

ABSTRACT

GILLIAM, JANICE HOOTS. The Impact of Cooperative Learning and Course Learning Environment Factors on Learning Outcomes and Overall Excellence in the Community College Classroom. (Under the direction of Carol E. Kasworm.)

This study tested the theory of social interdependence by examining the impact of cooperative learning (CL) in comparison to traditional instructional methods (identified in this study as non-cooperative learning, NCL) on 12 course learning environment factors, learning outcomes, and overall excellence of instruction and courses. It also investigated the relationship of 12 course learning environment factors on learning outcomes and overall excellence of instruction and courses. This study was conducted at a small rural comprehensive community college and utilized over 3000 student ratings of instruction as the primary data. The IDEA Center student rating form (IDEA Center, 1998b) was used to measure these variables. The Questionnaire on the Use of Cooperative Learning (Cooperative Learning Center, 1991) was used to identify faculty who taught courses integrating cooperative learning (CL) and those not integrating cooperative learning (NCL).

Quasi-experimental representative design guided the investigation of an experimental group (students in CL courses) and a comparison group (students in NCL courses) comparing course learning environment factors, learning outcomes, and overall excellence of instruction and courses. Student ratings of CL courses were significantly higher than NCL courses on learning outcomes (*p-value* of .007). Additionally, CL courses were significantly higher than NCL courses on 10 of 12 course learning environment factors and learning outcomes. Six of these ten variables were significant at the .01 level. The difference between student ratings of CL and NCL courses on overall excellence was marginal (*p-value* of .042). The most significant finding was the impact of course learning environment factors on learning outcomes and overall excellence of instruction and courses, each with *p-values* of .000. A large portion of the variance in student ratings of learning outcomes (82%) and overall excellence of instruction and courses (88%) could be attributed to the course learning environment factors. This study was one of the first to extensively examine the theory of social interdependence through the impact of cooperative learning on student ratings in a community college. It also investigated how course learning environment factors impacted student ratings of learning outcomes and the overall excellence of instruction and courses.

**THE IMPACT OF COOPERATIVE LEARNING
AND COURSE LEARNING ENVIRONMENT FACTORS ON LEARNING
OUTCOMES AND OVERALL EXCELLENCE IN THE
COMMUNITY COLLEGE CLASSROOM**

by
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A dissertation submitted to the Graduate Faculty of
North Carolina State University
in partial fulfillment of the
requirements for the Degree of
Doctor of Education

ADULT AND COMMUNITY COLLEGE EDUCATION

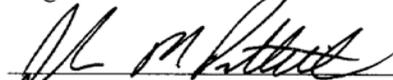
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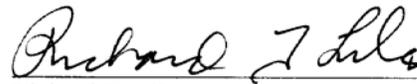
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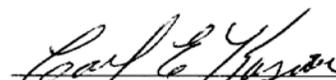
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Biography

Janice Hoots Gilliam was born in Tryon, North Carolina, the second of two daughters born to Martha Sarah Thompson and Edwin Larence Hoots. She graduated 6th in the 1973 high school graduating class of 180 students at East Henderson High School in Flat Rock, North Carolina, where she continues to reside. Gilliam completed cosmetology vocational training after high school and began working in the industry. She married Austin Mack Gilliam in 1973. They have three sons, Chad Austin (1975), Brad Eric (1976), and Jerry Dean (1979). Their fourth son, Jon David (1980), died six months after birth due to complications from a pre-mature birth.

After completing certification requirements for teaching cosmetology, Gilliam began a teaching career in cosmetology at Isothermal Community College in 1981. She started work on a bachelor's degree in 1981 upon the encouragement of, Dr. James Turner, Vocational Technical Division Chair of ICC (currently a professor at Western Carolina University), and Dr. Benjamin E. Fountain, President of ICC, and former President of the North Carolina Community College System (now retired). A bachelor's degree program for vocational instructors sponsored by the North Carolina Community College System provided Gilliam an opportunity to complete major courses for the Bachelor of Science Degree in Occupational Education through Western Carolina University and academic courses through Isothermal Community College. Gilliam was appointed department chair in 1985 by the Dean of Vocational-Technical Education, Dr. Walter Timm. Gilliam graduated from Isothermal Community College in 1988 with a 4.0 GPA and earned an Associate of Science Degree in Vocational Education. She completed the Bachelor of Science Degree in 1989 at Western Carolina University with a 3.8 GPA.

In 1987, Gilliam was hired by Haywood Community College to open a new cosmetology program as program coordinator, under the direction of Dr. Walter Plexico (Dean of Instruction) and Mr. Joseph H. Nanney, President (now retired). Over a period of 14 years, she worked to make the program one of the best in the state by establishing high standards through competency-

based education. Her students have placed in numerous state and national competitions and have had a high rate of success on licensing exams and placement in the industry. She served as President of the North Carolina Community College Cosmetology Instructors Association for two years (1995-1997) during the North Carolina Community College curriculum reengineering process and guided the development and implementation of the first associate degree for cosmetology in the state and one of the few in the nation. In 1990 Gilliam received the Excellence in Education Award at HCC. She also served on the Faculty Senate at HCC and was elected President of the Faculty Senate in 1992.

Gilliam continued her education and earned a masters degree from Western Carolina University in Industrial Education, Two-Year College, in 1992 with a 3.9 GPA. After earning a masters degree, she taught several undergraduate courses for vocational instructors' bachelor's degree program as an adjunct instructor for Western Carolina University while continuing as a program coordinator at HCC.

In 1997, Gilliam applied for and was accepted in the doctoral program in Adult and Community College Education at North Carolina State University, encouraged by two of her mentors, Dr. Walter Plexico, Dean of Academic Services (now at Wilkes Community College), and Dr. Nathan Hodges, President of HCC. Dr. Hodges appointed Gilliam as Interim Dean of Student Services in September of 2000, which has provided her a great opportunity for professional development in a senior administrative position. Gilliam completed the course work and finals for the educational doctorate in spring of 2001 with a 3.97 GPA.

Gilliam is currently an active member of Maranatha Baptist Church, East Flat Rock, North Carolina, where she is a member of the choir and the Missions Committee. Reverend Lewis Staton has served as her spiritual mentor and leader for many years, first as a Sunday School Teacher in another church and the past 20 years as pastor.

Acknowledgments

I would like to express my appreciation to the members my Advisory Committee, Dr. Carol E. Kasworm (Chair), Dr. Virginia S. Lee, Dr. Richard T. Liles, and Dr. John M. Pettitt. While setting high standards of excellence, Dr. Kasworm has provided an especially high level of support and encouragement in the completion of this project. In addition, I am grateful for the guidance and support of Dr. Don Locke, Director of the NCSU Doctoral Program in Asheville, through the entire program of study. I would like to thank Dr. Robbie Pittman, faculty member of Western Carolina University, for assistance with the statistics of this study and for his excellent instruction in the statistics application course.

