditional competitive methods of pedagogy because it motivates students to become more active and more involved participants in the learning process. This greater involvement could come in at least two ways. First, students may be motivated to expend more effort if they know their work is going to be scrutinized by their peers; and second, students may learn course material in greater depth if they are involved in helping teach it to fellow students (p. 427).

4. COOPERATIVE LEARNING MODEL IN PRACTICE

Two MBA IS courses were designed using the cooperative learning model and taught in the Fall 1992 semester at Drake University. This section presents background information on the two courses, the students, the procedures and assignments used in the courses.

4.1 MBA Program and Courses

Drake University is a private university with both Liberal Arts and professional programs. The two courses taught are part of the MBA program in the College of Business and Public Administration at Drake. The MBA program is

a 36 hour program designed predominantly for part-time (non-traditional) students (540 of the 560 students in the program are part-time students). Students typically take two courses a semester.

One of the courses taught using the cooperative learning model is the core, or required, IS course (Information Systems in Organizations) for all MBA and MPA (Masters of Public Administration) students. The other course was an elective course on Decision Support Systems (including Group Support Systems, Executive Information Systems and Expert Systems). There were 43 students enrolled in the IS course and 18 in the DSS course. The average age of the students was 29.27 years (sd: 5.83), the average number of years of work experience was 7.58 (sd: 6.19), and there were 21 women and 40 men total in the two classes.

4.2 Assignment of Students to Teams,

While teams are commonly used in most classes, it is the assignment of students to teams that is the first critical element of the cooperative learning model. If students are allowed to form their own teams, they will often congregate with friends or other students in the same major, background, job or with other similar traits or interests. What results are homogeneous teams with a large number of similarities between the students in these teams. One of the key underpinnings to the cooperative learning model is the assignment of students to **heterogeneous** teams. This allows the differences between students to enable them to learn from one another, depend on one another, and grow from their interactions with each other.

Teams were assigned based on number of criteria. On the first night of class, students completed a background information form that asked for the following information: undergraduate degree field, current program of study (MBA, MPA or JD/MBA), hours completed in the program, previous experience with computers, previous computer courses, and previous work experience [both type(s) and years]. Students also completed four individual difference measures (e.g., learning style, problem solving approach). This information was then used to create teams that were as heterogeneous as possible, with the approach varying slightly between the two classes. While this process was done manually, Weitz and Jelassi (1992) report on the development and use of a Multi-Criteria DSS utilized to assign MBA students to sections and work teams.

For the core IS course, ten teams of four students each were assigned, with one team of three. On the first pass through the student background data, eleven "leaders" were selected based on their work experience, computer

background and hours completed in the program. While these individuals often did emerge as the leader of their teams, they were not designated as the leader in any way. Next, the eleven "weakest" students, based on the background information they provided, were matched with the eleven leaders. These students often had little or no work/computer experience and were often just starting on their graduate coursework. After these two students had been assigned to teams, two other students were assigned in such a way as to balance experience level, gender, and other salient characteristics.

For the DSS course, six teams of three students each were assigned. Given that this course involved a semester-long project to develop and implement a prototype version of a DSS (or an ES), the assignment of students to teams was more critical. As with the IS course, leaders were selected based on their background and experience in the development of IS. This process was simplified by the fact that many of the members of the class were actively working in the IS area and already had substantial development experience. However, at least one third of the students had little to no IS experience, so they were matched up with the more experienced students. The third member of the team was assigned in order to balance experience level, gender, and other salient characteristics.

The four individual differences measures were not used to construct teams, but were used to ensure diversity in the teams. Once teams were assigned, the scores on the individual difference measures were then checked for each team. If there was a sufficient degree of diversity for a given team (e.g., members having different scores and different strengths and weaknesses), then that team was set. If not, then some minor adjustment of team members was done to provide the desired degree of diversity and heterogeneity for all teams.

The goal of diversity of background, experience, knowledge, skills, styles and approaches enables team members to depend on one another to a much greater degree. Much of the learning that went on during the course of the semester resulted from the exchange of ideas and information between the team members and among the teams. Those with greater knowledge or experience were able to share this with others in the team and class. In this way, those with more share with those with less. As a result of this sharing, all members of the team can learn and benefit from the interactions.

The cooperative learning model was presented to students on the first night of class along with an explanation of their responsibilities as team members (see the appendix for the

explanation included in the class syllabi). Students were then assigned to teams on the second night of class and were asked to provide some anonymous feedback as to their team assignments and on their views about the use of cooperative learning teams for the upcoming semester. Table 2 contains the students' responses to the initial team questionnaire. Some of these questions will be discussed in subsequent sections.

