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ABSTRACT

This study was designed to assess the effects of a specific cooperative learning strategy in an introductory college business information systems course. The cooperative approach's impact on student achievement and on a number of personal and social attributes was examined. A total of 117 college sophomores and freshmen enrolled in 3 sections of an introductory business information systems course at a state university comprised the sample of 51 females and 76 males. All of the students completed three course examinations and a battery of eight measures focusing on personal characteristics. The groups differed in when cooperative learning was implemented--week 1, week 5, or week 10. The cooperative learning strategy required students to write a list of the 15 key points for each assigned chapter and consult with 3 other students who comprised their working groups followed by comparison with another group. A multivariate analysis of examination scores revealed that the cooperative learning strategy appeared to facilitate performance on course examinations. However, comparison of time of administering the personal characteristics measures and course section suggested that exposure to cooperative learning worked to discourage rather than encourage students to try to resolve controversies through thorough analysis of the disagreement. (Contains 11 references.) (CK)

Effects of a Cooperative Learning Strategy on Academic Achievement and Personal and Social Attributes in an Introductory College Computer Course

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Objectives

This study was designed to assess the effects of a specific cooperative learning strategy in an introductory college business information systems course. The cooperative approach's impact on student achievement and on a number of personal and social attributes of the students was examined.

Theoretical Framework

This research is based on the work of Slavin (1990), Johnson and Johnson (1986), Kagan (1989), Dansereau (1988), and others who propose that cooperative learning strategies can promote student achievement, positive social interdependence, and positive attitudes regarding the self and academic pursuits. The positive effects of cooperative learning on achievement are hypothesized to be the result of the approach's encouragement of active processing of instructional material and the imitation of effective learning behaviors modeled by some members of the group (Dansereau, 1988). The beneficial effects on students' attitudes and social interdependence are assumed to flow from structured experiences that demonstrate to students

that cooperation on assigned tasks can have a positive impact on group performance and in turn on individual achievement in the class (Kealy & Witmer, 1991).

Although Slavin (1989/1990) has referred to cooperative learning as "one of the most thoroughly researched of all instructional methods" (p. 52), he noted in the same article that very little of the research has been conducted at the college level. In addition, much of the research has focused on the possible influence of cooperative learning on various aspects of academic achievement rather than on social and attitudinal characteristics of student learners. Therefore, the present study was designed to contribute to the literature on cooperative learning effects by investigating at the college level the influence of a specific cooperative learning approach on both academic performance and various social and attitudinal attributes of the students.

Methods and Data Sources

Subjects. A total of 127 students, predominantly sophomores (58%) and freshmen (15%), enrolled in three sections of an introductory business information systems course at a Midwestern state university participated as part of a course requirement. The sample was comprised of 51 females and 76 males.

Materials and Procedure. On the first day of class, students in all three sections of the course completed the following eight measures: 1) the Personal Attribute Inventory (Parish, Bryant, & Shirazi, 1976), which consists of 80 words from which subjects select 20 that describe themselves; 2 & 3) two versions of the Revised Love/Hate Checklist (Parish & Necessary, 1993), each consisting of the same 40 words from which on one version subjects select 10 words that describe how they act toward their peers and from which on the other version they select 10 words that describe how they perceive their peers act toward them; 4) the Social

Interdependence Questionnaire (Johnson & Johnson, 1991), a 12-item questionnaire assessing respondents' orientation toward goal interdependence with others that yields Competitive, Individualistic, and Cooperative subscale scores; 5) the Understanding Your Leadership Actions Questionnaire (Johnson & Johnson, 1991), a 12-item questionnaire assessing respondents' leadership actions in a group context that yields a Task Actions score (reflecting the degree to which one's leadership actions promote accomplishment of the group tasks) and a Maintenance Actions score (reflecting the degree to which one's leadership actions promote positive relationships within the group); 6) the Understanding My Controversy Behavior Questionnaire (Johnson & Johnson, 1991), a 30-item questionnaire assessing respondents' typical actions when they are involved in a controversy that yields scores on the six strategies of Win-Lose, Rejection, Confirmation, Perspective Taking, Avoidance, and Problem Solving; 7) Rotter's (1966) Internal-External Control Scale; and, 8) a sheet of questions regarding demographic characteristics such as gender, age, class in college, GPA, and family status. All of the questionnaires, with the exception of the locus of control scale and the demographic survey, were checked for reliability of the derived subscales or for the survey as a whole by computing for each an alpha coefficient for each administration. Only the Perspective Taking subscale of the Understanding My Controversy Behavior Questionnaire failed to demonstrate a consistent pattern of alpha coefficients above .65. Further analysis revealed that removing one of the original questions from that subscale resulted in alpha coefficients consistently above .70. Therefore, only scores from the revised subscale were used.