I would like to recognize Dr. Roger Johnson, Co-Director of the Cooperative Learning Center at the University of Minnesota, and Dr. Edythe Johnson Holubec, sister of Roger and David Johnson and Associate of the Cooperative Learning Center, who inspired me to learn and use cooperative learning through their workshops, and the support they provided during this endeavor. Their research, publications, and training in cooperative learning are extraordinary.

Special acknowledgment must also be given to Dr. Nathan Hodges, President of Haywood Community College and mentor, who allowed me the opportunity and provided encouragement to pursue this degree and to use Haywood Community College as the research site for this study. All of the HCC faculty, staff, and students, especially Dr. Michael Germano (Dean of Academic Services), Lucille Hicks (HCC Planning and Research Office), HCC Student Services staff, HCC faculty who implemented cooperative learning, and students in Spring Semester 2001, were very helpful and supportive in administering and completing over 3000 surveys.

The staff at the IDEA Center, Kansas State University, provided much assistance in this project. Dr. Donald Hoyt and Dr. William Pallett were very gracious in granting access to information and resources related to their student evaluation form and assessment. Their work on

this state-of-the-art assessment instrument for the last 20 years added another dimension to my study and increased the significance of the findings.

I will always be grateful for the friendship of each member of the NCSU Asheville Cohort II, who supported and encouraged me the last four years. Without the advantage of the cohort members through all the courses, my success would not have been possible, especially our study group in the statistics course in the summer of 1999. One very special member of our cohort, Ms. Jeanette Staley, who died November 18, 2001, was an inspiration to us all. Her life was a shining example as a math instructor, student, mother, wife and friend.

Lastly, and most importantly, the unwavering support and patience of my family, particularly my husband of 28 years, Austin, assisted me in the completion of this goal and many other educational goals since we have been married. My three sons, Chad, Brad, and Jerry, continue to be my pride and joy as fine young men and have always been supportive in my many endeavors. My mother, Martha Thompson Hoots Justice, continues to be a source of strength and unconditional love, and I appreciate her encouragement in my completion of this degree, as I know it will make her very proud. My stepfather (Lester Justice), sister and brother-in-law (Judy and Anthony Palazzo), nieces (Michelle Simpson and Erica Dalton), and mother-in-law (Ivory Gilliam) have all supported me in reaching my educational goals. In all the courses that I have taken, the values that my mother and father, Edwin Larence Hoots, taught me over the years have been the greatest lessons ever learned. My father died in 1986 but will always be my greatest mentor. He left a volume of love, knowledge, and wisdom that will always be treasured.

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Chapter I: The Problem and its Setting

Introduction

Cooperative learning is a group-based instructional strategy designed to supplement the lecture-based classroom. Used extensively in the elementary and secondary levels since the 1960's and in higher education since the 1990's, cooperative learning has a rich history of theory, research, and practice related to adult education.

An increasingly popular and effective instructional strategy with some professors in higher education, cooperative learning did not originate as an adult education model. Its theoretical roots, however, bear some important commonalities with adult education. The philosophical teachings of the early 1900's, particularly the Progressive Education Movement and the Gestalt School of Psychology, helped to establish the framework for group-based instruction in promoting socially interactive learning and democracy in the classroom (Johnson & Johnson, 1992). Based on this foundation, the goal of cooperative learning is to transform the adult learner from a passive observer to an active participant, building higher-level thinking skills, increasing achievement, enhancing appreciation for diversity, increasing team skills and self-esteem, and promoting self-direction and student responsibility for learning. "In contrast to competitive and individualistic learning environments, students work together cooperatively to accomplish shared learning goals" (Johnson & Johnson, 1998). Students achieve learning goals if and only if the other group members achieve theirs. Working in small groups, students work together to ensure that all group members achieve a pre-established criterion. While not easy to implement, cooperative learning is a powerful learning strategy when all the critical elements are in place.

Background

Theoretically different than other adult education instructional strategies, cooperative learning focuses on how students learn in small groups through social interdependence. Cooperative learning is designed to maximize learning for all students in each group, which differs from the traditional use of learning groups. Defining what cooperative learning is not, is as important as defining what it is. Cooperative learning is not simply telling students to work together on a project. Traditional learning groups have low interdependence; students take responsibility only for themselves (Smith & Waller, 1997). In contrast, cooperative learning groups revolve around the premise of high, positive interdependence—members are responsible for their own and each other’s learning. In traditional groups, there is little attention to group formation. Students are randomly assigned to groups in cooperative learning to increase diversity and to maximize student potential. Team skills are ignored in traditional group environments, but are intentionally and purposefully taught in cooperative learning while teaching content. Group processing generally does not take place in traditional group learning, but is a priority in cooperative learning to continuously improve the quality of work produced by the group and the ability of the students to work together.

Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other’s learning (Johnson, Johnson, & Smith, 1998a). Students are assigned to groups of two to five members by the instructor for the purpose of achieving academic or social tasks. Five elements are required for effective cooperative learning: (a) positive interdependence, (b) individual

accountability, (c) promotive interaction, (d) group processing, and (e) interpersonal/social and team skills.

In cooperative learning, the role of the student is to complete the assigned group role and to work collaboratively with other students to accomplish a shared goal through interaction and problem solving (Johnson, Johnson, & Smith, 1998a). Students focus their attention on the assigned task to increase his/her own learning and the learning of group members. Interaction and effective communication between students is critical during cooperative work assignments. Group members equally share the assigned task and tutor and work with other students in the group to learn and complete the assigned task. Each student is responsible and accountable for learning the assigned task while helping others learn the task. Learning course content and team skills while working on assigned tasks is an expected outcome of cooperative learning.

The function of the learning group is to share information and perspectives on the assigned task and produce completed assignments through member's joint efforts and contributions (Johnson, Johnson, & Smith, 1998a). Group members learn interpersonal skills (emphasizing both task and teamwork), communicate effectively, and establish positive relationships to increase group productivity. During learning activities, group members collectively assess the group's effectiveness to continuously improve performance. The team develops a jointly derived answer within the assigned time frame.

The instructor's role in cooperative learning is to make preinstructional decisions: formulate learning goals, decide on the size of groups, choose a method for assigning students to groups, decide on which roles to assign group members, arrange

the room, and prepare the materials students need to complete the assigned task (Johnson, Johnson, & Smith, 1998a). In planning cooperative learning, instructors purposely design strategies to integrate and assess the implementation of the five elements of cooperative learning. Before the task begins, the instructor explains the assignment and cooperative structure. During the assignment, the instructor monitors each of the learning groups, intervenes when needed to improve task work and teamwork, and brings closure to the lesson. The instructor evaluates and processes the quality and quantity of students' achievements individually and as a group.