Once students were assigned to teams, they were asked to sit together by teams in class. A number of in-class team exercises were conducted to help the teams get to know one another. Also, some class time was given to students to use for their team meeting time nearly every week (more class time was given to the DSS class given the nature of their semester-long project).

4.3 Team Homework, Assignments and Exams

One of the underlying elements of the cooperative learning model is that of a positive interdependence of students on each other. In order to facilitate this interdependence, students in both classes were told that 55% of their grade (550 out of 1,000 points) would be based on team performance, the remaining 45% (450 points) would be based on individual performance. For most students, this was the first time that a majority of the points for their grade was dependent on others. Their response on the initial team questionnaire (see Table 2) indicates a somewhat strong concern about this format; additional comments from students expressed further concern about this interdependence.

In the IS core course there were three elements to the 1000 points: individual journals and exercises (25%), exams (20% team; 20% individual), and team exercises (35%). Students wrote a journal entry each week for the class and also performed a number of individual exercises. Journals are a learning tool that enables students to **reflect** upon the experiences that they have had in class and to **integrate** those experiences with their work, other classes and previous experiences, and then to **apply** the things they are learning in their lives. The journals also provided a means for the faculty member to receive feedback on how the teams were doing and any problems that came up along the way. Additionally, peer evaluations were used three times during the semester to gauge the levels of cooperation, participation and problems with the teams. The evaluations were not used for determining the number of points a team member would receive, although they could be used in that manner, rather they were used primarily for feedback and corrective measures.

Table 2. Student Responses to Initial Team Questionnaire

	MEAN (N)	ST. DEV.
1. Level of experience working in groups: (1 = Seldom; 3 = Neutral; 5 = Often)	3.57 (60)	1.06
2. I like to participate in groups: (1 = Strongly Disagree; 5 = Strongly Agree)	3.47 (60)	0.98
3. I have had positive experiences thus far working in groups in the MBA program: (1 = Strongly Disagree; 5 = Strongly Agree)	3.35 (55)	0.77
4. As a student I would rather work in teams than on my own: (1 = Strongly Disagree; 5 = Strongly Agree)	2.58 (59)	1.05
5. How motivated are you to make this team successful: (1 = Not Very Motivated; 5 = Very Motivated)	4.63 (59)	0.58
6. How successfully do you expect the team to accomplish the required outcomes for the course this semester: (1 = Not Very Successful; 5 = Very Successful)	4.36 (59)	0.69
7. How significant do you expect your personal contribution will be to the team's outcomes: (1 = Not Very Significant; 5 = Very Significant)	4.22 (60)	0.64
8. How equal do you feel the individual contributions of the team members will be: (1 = Unequal Participation; 5 = Equal Participation)	4.20 (60)	0.86
9. Are you concerned about having a majority of the points being tied to team performance rather than individual performance: (1 = Not Very Concerned; 5 = Very Concerned)	3.73 (60)	0.97

Individual exercises used in the IS course included such activities as sending electronic mail messages, visiting a retail computer store to investigate products, writing a paper on their own theory of management and how IS impacts that theory, and writing a short paper on how they believe technology will impact their jobs and lives in the future. Team assignments included questions on cases, writing sample exam questions for each test, a paper and presentation on an emerging technology, and a paper and presentation on the strategic use of IS (usually from one of the student's organizations).

In the DSS course, there were also three elements to the 1,000 points: individual journals, exercises and a research paper (25%), exams (20% team; 20% individual), and team exercises (35%). Journals and individual exercises were similar to the IS course, however, students also had to write a short research paper on an element of emerging technology in the decision support area. There were several small team assignments (e.g., spreadsheet, 4GL, ES shell) and one major project. The major project involved the development of a prototype DSS (or ES) for an organization. This

was a semester-long project and required a substantial amount of effort and coordination among the team members.

In both classes, exams were given using two different team approaches. The first exam was taken by each student on an individual basis (100 points possible). Then a "team score" was calculated and each member of the team was awarded that score (100 points possible). This was done to promote working together by the students in their teams in preparation for the exam (including the team assignment of writing sample test questions). The goal was that the team members would be motivated to ensure that all team members had learned the material and were more prepared for the exam than they may have been just working on their own. The intent was to ensure positive interdependence of all team members, while simultaneously promoting individual responsibility on the part of each individual student.