All three sections of the course met on a Monday-Wednesday-Friday schedule and were taught by the same instructor. From the beginning of the course, students in the 10 a.m. section of the course experienced the cooperative learning strategy during each class meeting, except for

the three class sessions devoted to testing and an additional eight sessions devoted to computer laboratory exercises involving word processing and database and spreadsheet applications. Students in the 1 p.m. section of the course were introduced to the cooperative learning strategy in week 5 of the semester, following the first test in the course, and students in the 2 p.m. section of the course were introduced to the cooperative learning strategy in week 10 of the semester, following the second test in the course. In week 15, students in all sections took a third and final test in the course. In weeks 5, 10, and 15, prior to receiving their most recent test result, students in all three sections of the course completed again all of the measures, except the demographic survey, that they were asked to complete on the first day of class.

The cooperative learning strategy employed consisted of the following elements. Each student read the assigned textbook chapter(s) prior to class and wrote a list of the 15 key points for each assigned chapter. At the beginning of class, each student met with three other students who comprised his or her permanent cooperative working group for the semester. The members of the group compared their notes, and each student marked with an asterisk points on his or her list that were reported by others in the group. Then, each group met with another group in the class to further compare notes, and each student double marked items on the list that were identified by both groups as important points of each chapter. This exercise took 12 to 15 minutes. A lecture on the assigned reading then followed. Prior to the introduction of the cooperative strategy for the 1 p.m. and 2 p.m. sections of the course, the first 15 minutes of the class were devoted to presentations by students concerning how they or others, based on either personal experience or library research, use personal computers for business applications or for fun. This exercise was included in order to hold lecture time and content constant across the three sections of the course, and the information on computer applications presented by students

was not tested on the course examinations. The exams employed were the same for all sections of the course and consisted of 50 multiple-choice questions.

Results and Conclusions

Examination performance. The examination scores of the three sections of the class were subjected to multivariate analysis of variance (MANOVA) with repeated measures. The between-subjects factor was course section (10 a.m., 1 p.m., and 2 p.m.), and the within-subject factor was examination (first, second, and third, given at week 5, 10, and 15 of the semester, respectively). Of primary interest in this study was the possible interaction of course section and examination, and the MANOVA revealed that this interaction was significant, multivariate F (4, 242) = 9.86, $p < .001$. The means from this interaction are shown in Table 1. Tukey's test of unfounded means revealed that the 10 a.m. class showed significant improvement from the first examination to the second and from the second to the third. The 1 p.m. class showed the same pattern of significant improvement across the three examinations. The 2 p.m. class showed no significant change in performance from the first to second examination, but the performance of this group on the third examination did exceed significantly the group's performance on both the first and second examinations of the semester. Comparing the three groups on each of the three examinations, Tukey's test revealed that the 2 p.m. class significantly outperformed the other two classes on the first examination. However, on the second examination, the 10 a.m. class significantly outperformed the other two classes, which did not differ significantly from each other. On the third examination, the performance of the three classes did not differ significantly.

Thus, these results suggest that the cooperative learning strategy did operate to facilitate performance on course examinations. Both classes that used the cooperative learning strategy

between the first and second examination and between the second and third examination (the 10 a.m. and the 1 p.m. classes) showed significant improvement across the three examinations. On the other hand, the class that did not experience the cooperative learning strategy until after the second examination (the 2 p.m. class) did not show improvement from the first examination to the second but did show significant improvement from the second to the third examination following exposure to the cooperative strategy. This pattern for the 2 p.m. class suggests that the improvement across examinations shown by the other two classes was not simply a function of increased experience with the course content and taking examinations on that content.

The comparisons across groups on each of the examinations is also consistent with the interpretation that the cooperative strategy was benefiting students on their examination performance. The superiority of the 2 p.m. class on the first examination was not in evidence on the second examination. By the second examination, the 10 a.m. class had had 10 weeks of exposure to the cooperative strategy and showed examination performance that exceeded significantly performance of the other two groups. At the time of the second examination, the 1 p.m. class had had five weeks of exposure to the cooperative strategy, and the performance of the class rose relative to its performance on the first examination to a level that was not significantly different from that of the initially superior 2 p.m. class. By the time of the third examination, all classes had had exposure to the cooperative strategy, and performance across the groups did not differ.

Personal characteristics. Fifteen separate MANOVA's were performed on the scores derived from the various personal characteristics questionnaires described above. The between-subjects factor was course section (10 a.m., 1 p.m., and 2 p.m.), and the within-subject factor was time of administration of the questionnaire (week 1, 5, 10, and 15 of the semester). As in the

case of examination performance, of primary interest was the interaction of course section and time of administration of the questionnaire. This interaction was significant only in the analysis of scores on the Problem-Solving subscale of the Understanding My Controversy Behavior Questionnaire, using the averaged univariate results, $F(6, 336) = 2.19$, $p < .05$. The multivariate results were just short of significant, $F(6, 220) = 1.97$, $p < .072$. The means from this interaction are shown in Table 2. Tukey's test for unconfounded means showed that the scores of both the 10 a.m. class and the 1 p.m. class on this measure declined significantly from the first to the fourth administration of the questionnaire, whereas the scores of the 2 p.m. class did not change significantly from the first to the fourth administration of the questionnaire. Thus, these results suggest that exposure to the cooperative learning strategy worked to discourage rather than encourage students to engage in the constructive strategy of trying to resolve controversies through a thorough analysis of the disagreement. Collectively, the results from the MANOVA's suggest that use of the cooperative learning strategy employed in this study was not effective in promoting change in personal characteristics that could influence students' behavior in a learning environment.