From a meta-analysis of the research in cooperative learning, outcomes of cooperative learning include the increased effort of students to achieve and produce high quality work (Johnson, Johnson, & Stanne, 2000). When working cooperatively, students also increase their psychological adjustment to the environment and competence in team skills while building positive relationships and establishing trust between group members. Students learn to set and meet goals individually and as a team. The potential learning power of each student is expanded through the synergy of the learning community and the experience, strengths, and skills that each individual team member brings to the group (Vygotsky, 1962). In cooperative learning environments, students develop higher-order thinking and reasoning skills and understand course content at a higher level through peer tutoring and teamwork (Johnson & Johnson, 1998). The discovery that information can be found from sources other than the teacher—the experience, knowledge, and perceptions of team members (the learning community)—expands the resources of the learner. Students feel part of the group in a team-centered environment—increasing their potential to learn. The

interaction between students and between students and the instructor is increased exponentially through cooperative learning. Appreciation of diversity in working with other students of all ages, backgrounds, and academic levels adds value to learning in a cooperative environment.

This study investigated course learning environment factors (CLEF), the overall excellence of instruction and courses, and the achievement of learning outcomes of adult learners in cooperative classrooms in comparison to classrooms in which cooperative learning was not used. These variables were measured using a student-rating instrument. Student-rating instruments have been effectively used as a tool to measure the relationship of instructional methods and learning. In the literature on student ratings of courses and instruction, a positive correlation was shown between student ratings of instruction and learning. Cohen (1981) and Feldman (1989) reviewed several studies comparing student grades on an external exam, as the measure of student learning, and the correlations between the exam grade and various student ratings of instruction and learning. The results supported a positive relationship between the student ratings and exam grades. Classes in which the students gave the instructor higher ratings tended to be the classes where the students learned more. While cooperative learning has not been broadly implemented in higher education, multiple studies from the review of literature indicated that cooperative learning provided a more effective learning method than the traditional, individualistic, lecture-based classroom in producing a variety learning outcomes. In a cooperative learning environment, students learn interactively in a social environment that promotes a wide

range of learning outcomes, including communicative learning, team skills, and problem-solving skills.

Conceptual Framework

The literature suggested that cooperative learning enhanced student ratings of instruction and learning outcomes, particularly with adult learners. Astin (1993) found that research has consistently shown that cooperative learning approaches produce outcomes that are superior to those obtained through traditional competitive approaches. There is limited research, however, to support the effectiveness of the theory of social interdependence, through the application of cooperative learning, in the community college setting.

Cooperative learning is different than other adult education models in that it is framed in the theory of social interdependence, from which the concept of group dynamics evolved (Johnson & Johnson, 1998). Dewey, the architect of the Progressive Education Movement, believed that learning is a social process that begins at birth (Dewey, 1916). This philosophy provided the foundation for cooperative learning with the student at the center of the classroom. The democratic principle promoted by Dewey (1916), Vygotsky (1962), and Lindeman (1926), that we are dependent on others for survival and also for learning established the conceptual framework for cooperative learning—the theory of social interdependence (Johnson, Johnson, & Smith, 1998a). Koffka (1935), Lewin (1936, 1951), and Deutsch (1949, 1995, 2000) created and refined theories related to group dynamics. Koffka (1935) stated that the essence of a group lies in the interdependence of its members created by common goals; groups are dynamic wholes in which a change in the state of any member

changes the state of the other members. Deutsch (1949) noted that interdependence could be positive (cooperation), negative (competition), or nonexistent (individualistic efforts). Through promotive interaction between students and the establishment of interdependence through a common goal, individual learning and productivity are enhanced. Additional theoretical support for cooperative learning is found in the cognitive learning theory, developed by Piaget (1954), which stated that learning is based on intrinsic motivation, constructed by the student, and rooted in personal experience and prior knowledge. Through the joint construction of knowledge by the group, students are resource and role interdependent, increasing individual learning and productivity. The behavioral perspective provides the structure for group work, in that it must be reward and task oriented, providing extrinsic motivation for learning from the environment (Johnson, Johnson, & Smith, 1998a).

The theoretical foundation for cooperative learning is comprehensive. It encompasses the theory of social interdependence based on group dynamics, with supporting theories of the cognitive learning theory that establishes how students learn and behaviorist theory that provides the structure for the learning environment. Each theory contributes to the overall effectiveness of cooperative learning.

Definitions

Cooperative Learning

Cooperative learning (CL) is the instructional use of small groups so that students work together to maximize their own and each other's learning (Johnson, Johnson, & Smith, 1998a). Five elements are required in cooperative learning (a) positive interdependence, (b) individual accountability, (c) promotive interaction, (d)

group processing, and (e) interpersonal/social and small group skills. The ICSF—SRIC (IDEA Center, 1998b) (Appendix A) was used to measure student ratings of learning outcomes and overall excellence of instruction and courses in CL and NCL classrooms. A complete operational definition of cooperative learning is given in Appendix B.

Course Learning Environment Factors

Course learning environment factors (CLEF) reflect key elements of those factors that influence student ratings of instruction. These factors were found to be statistically meaningful by the IDEA Center through empirical research and factor analyses of the previous data collected from the IDEA Center Survey Form (IDEA Center, 1998b; Pallett, 2000). These factors included items typically found on a student-rating instrument, such as items related to instructional methods, the instructor, the student-faculty relationship, the course, and the student's assessment of their contribution to learning. The following factors were labeled as CLEF (course learning environment factors) for the purpose of this study.

1. Implementation of techniques for learning engagement (INSTMETH).
2. Degree of course difficulty (DIFF).
3. Self-assessment of the level of student participation and motivation (SELFASMT).
4. Degree of student-faculty contact (STUFAC).
5. Level of interactive student involvement (INVOLVE).
6. Faculty emphasis on high expectations (HIGHEXP).
7. Clarity of instructor's perspective on content (COMM).
8. Emphasis on assessment and feedback (ASSESS).

9. Faculty emphasis on key elements of the course (STFOCUS).
10. Promoting student interest in the course (INTRST).
11. Faculty emphasis on group learning/team skills (GRPSKLS).
12. The use of multiple instructional approaches (MULTIPLE).

The individual labels of these scales or factors were renamed for this study. Appendix C lists the label used by IDEA Center and the labels used in this study. The CLEF (course learning environment factors) are listed with the items from the student survey used to measure them in Appendix D.

Elements of Cooperative Learning

1. Positive interdependence. Team members perceive that they are dependent on other members of the group to complete the group's goal, task, or assignment. (Johnson, Johnson, & Smith, 1998a).
2. Individual accountability. The quality and quantity of each member's contribution to learning is assessed and provided to the group and the individual. Each student, as well as the group, is responsible for learning the assigned task. (Johnson, Johnson, & Smith, 1998a).
3. Face-to-face promotive interaction. Team members promote each other's productivity by helping, sharing, and encouraging efforts to produce and learn. Group members explain, discuss, and teach what they know to teammates. (Johnson, Johnson, & Smith, 1998a).
4. Interpersonal/social and small group skills. Team members purposefully learn social skills necessary to function effectively as a learning community. These team skills relate directly to job-performance skills, such as

instructorship, decision-making, trust building, communication, and conflict-management. (Johnson, Johnson, & Smith, 1998a).