An exam scoring method was devised to take advantage of the strengths of the team, while still holding each member of the team accountable. For the team score, the highest

score received by a team member on each question was selected, then the remaining scores on that question would be averaged. If, for example, on a given question the four scores were six, five, four, and three points, the highest score, six, would be selected and the average of the remaining scores would be calculated (i.e., four). This was done for all the questions on the exam, two totals summed, the two numbers added, and then divided by two to produce a "team" exam score. For the 43 people in the IS course, 28 had a higher "team" score than their individual score (by an average of nearly seven points) and 14 had a higher individual score than team score (by an average of less than two points) (for one person both scores were the same). As a result of the combined scoring, seven students moved up one letter grade by having the team score added onto their individual scores; no one moved down a grade. While there was initial resistance to the "take the best and average the rest" approach, most students felt comfortable with this approach after seeing the results.

Students were surveyed as the final exam drew near and asked what type of team format they would like to use for the final exam (options included same as the first test, take the exam as a team, take-home portion of the exam). The preference was to take the entire exam as a team (by a slim margin over the same format as the first exam). For the final exam, each team was placed in a separate room and given a set of questions and told to provide one set of answers for the team. The exam was sufficiently long that the team had to determine their approach and do some combination of delegation and discussion. This in and of itself was a learning experience.

5. COOPERATIVE LEARNING MODEL ASSESSMENT

At the end of the semester, students were asked to provide some (anonymous) feedback on their experiences participating in a class using the cooperative learning model. Table 3 presents the results of the final team questionnaire filled out by students just prior to the end of the semester (before they took the final exam). Table 4 contains responses to open-ended questions on the final team questionnaire which asked them what the "positive" and "negative" factors of working in teams during the semester were, along with recommendations for changes to the approach used.

5.1 Final Questionnaire Results

Results from the questions on the final questionnaire give an indication of the students' assessment of the cooperative learning model as it was employed in the classes. Students felt fairly positive about their ability to accomplish the outcomes required of their teams (question 1), their ability to work together as a team (question 2), and the minimal

degree of conflict experienced in the teams (question 3). Overall, students indicated that participating in cooperative learning teams had been a fairly positive learning experience (question 5). Students also felt very positive about the use of teams for sharing of ideas, opinions and knowledge; the social interaction that occurred; and their ability to learn communication, cooperation and team skills from the experience (based on students' responses to the open-ended questions).

The major problem from the students' perspective was the ability to meet as a team, given the limited number of available hours in the week for part-time students and the inevitable scheduling conflicts that occurred. Another concern that is common to team work is the issue of unequal participation by team members. While the students indicated that over 56% of the work was done as a team, anyone who has ever participated in team activities knows that it is common for some members to do more than their fair share of the work and others to do less than their fair share. On the final questionnaire, students were also asked to provide an indication of the contribution of each member of the team for the semester. The results were that 32% of the students (19 out of 60) indicated that there had been equal participation by all students during the semester; 13.6% indicated less than a 10% difference from the highest contributing member to the lowest; 40.8% indicated a difference of 20% from the highest to the lowest; with the remaining 14.1% indicating a substantial difference (ranging from 25% to 65%).

The final problem indicated by students was the dependence on others for one's final grade. The students' responses on the final questionnaire also indicated their concern with the dependence on others for their final grade (question 4). To assess whether the students' view on positive interdependence had changed any over the course of the semester, a matched pairs t-test was conducted using the students' response to question 9 on the initial questionnaire and question 4 on the final questionnaire. The result of the t-test was not significant ($T=0.936$; $p=0.3531$), indicating that a significant change in opinion had not taken place on this issue.

Matched pairs t-tests were also conducted on three other question pairs from the two surveys. Question 6 (from the initial questionnaire, "How successful do you expect to be?") was paired questions 1 and 2 from the final questionnaire ("accomplishing outcomes" and "working together"). Neither t-test was significant ($T=0.339$ and $T=0.714$, $p=0.7356$ and $p=0.4780$). However, when the two classes were evaluated individually, the t-test for the DSS class approached significance for the first combination ($T=-2.061$, $p=0.0549$). This is an indication that the teams in the DSS class had actually been more successful in accomplishing the outcomes required for the course than they had expected to be.