Educational Importance of the Findings

These results provide additional evidence of the possible benefits of cooperative learning strategies on student achievement at the college level. These findings are especially interesting in that the cooperative strategy used did not employ group contingencies of the type that Slavin (1991) has identified as being conducive to the effectiveness of cooperative learning. In future research, it would be useful to examine at the college level variations of the cooperative approach used in this study, especially variations that incorporate group contingencies whereby individuals

are rewarded for the performance of the group as a whole. The results of the present study also suggest that it would be useful in future studies to examine the effects on academic achievement of discontinuing a cooperative learning strategy that has been in effect for some time. Such a methodological variation could help establish that the apparent effects of the cooperative approach in this study are in fact attributable to use of the strategy rather than to increased familiarity with the course material and the professor's approach to testing.

The results of this study also suggest that caution is in order in suggesting that cooperative learning can exert a positive influence on personal and social attributes that may in turn benefit the student. No such positive influences were detected in the present study. However, the absence of a positive effect of cooperative learning on student characteristics in this study has to be viewed in the context of the particular strategy employed and the length of time students were exposed to the strategy. A cooperative approach providing more opportunity for complex interpersonal interactions in the process of arriving at a group product that can clearly benefits the individual members of the group might be more likely to affect significantly the personal and social attributes of the participants. In addition, it is possible that longer exposures to cooperative approaches are required to produce effects on personal characteristics of the type assessed in this study, particularly when studying adolescents and adults whose personal characteristics may be less susceptible to influence than are those of children.

References

Dansereau, D. F. (1988). Cooperative learning strategies. In C. E. Weinstein, E. T. Goetz, & P. A. Alexander (Eds.), Learning and study strategies: Issues in assessment, instruction, and evaluation (pp. 103-120). San Diego: Academic Press.

Johnson, D. W., & Johnson, F. P. (1991). Joining together: Group theory and group skills (4th ed.). Englewood Cliffs, NJ: Prentice-Hall.

Johnson, D. W., & Johnson, R. T. (1986). Learning together and alone (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Kagan, S. (1989). Cooperative learning: Resources for teachers. San Juan Capistrano, CA: Resources for Teachers.

Kealy, R. P., & Witmer, K. D., Jr. (1991). Cooperative learning in higher education: Alternative approach to collegiate instruction. Frostburg, MD: Frostburg State University, Department of Educational Professions. (ERIC Document Reproduction Service No. ED 345 672, HE 025 584)

Parish, T. S., Bryant, W., & Shirazi, A. M. (1976). The Personal Attribute Inventory. Perceptual and Motor Skills, 42, 715-720.

Parish, T. S., & Necessary, J. R. (1993). Perceived actions of parents and attitudes of youth. Adolescence, 28, 185-188.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 80(1, Whole No. 609).

Slavin, R. E. (1989/1990). Research on cooperative learning: Consensus and controversy. Educational Leadership, 47(4), 52-54.

Slavin, R. E. (1990). Cooperative learning: Theory, research, and practice. Englewood Cliffs, NJ: Prentice-Hall.

Slavin, R. E. (1991). Cooperative learning and group contingencies. Journal of Behavioral Education, 1, 105-115.

Table 1

Mean Examination Scores as a Function of Class Section and Examination Sequence

Class section	Examination sequence		
	First	Second	Third
10 a.m.[a]			
M	76.18	84.07	88.36
SD	9.68	7.30	7.84
1 p.m.[b]			
M	70.10	77.90	86.00
SD	11.50	7.91	9.33
2 p.m.[c]			
M	81.00	79.81	87.42
SD	9.09	9.97	7.80

Note. The 10 a.m. section began to use the cooperative learning strategy at the beginning of the semester. The 1 p.m. section began to use the strategy following the first examination. The 2 p.m. section began to use the strategy following the second examination.

[a]$n = 45$. [b]$n = 39$. [c]$n = 41$.

Table 2

Mean Scores on the Problem Solving Subscale of the Understanding My Controversy Behavior Questionnaire as a Function of Class Section and Time of Administration

Class section	Time of administration			
	Week 1	Week 5	Week 10	Week 15
10 a.m.[a]				
M	17.00	15.76	16.14	15.24
SD	2.40	2.65	2.62	2.95
1 p.m.[b]				
M	17.49	16.03	16.03	15.67
SD	3.35	3.75	3.46	3.88
2 p.m.[c]				
M	16.36	15.67	16.13	16.62
SD	2.53	3.26	3.69	3.27

Note. The 10 a.m. section began to use the cooperative lerning strategy at the beginning of the semester. The 1 p.m. section began to use the strategy following Week 5. The 2 p.m. section began to use the strategy following Week 10.

[a]$n = 37$. [b]$n = 39$. [c]$n = 39$.

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