5. Group processing. Group members reflect on their progress as a learning team and define strategies for improvement. Instructors also monitor the performance of the group and provide feedback to the group. (Johnson, Johnson, & Smith, 1998a).

Non-cooperative Learning

Non-cooperative learning (NCL) environments did not implement the five elements of cooperative learning, as previously defined. NCL classrooms were measured by the ICSF—SRIC (IDEA Center, 1998b) on overall excellence of instruction and courses and learning outcomes.

Purpose of the Study

The purpose of this study was to test the theory of social interdependence through the examination of student ratings of the impact of cooperative learning on course learning environment factors, learning outcomes, and overall excellence of instruction and courses when compared to classes not taught cooperatively. The operationalization of theory of social interdependence through the application of cooperative learning in the classroom guided the study by providing the focus of how students learn—interactively and socially. The theory of social interdependence expands the learning circle from individuals competing alone to groups learning together (Lewin, 1935 & Deutsch, 1949). Goal interdependence, resource and role interdependence, and reward and task interdependence guide the success of the group members. Through promotive interaction individual learning and productivity are

enhanced. In practice, the operationalized function of the study was to determine the relationships among the following variables: cooperative learning, course learning environment factors, learning outcomes, and the overall excellence of instruction and courses at one institution, Haywood Community College.

Statement of the Problem

Although many research studies have validated the benefits of cooperative learning, there was a lack of research found on the impact of cooperative learning environments on student ratings of learning outcomes and course learning environment factors. Instructional methods and the learning environment influence student learning and student perceptions of learning. The social interaction and interdependence of students in the classroom learning environment (such as in cooperative learning environments) also impact student perceptions of learning and instruction. There was a lack of understanding of how the learning environment and instructional methods, such as cooperative learning, impact student ratings of instruction, courses, and learning outcomes in the community college classroom. This study examined how the course learning environment and instructional method, CL or NCL, impacted student perceptions of what they learned (learning outcomes) and the quality of the instruction and the course (overall excellence of instruction and courses).

Research Questions

Research Question One. What is the impact of the instructional method (CL and NCL courses) on student ratings of CLEF (course learning environment factors) in the community college classroom?

Research Question Two. What is the impact of the instructional method (CL and NCL) on student ratings of LRNOUT (learning outcomes) and OVRALL (overall excellence of courses and instruction) in the community college classroom?

Research Question Three. What is the impact of CLEF (course learning environment factors) on student ratings of LRNOUT (learning outcomes) and OVRALL (overall excellence of courses and instruction) in the community college classroom?

Research Question Four. What is the impact of the instructional method (CL and NCL) and CLEF (course learning environment factors) on student ratings of LRNOUT (learning outcomes) and OVRALL (overall excellence of courses and instruction) in the community college classroom?

The dependent variables, LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) were presented in Appendix E with the items from the student rating survey used to measure them. Each of the research questions were listed in Appendix F with a listing of independent and dependent variables for each question.

Limitations of the Study

1. An assessment of the level and quality of implementation of cooperative learning or specific cooperative learning strategies was not a part of this study. The QUCL (Cooperative Learning Center, 1991) was used to determine the courses in which cooperative learning was implemented. The results of this questionnaire was used only to identify courses in which

cooperative learning had been implemented, establishing the basis for comparing CL classrooms and NCL classrooms.

2. The interpretation of learning outcomes and overall excellence of instruction and courses was limited to that which is measured by the ICSF—SRIC (IDEA Center, 1998b). Only only 2 items on the ICSF—SRIC measured the variable overall excellence of instruction and courses while 12 items were used to measure learning outcomes.
3. While the entire student population in regular-schedule academic courses of a community college was used in the study, generalizability will be limited to other community colleges in which students are demographically and academically similar and in which similar programs are offered.
4. Independent variables or factors that influence student ratings were limited to those measured by the ICSF—SRIC (IDEA Center, 1998b).
5. Student ratings of instruction provided only one component of many in assessing instructional methods, such as cooperative learning.
6. This study was limited to student perceptions of learning, instruction, and courses as measured by student ratings on the ICSF—SRIC (IDEA Center, 1998b).
7. Students and faculty were not randomly assigned to the CL and NCL groups. Using the entire population of students in regular academic courses and regression analysis, however, helped to diminish the impact of extraneous variables not measured in this study.

8. Variation in training and implementation of CL was not controlled. Limited training and implementation could have negatively impacted the results. Group learning, if not appropriately implemented, can be less effective than competitive or individualistic learning environments. (Johnson, Johnson, & Smith, 1998a). Implementation of CL was self-reported and not observed by the investigator.
9. Instructional methods other than CL used by the faculty in the CL or NCL courses may have impacted learning either positively or negatively.

Significance of the Study

This study offered an increased understanding of both instructional practice and research of cooperative learning and the factors that impact the learning environment. The findings may provide guidance to faculty and curriculum leaders regarding the influence of cooperative learning and course learning environment factors on student ratings. The outcomes of this study could also influence future faculty development through the promotion of training that encourages the use of multiple instructional strategies. The findings may also serve as a catalyst for future research on the influence of cooperative learning instructional methods on student ratings of learning outcomes and overall excellence of courses and instruction using the community college level population.

There have been few research studies that have focused on student ratings of learning outcomes in the community college. In previous effectiveness studies of cooperative learning, actual grades or GPA's or student satisfaction of instruction and courses have been used to determine the impact of cooperative learning. This study

looked at the student ratings of not only instruction and the course, but the achievement of learning outcomes. Few student-rating systems of instruction included this component (see Appendix E). The study will contribute to the existing body of research regarding the theory of social interdependence as an influence on cooperative instructional strategies, student ratings of learning outcomes and overall excellence of courses and instruction using community college level populations.

Chapter II: Literature Review

Introduction

The purpose of the literature review is to provide clarification and further exploration of cooperative learning for this study through an overview of the key understandings of this concept as an instructional strategy. In addition, this review presents the connection of cooperative learning and adult education, the conceptual framework for cooperative learning, and a comparative analysis of cooperative and collaborative learning. As part of this review, an historical and philosophical perspective provides insights to the development of cooperative learning and social interdependence theory. A summary of the past research on cooperative learning is presented to provide an understanding of the studies conducted on this group-based instructional method. Lastly, a review of the literature on using student ratings to measure instructional effectiveness provides an overview of this evaluation tool used in education.

Cooperative Learning

Introduction to Cooperative Learning

Cooperative learning is an instructional strategy in which small groups of students work together to accomplish shared goals (Johnson, Johnson, & Smith, 1998a). Students perceive they can reach their learning goals if and only if the other group members also reach their goals. Students are assigned to groups of two to five members by the instructor for the purpose of achieving academic and social tasks. Cooperative learning is distinguished from other small group learning strategies by five elements

required for effectiveness: positive interdependence, individual accountability, promotive interaction, group processing, and team or social skills.