Table 3. Student Responses to Final Team Questionnaire

	MEAN (N)	ST. DEV.
1. Over the course of the semester, our team was very successful in accomplishing the outcomes required of us: (1 = Strongly Disagree; 5 = Strongly Agree)	4.32 (60)	0.93
2. Over the course of the semester, our team was very successful in working together as a team: (1 = Strongly Disagree; 5 = Strongly Agree)	4.27 (60)	0.92
3. Over the course of the semester, we had little problem with conflict within our team: (1 = Strongly Disagree; 5 = Strongly Agree)	4.17 (60)	0.99
4. As the semester draws to a close, I feel more comfortable having a majority of my points based on my team's performance: (1 = Strongly Disagree; 5 = Strongly Agree)	3.53 (60)	1.08
5. I believe that working on the team has been a valuable learning experience for me: (1 = Strongly Disagree; 5 = Strongly Agree)	3.80 (60)	1.13
6. I would like to participate as a team member in future classes in the MBA program: (1 = Strongly Disagree; 5 = Strongly Agree)	3.47 (59)	1.00
7. Cooperative teams should continue to be a required element of this class: (1 = Strongly Disagree; 5 = Strongly Agree)	3.80 (60)	1.23
8. What percentage of the work done by your team was completed:		
Working together as a team:	56.71% (60)	21.48
Working individually:	43.29% (60)	21.48

When asked if they would like to participate in teams again in future MBA classes, the response from students was fairly neutral (question 6). Another matched pairs t-test was conducted using question 6 and question 3 from the initial questionnaire ("Positive experiences in previous groups"). The t-test was not significant ($T=-0.545$, $p=0.5879$). However, students were a little more positive about the continued use of teams in the class they had taken (question 7).

In response to the open-ended questions, students provided suggestions for improving the classes ranging from providing more meeting time during class, to limiting the team work to one or two large projects instead of a number of smaller ones. Finally, several students indicated that they would not change anything about the course.

6. RECOMMENDATIONS FOR PRACTICE

From these two classes, many valuable lessons have been learned. It is important for the faculty member to explain the cooperative learning model to students, but also *why* it is being used and *how* it will be applied. Providing students written information (such as that included in the appendix) will be useful to them as they mull over the model. There will be resistance. While this model is widely used and accepted in many schools and at many levels, there are many people who have not yet experienced it. Resistance to change is strong — from both students and other faculty members. Recognizing and dealing with this resistance will help to make the process successful.

Table 4. Student Responses to Open-Ended Questions

Positive Responses	Number	Percentage
Sharing ideas/opinions/knowledge:	40	71.4
Social interaction:	37	66.0
Learned communication skills/cooperation:	20	35.7
Learned team concept/skills:	13	23.2
Negative Responses	Number	Percentage
Scheduling conflicts/Time:	41	73.2
Unequal participation of members:	16	28.6
Grade dependent on others:	12	21.4
Suggested Changes	Number	Percentage
More meeting time during class:	12	21.4
Limited teamwork to one or two larger projects:	8	14.3
Change nothing:	7	12.5

The creation of heterogeneous teams is essential to the success of collaborative learning. Teams must be heterogeneous to tap into the rich diversity of class members and to provide the types of interaction required for collaborative learning teams to be successful. The careful assessment of the student population and the utilization of multiple criteria are essential to the success of the team assignment process.

In working with part-time students, it would be recommended to keep group size to a minimum. The DSS course used teams of three and the IS course had teams of four. The difficulties in arranging meeting times and coordination were less for the DSS class. They were slightly more satisfied than the IS class when most of the results were evaluated on a per class basis. Three person teams still provide the group interaction necessitated in the cooperative learning model without creating as much of a burden.

Another recommendation would be to provide additional class time for teams to meet. The time at the start and end of a class is the best time to do this. Providing more in-class time was the primary comment from students in terms of recommended changes. Team activities during class also help in the team development process, particularly early in the semester.

Another factor that may have led to the greater degree of satisfaction with the team for the DSS class is based on the fact that that class had a major semester project that required the teams to meet on a somewhat regular basis and work together more consistently. Several of the students

from the IS course, where they had a larger number of smaller projects, indicated a desire to have the team work limited to one or two larger projects. While ongoing team activities are the hallmark of the collaborative learning model, there is some flexibility for the instructor to determine what these activities will be: for example, one or two large, long term projects, or a number of smaller ones.

Teams activities must be processed by the team and the instructor and feedback provided in order for the students to learn and develop group processing skills and social skills. This is an essential element of the collaborative learning model and is often neglected for lack of understanding or insufficient time.

Team exams are another area that provides a number of opportunities. Two different team exam methods were employed in these classes. Both methods have tradeoffs in terms of their application of individual accountability and positive interdependence. After the second exam, students were asked which exam method they preferred: (1) individual exams with a team score or (2) team exam. Seventeen out of 59 indicated a preference for the first method, 36 indicated a preference for the second, five liked both and one did not like either method.