In cooperative learning, the role of the student is to complete the assigned group role and to work collaboratively with other students to accomplish a shared goal through interaction and problem solving (Johnson, Johnson, & Smith, 1998a). Students focus their attention on the assigned task to increase his/her own learning and the learning of group members. Interaction and effective communication between students is critical during cooperative work assignments. Group members equally share the assigned task, tutor other students in the group to learn and complete the assigned task, and work as group members to learn and complete the assigned task. Each student is responsible and accountable for learning the assigned task while helping others learn the task. Learning course content and team skills while working on assigned tasks is an expected outcome of cooperative learning.

Johnson, Johnson, and Smith (2000) stated that in cooperative learning classrooms,

The instructor assigns students to small groups, gives them a question to discuss, and facilitates (and moderates) as student exchange ideas, explain and elaborate their views, question and respond to each other, and jointly derive an answer. The questions tend to be open-ended and require higher-level cognitive reasoning to answer; the answers are open to interpretation. Knowledge is assumed to be dynamic and socially constructed. The instructor monitors the groups to facilitate discussion and obtain a “window” into students’ minds by listening to their explanations (p. 13).

Types of Cooperative Learning

Johnson, Johnson, and Smith (1998b) developed three ways to integrate cooperative learning in the classroom: formal cooperative learning, informal cooperative learning, and cooperative base groups. Formal cooperative learning is students working together, for one period to several weeks, to achieve shared learning goals aimed at joint completion of specific tasks and assignments. Any subject or course assignment may be structured for formal cooperative learning. Groups formed on this basis provide the foundation for all other cooperative-learning procedures. In formal cooperative-learning groups, instructors guide learning in a number of ways:

1. Instructors make a number of preinstructional decisions. An instructor has to decide on the academic and social-skill objectives, the size of groups, the method of assigning student to groups, the roles students will be assigned, the materials needed to conduct the lesson, and the way the room will be arranged.
2. The instructor explains to students the task and the concept of positive interdependence. An instructor defines the assignment, teaches the required concepts and strategies, explains positive interdependence and individual accountability, gives the criteria for success, and specifies the expected social skills.
3. Instructors monitor students' learning and intervene to assist students with tasks or with interpersonal and group skills. An instructor systematically observes and collects data on each group as it works. When needed, the

instructor intervenes to assist students in completing the task accurately and in working together effectively.

4. Instructors assess and evaluate students' learning and help students process how well their group functioned. Students' learning is carefully assessed and the performance of each is evaluated. Members of the learning groups then process how effectively they worked together.

Informal cooperative learning groups are used primarily to enhance direct instruction (presentation, demonstrations, films, videos) (Johnson, Johnson, & Smith, 1998b). They are typically temporary and ad-hoc, formed for a brief period of time (such as intermittent two-to four-minute discussions during a class session). Instructors may use informal cooperative-learning groups during a class by having students turn to a classmate near them to discuss briefly a question posed by the instructor or to summarize what their instructor has just presented. Doing so focuses student attention on the material and ensures that students process it cognitively.

Cooperative base groups are longer-term groups (lasting for at least a semester) with stable membership whose primary responsibility is to provide each student the support and encouragement he or she needs to make academic progress and to complete the course(s) successfully (Johnson, Johnson, and Smith, 1998b).

The three types of cooperative learning complement and support each other. They might all be used in a single class session (Johnson, Johnson, & Smith, 1998b). Instructors may vary the type and frequency of the use of the three types of cooperative learning. A variety of specific strategies have been developed to apply the three types of cooperative groups (Johnson, Johnson, & Smith, 1998a). For example, when using

informal cooperative learning the instructor may use any of the following strategies to supplement lectures at 10 to 15 minute intervals to increase learning: (a) focused discussion pairs, (b) question-and-answer pairs, (c) advanced preparation papers, (d) turn-to-your-neighbor summaries, (e) cooperative note-taking pairs, and (f) read-and-explain pairs.

In summary, cooperative learning is successful only when each member of the group and the instructor understand and perform their critical roles. As one of the most well defined group-learning strategies, cooperative learning promotes five elements that differentiate it from other group-learning methods. Cooperative learning can be used with any subject, can be used alone or with other instructional strategies, and can be used with small or very large classes. A variety of cooperative learning strategies have been developed for use in the classroom for a range of student age groups. Cooperative learning is very effective in adult education settings, providing mature students an opportunity to share their experiences and be more involved in their education, as discussed further in the next section.

Cooperative Learning and Adult Education

Ideally, strategies for improving instructional effectiveness are based on the theoretical framework of how students learn. Many studies have been conducted on the effectiveness of various instructional strategies. The philosophies and theories of adult education, beginning in the early 1900's, have been directed toward improving instructional effectiveness, and thus, learning. Cranton (1989) noted that many of the theories in adult education could be traced directly to the writings of Dewey (1916, 1938). Lindeman (1926) expanded Dewey's work, providing one of the earliest

descriptions of the philosophies and tenets of adult education. Dewey and Lindeman contended that education is a lifelong process based on life experience and the scientific method of learning. Malcolm Knowles (1978, 1980, 1984) had a major impact on adult education and is credited with popularizing the term “andragogy.” Knowles contrasted “andragogical” or learner-centered methods with “pedagogical” or teacher-centered methods. He argued that adults differ from pre-adults in many ways that affect learning and how they approach learning (Imel, 1989). These philosophies support the interactive, social learning concept of cooperative learning and are directly associated with the theoretical foundation of this instructional strategy.

Dewey, the architect of the Progressive Education Movement, believed that learning is a social process, starting at birth (Dewey, 1916). This movement provided the foundation for cooperative learning with the student at the center of the classroom. The democratic principle promoted by Dewey (1916), Vygotsky (1962), and Lindeman (1926), that we are dependent on others for survival and also for learning, is the basis of cooperative learning—the theory of social interdependence (Johnson, Johnson, & Smith, 1998(a). Koffka (1935), Lewin (1936, 1951), and Deutsch (1949, 1995, 2000) created and refined theories related to the theory of social interdependence—group dynamics, an extension of the democratic principle promoted by Dewey, Vygotsky, and Lindeman. Koffka (1935) proposed that groups were dynamic wholes in which the interdependence of the members could vary. Lewin (1936, 1951) refined this theory by stating that the essence of a group is the interdependence among members (created by common goals), resulting in the group being a dynamic whole. A change in the state of any member of the group changes the state of the other members of the group. Deutsch

(1949) extended Lewin's interpretation of social interdependence and formulated the theory of cooperation and competition. Deutsch (1949) conceptualized three types of social interdependence: positive (cooperative efforts), negative (competitive efforts), and none (individualistic efforts). These theories provided the foundation for group dynamics that initiated the team-based work environment in the late 1940's and 1950's.