Many of us have incorporated elements of the collaborative learning model in our classes for years. However, without an overall understanding and complete implementation of the collaborative learning model it is hard to reap the benefits this rich pedagogical model provides for students

and faculty alike. In fact, while many instructors may say that they are utilizing "cooperative learning" since they put students in teams, there are potential dangers in incorrectly labeling what is being done as "cooperative learning."

7. LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

As an exploratory study, there are a number of limitations to this research. First, this assessment provides no comparisons to other classes using alternative pedagogical models. Second, results provide only description statistics and cannot be generalized beyond this setting. Results are also impacted based on the instructor's teaching style and experience with the cooperative learning model. Finally, these classes were graduate level courses and taken primarily by part-time students. These limitations make the application of the results of this study quite limited. However, despite these limitations, as an exploratory study in a relatively untouched area in IS, this study does provide for the beginnings of a foundation on which subsequent research can be built.

There are substantial opportunities for future research in this important, but somewhat neglected, area. Comparative studies need to be conducted to assess the effectiveness of the cooperative learning model when compared to other pedagogical models for IS classes. Additional outcomes measures need to be assessed (e.g., performance measures) in addition to student survey feedback. Further refinement and validation of survey instruments would also be beneficial. Another area for research would be the use of such tools as electronic bulletin boards and Group Support Systems to support cooperative learning teams. Finally, the efficacy of this model for use in training in business and industry also presents many interesting opportunities and challenges.

In these efforts, it is important for us to draw upon the wealth of knowledge and experience from our colleagues in Education and other related fields. Collaboration among faculty members from different disciplines is another element of the cooperative learning model that is important in order to be successful in the implementation of the cooperative learning model.

8. CONCLUDING REMARKS

This paper has presented the use of the cooperative learning model to teach two MBA IS classes. The model was first explained and a description of its implementation and feedback from the students was also provided. Johnson, Johnson and Smith (1991b) point out that: "The more one

works in cooperative learning groups, the more that person learns, the better he understands what he is learning, the easier it is to remember what he learns, and the better he feels about himself, the class and his classmates" (p. vi). While the cooperative learning model is not a panacea with all the answers to this country's educational woes, it does provide a means for students to become more active in their learning processes. It puts a greater degree of responsibility on students for their learning processes by having a greater degree of interdependence on others as well as individual accountability to peers, not just to the teacher. It provides for the sharing of knowledge among students and taps into the powerful diversity that exists among students as well. The cooperative learning model is also very powerful in the development and refinement of the types of skills — such as learning to learn, communication, and teamwork — that our students need for today's workplace and that of tomorrow. While it may not be a solution to all of our educational and training problems, the cooperative learning model presents a number of interesting opportunities to faculty who are willing to try it.

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APPENDIX

(From class syllabus)

Cooperative Learning Teams:

[Material in this section is primarily based on: D. W. Johnson, R. T. Johnson, and K. A. Smith, *Active Learning: Cooperation in the College Classroom*]

Throughout the entire semester you will be a part of a team. This team will consist of four members. Team membership will be assigned based a number of individual characteristics. **These teams will function as a support group for members by:**

- 1) Giving assistance, support, and encouragement for mastering the course content and skills and providing feedback on how well the content and skills are being learned.
- 2) Giving assistance, support, and encouragement for thinking critically about the course content, explaining precisely what one learns, engaging in intellectual controversy, getting work done on time, and applying what is learned to one's own life.
- 3) Providing a set of interpersonal relationships to personalize the course and an arena for trying out cooperative learning procedures and skills emphasized within the course.
- 4) Providing a structure for managing course evaluation.

Your three main responsibilities will be to:

- 1) Master and appropriately implement the theories, concepts, and body of knowledge (as well as skills) emphasized in this course.
- 2) Ensure that all members of your team master and appropriately implement the theories, concepts, and body of knowledge (as well as skills) emphasized in this course.
- 3) Ensure that all members of the class master and appropriately implement the theories, concepts, and body of knowledge (as well as skills) emphasized in this course. In other words, if your group is successful, find another group to help until all members of the class are successful.

Teams members are to be there to help each other. If a team member must miss class, then the other team members are to make sure that person receives notes and handouts from that class and is informed of any assignments or activities discussed during the class. A majority of the work to be done in this class, and points received, will be on a team basis. Teams will generate a number of written reports and participate in presentations. All team members must participate in these activities and it is the responsibility of the team to ensure that all team members understand all the concepts related to the completed projects and presentations.

All team members are expected to fully participate in all class activities, participate in class discussions, strive to maintain positive working relationships with their team members, complete all assignments, assist classmates with understanding and completing their assignments, as well as freely expressing their ideas, thoughts, comments, and constructive criticisms to both their team members and the class.