In summary, Dewey, Lindeman, and Knowles provided key philosophical and theoretical foundations for cooperative learning in the adult student setting. Democracy, interactive learning, and student-centered education are a few of the themes established by these founding fathers in the adult education arena that are also found in the cooperative learning philosophy. While the current emphasis in higher education on cooperative learning originated at the elementary and secondary educational levels, there are strong philosophical and theoretical ties between cooperative learning and adult education, creating an easy transition and adaptation of the learning model to the college level.

The Conceptual Framework of Cooperative Learning

Theoretically, cooperative learning is unique in comparison to other adult learning models. Cooperative learning is framed in the theory of social interdependence, grounded in the work of Koffka, Lewin, and Deutsch (Johnson, Johnson, and Smith, 1998b). Additional theoretical support for cooperative learning is found in the cognitive learning theory, developed by Piaget (1954), which emphasized that learning is based on intrinsic motivation and is constructed by the student. In the cooperative classroom, students jointly construct knowledge, reinforcing resource and role interdependency. The behavioral perspective provides the structure for group work, in that it must be

reward and task oriented, providing extrinsic motivation for learning (Johnson, Johnson, & Smith, 1998a). All the facets of learning are addressed collectively in the theoretical foundation for cooperative learning, as illustrated in Figure 1. Each theory will be discussed in relationship to cooperative learning.

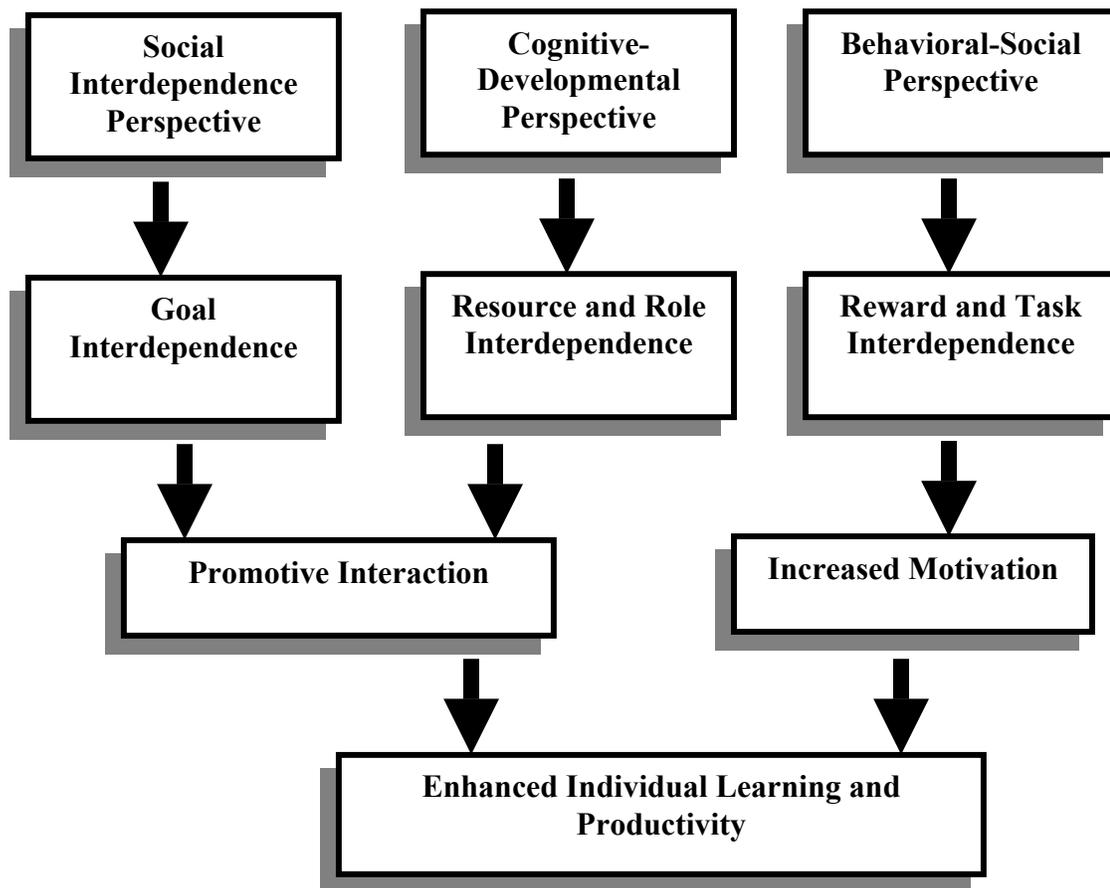


Figure 1. Theoretical Framework for Cooperative Learning

Note: From Johnson, D. W., Johnson, R. T., & Smith, K. A. (1998a). Active learning: Cooperation in the college classroom. Edina, MN: Interaction Book Company.

The key identifying factor between cooperative learning and other instructional models is that it is based on the theory of social interdependence from the work of Gestalt theorists on group dynamics (Johnson & Johnson, 1998). The theory of social interdependence provides educators with a conceptual framework for understanding how to structure effective learning, how it can be adapted to a wide variety of situations, and how it can be applied to a wide range of issues—such as achievement, ethnic integration, and retention. The social interdependence theory, extended from the work of Lewin (1935) and Deutsch (1949, 1962) increases the learning circle from individuals competing alone to groups learning together, multiplying the potentiality for learning.

In the practice of cooperative learning, positive interdependence creates promotive interaction—which occurs as individuals encourage and facilitate each other's efforts to reach the group's goals, and in turn, maximizing each member's learning (Johnson & Johnson, 1998) as illustrated in Figure 1. Group members can promote each other's success by: (a) giving and receiving help and assistance—both task-related and personal; (b) exchanging resources and information—orally explaining, elaborating and summarizing information, and teaching one's knowledge to others; (c) giving and receiving feedback on task work and teamwork behaviors—monitoring each other's effort; (d) challenging each other's reasoning through intellectual controversy, promoting curiosity and motivation to learn; (e) advocating increased efforts to achieve—encouraging others to achieve increases one's own commitment to do so; (f) mutually influencing each other's reasoning and behavior; (g) engaging in the interpersonal and small group skills needed for effective teamwork; and

(h) processing how effectively group members are working together and how the group's effectiveness can be continuously improved.

The effects of the operationalization of social interdependence are many. Social interdependence is a generic human phenomenon that influences many different outcomes simultaneously (Johnson & Johnson, 1998). Researchers have focused on such diverse dependent variables as individual achievement and retention, higher-level reasoning, intrinsic motivation, attitudes toward diversity, self-esteem, and many others. The evolution of the social interdependence theory, through research and theory refinement, has led to practical theory- and research-based implementation processes that enhance the learning efforts of students working cooperatively in teams.

The cognitive-developmental theory is a supporting theoretical influence on the development of cooperative learning. The cognitive-developmental perspective provides the intrinsic motivation in cooperative learning environments in relation to resource and role interdependence, as illustrated in Figure 1. Piaget (1954) described cooperation as striving to attain common goals while developing one's own feelings and perspective with a consciousness of others' feelings and perspectives (Johnson & Johnson, 1999). Cooperative learning in the Piagetian tradition is aimed at increasing the student's intellectual development by requiring students to reach consensus with others who hold opposing viewpoints of the assigned task. Each student serves as a resource for other students and plays a vital role in the other's gain of knowledge while working toward consensus.

Additionally, the cognitive perspective explains how students learn through construction of knowledge from intrinsic motivation and is based on the student's

personal experiences and interaction with the world (Piaget, 1954). Piaget (1954) identified the stages of cognitive development and three kinds of knowledge: physical knowledge, logico-mathematical knowledge, and social knowledge. The cognitive learning theory places the learner at the center of the classroom with the instructor facilitating an active learning environment. Piaget studied how humans come to know what they know over time, a major break from the work of other theorists who studied the behavior, rather than what generates the behavior as cognitive psychologists proposed. Cognitive learning theory focuses on the process of building knowledge, rather than the context or product.

Vygotsky (1962), who provided an alternate perspective on cognitive learning theory from the Gestalt School of Psychology, stated that learning and thinking involve the participation of the learner—the learner constructs knowledge through interaction with others, the learning environment, and experience. Learning is student-centered and facilitated by the instructor rather than dictated. Vygotsky (1962) established that knowledge is socially constructed from cooperative efforts to learn, understand, and solve problems.

In practice, the cognitive learning theory provides the theoretical framework for changing the way teachers teach because of the notion that students construct their own learning (Wittrock, 1978). Research in cognitive psychology supports the theory that if information is to be retained in memory and related to information already in memory, the learner must engage in some sort of cognitive restructuring, or elaboration, of the material. Writing a summary or outline of a lecture is more effective than just taking notes because the process requires the student to reorganize the material and sort out

what is important (Brown, Bransford, Ferrara, and Campione, 1983; Hidi and Anderson, 1986; Slavin, 1990). One of the best methods of elaboration is explaining the material to someone else. Vygotsky (1978) stated that the elaboration process by the student helps the student retain the information being explained. Dansereau (1995; Dansereau & Newbern, 1997) and colleagues validated this principle in a series of studies that college students working on structured “cooperative scripts” could learn technical material or procedures significantly better than students working alone.

The second supporting theory, the behavioral learning theory, provides structure and order to the classroom through extrinsic motivation and is grounded in the stimulus-response work of Bandura (1977) and Skinner (1971). Skinner (1971) defined learning as a relatively permanent change in behavior in response to stimuli.

Behaviorists focus on measuring learning through observable effects, such as written evaluations or performance checklists (Blanchard & Thacker, 1999). In science, concepts, events, and phenomena are assigned an operational definition—defining the concept in terms of how it is measured. Behaviorists, in particular, have adopted this method of assigning a definition relative to permanent changes in behavior.

Behaviorists suggested that the environment—the stimulus/response approach, controls learning. The instructor controls learning by controlling the stimuli. The learner is dependent on the instructor to determine the correct associations between the stimulus and response. In the cooperative learning classroom, the behavioral perspective assumes that students will work hard on a task to secure a reward, providing incentive and motivation for students to participate in a group effort, as illustrated in Figure 1.

In summary, cooperative learning is grounded in the theory of social interdependence and supported by the cognitive and behavioral learning theories. While cognitive and behavioral learning theories disagree on how learning takes place, cooperative learning uses them both to enhance the efficiency and effectiveness of learning. The cognitive-developmental perspective focuses on what happens within the individual (Johnson & Johnson, 1999). Behavioral learning theory assumes that cooperative efforts are generated by extrinsic motivation to achieve rewards. Providing intrinsic and extrinsic motivation adds powerful dimension to the cooperative learning model that is yet to be fully explored. The theory most fully developed and the most clearly related to cooperative learning practice is the social interdependence theory. Social interdependence assumes that cooperative efforts are based on intrinsic motivation to work together to achieve a common goal through positive interaction. Social interdependence specifies the conditions under which cooperation is most effective, the outcomes most affected by cooperation, and the most effective procedures for implementing cooperative learning.

A Comparison of Collaborative Learning and Cooperative Learning

Of all the group-based instructional strategies, cooperative learning and collaborative learning are most often compared and often with problematic confusion due to terminology. These two terms are similar from one definitional point of view. Both terms relate to sharing—mutual, two-way, supportive, or joint interaction. As instructional strategies, however, there are key differences between the two models, which the following literature review will explain.

While both collaborative learning and cooperative learning are grounded in the concept of group-based learning, derived from group dynamics theory, there are some important differences in the two instructional modalities. Collaborative and cooperative learning have been described as lying on a continuum of group-based learning strategies, with collaborative learning being the least structured approach and cooperative learning the most structured (Macaulay & Gonzales, 1996; Millis, 1998). Cooperative learning requires the implementation of five key elements to be effective, while collaborative learning is less structured, shifting more responsibility to the student.

From a theoretical perspective, Bruffee noted that collaborative and cooperative learning are similar in several ways (Bruffee, 1993, 1999). Bruffee (1999) stated that, “both are educational activities in which human relationships are the key to welfare, achievement, and mastery. While both camps may disagree on terms, methods or principles, and assumptions, their long-range goals are strikingly similar” (p. 83). Theoretically, both are grounded in the philosophies of Dewey (1897), that learning should be social and interactive. Both learning models rely on constructive conversation. Students construct knowledge together as they talk and reach consensus, taking advantage of the resources of the adult learner, who brings to class a variety of experiences and personal perception that shapes learning. Instructors in both learning models set up conditions in the classroom so that students learn together.

Collaborative learning, however, leans more toward the radical philosophies of Freire (1972, 1974), who promoted the resistance of the hierarchical authority in the classroom—the professor, and the formal body of knowledge. Bruffee (1993) viewed

cooperative learning as a more “repressive” form of pedagogy with teacher-developed goals and assessments, constant supervision, and the discouragement of dissent.

Bruffee’s perception of collaborative learning is that it is more adult-centered because it assumes student responsibility for governance and evaluation and encourages disagreement.

Millis (1998) noted that Bruffee’s position is not without disagreement. Millis (1998) explained that Bruffee failed to recognize the major concerns of all faculty committed to group work: time and content coverage. The ideal learning environment is one in which students are free to explore topics as shared conversation, reach their own conclusions, and clarify and sometimes resolve academic disagreements. In reality, the typical classroom is bound by traditional constraints, including requirements to cover key concepts and core knowledge. With cooperative learning, instruction can be both efficient and effective, especially in classrooms filled with diverse learners at all levels of academic preparation and social enculturation.

The two types of group learning instructional methods are similar in many ways. Matthews, Cooper, Davidson, and Hawks (1995) noted the numerous assumptions shared by both cooperative and collaborative learning, such as: (a) learning is a social, interactive process; (b) teaching and learning are shared experiences between the teacher and the students; (c) balancing lecture and small-group learning is an important part of a teacher’s role; (d) small-group learning develops higher-order thinking skills and enhances individual abilities to use knowledge and resources; (e) accepting responsibility for learning as an individual and as a group member enhances intellectual development; (f) social dialogue enhances a student’s

ability to reflect on his or her own assumptions and thought processes; (g) developing social and team skills through consensus building is a fundamental part of a liberal education; (h) belonging to small and supportive academic learning community increases student success and retention; and (i) appreciating diversity is essential for the survival of a multicultural democracy.

A broader perspective of collaborative and cooperative learning is achieved through a comparative review of the educational levels in which these two types of group-based learning are used. Bruffee (1999) categorizes the two types of instructional methods based on where and how they were implemented. He proposes that collaborative learning is typically used in higher education and that cooperative learning is more appropriate for pre-college students. Bruffee (1999) points out that education for adults should be different than education for children. Bruffee (1999) views the main purpose of elementary education is to help children establish themselves in knowledge communities nested in the common culture through foundational knowledge. The major purpose of college education is to help adult learners renegotiate their membership in well-established cultures through nonfoundational knowledge. College education is nonfoundational in two ways: it is less likely to address questions with widely agreed-upon answers and is more likely to address questions with ambiguous or arguable answers. Bruffee (1999) states that college students should be allowed to construct new knowledge, with no boundaries of right or wrong answers, nor the confines of the traditional classroom—less structure, less control of the learning environment by the instructor. The elements of individual

accountability or positive interdependence are not a requirement for collaborative learning as is true with cooperative learning.

Key features of cooperative learning are consistent with the basic tenets of adult learning theory. Knowles' (1984) theory of andragogy states that adults learn best through active and experiential techniques involving discussion and problem solving which allows them to draw on their personal and professional experiences. As the average age of college students increases, the relevance of cooperative learning also increases as adult learners are more likely to be interested in participating with others in the learning process, to assume responsibility for learning, and to work independently with less instructor supervision (Cuseo, 1992). In addition, the issue of increasing diversity also provides relevancy for cooperative learning in that it serves as an effective strategy for enhancing college achievement and retention of the changing student population.

The historical roots of the two models vary greatly. Bruffee (1999) credited British Educator, Edwin Mason, with initiating collaborative learning in British comprehensive and grammar schools in 1970, not in the colleges and universities. Bruffee (1999) adopted the term, collaborative learning, from Mason's work and initiated collaborative learning at the college level in the United States in the 1970's at Brooklyn College, a constituent campus of City University of New York. Bruffee (1995) and Vygotsky (1978) noted that social constructivism contends that since knowledge is socially constructed, the group should produce learning rather than some disciplinary authority. Bruffee (1993) stated that rather than transferring knowledge from one person to another through the traditional methods, collaborative learning

assumes instead that knowledge is a consensus among the members of a community of knowledgeable peers—something people construct by talking together and reaching agreement. Bruffee (1993) also noted that collaborative learning is a reacculturative process that helps students become members of knowledge communities to which they already belong.

Cooperative learning began at about the same time, in the late 1960's and early 1970's in elementary and secondary classrooms (Johnson, Johnson, & Smith, 1998a). Cooperative learning expanded from the theories and philosophies of Dewey (1897), Lindeman (1926), and Rogers (1951) from the Progressive Adult Education Movement, and from the group dynamics philosophies of Koffka (1935), Lewin (1936), and Deutsch (1949). Johnson and Johnson (1999) credited the establishment of the Lancaster School in the early 1800's with implementing cooperative learning in formal education, and later, Colonel Frances Parker, in the late 1800's, promoted cooperative learning in public schools. In the early 1900's, Dewey led the movement to change traditional education to socially, interactive learning. In the 1970's, a number of educators and theorists promoted cooperative learning at the elementary and secondary levels. These individuals included Cook, Slavin, Shlomo and Sharan, Cohen, and Kagan. In the early 1990's, however, Roger and David Johnson adapted their model of cooperative learning to higher education.

While the recent surge in cooperative learning began in youth education in the late 1960's, it has become increasingly popular at the higher education level. Collaborative learning grew from 1970's initiatives at the college level, but can be found at all educational levels in practice. Different historical perspectives have led the

two models in different directions, but the overall goal is to increase social interaction to enhance learning.

Clarification of the terminology between cooperative and collaborative learning is important from a practical and research perspective. From a practitioner's point of view, Cross (2000) stated that the term cooperative learning is typically used to refer to group-based learning at the elementary and secondary levels, while the term collaborative learning refers to group-based learning in higher education. The literature does not support this perception, however. Cooperative and collaborative learning are two different models of group-based learning, regardless of the level at which they are implemented. Both terms and related principles are used at all levels of education. Cooperative learning relies on five elements for effective implementation, whether at the elementary level or in higher education: positive interdependence, individual accountability, face-to-face promotive interaction, group processing, and social or team skills. These elements are not present in the collaborative classroom, which is much less structured. In cooperative learning, the focus is for students to learn content while learning team skills in an interactive, social environment. The facilitator is much more involved in the learning process than in collaborative learning. The instructor monitors and intervenes if the five elements are not carried out in the small groups. In collaborative learning, the professor may leave the room to promote diversity of ideas by removing the influence or control of the instructor. The focus is on constructing new knowledge, resisting the hierarchy of the traditional classroom in which the professor is the source of knowledge and authority. In practice, the collaborative classroom and the cooperative classroom are very different to a discerning practitioner and researcher.

Summary

Cooperative learning is an instructional strategy in which small groups of students work together to accomplish shared goals. The structure of the classroom is well defined, as is the role of the instructor and the student. The theoretical foundation of cooperative learning, the social interdependence theory, is similar to the philosophies of adult education. Many of the founding fathers of adult education, such as Dewey and Lindeman, provided direction for cooperative learning. Cooperative learning is often confused with collaborative learning in the literature and practice. While their definitions are similar, they are different in theoretical perspectives and in practice. Cooperative learning is much more structured and operationally defined than collaborative learning. Both are used at all levels of education and in a variety of learning environments.

Historical and Philosophical Perspectives in the Development of Cooperative Learning

Introduction

Theorists and researchers in higher education, especially in the last 100 years have proposed and validated many effective methodologies to complement the traditional lecture, but they have not been broadly implemented in practice in higher education. Studies over the last 100 years have indicated that structured, group-based learning produced many positive outcomes (Johnson & Johnson, 1998). Prior to the 1900's, some group-based learning was being promoted in educational settings. In the early 1800's, the Lancaster School and the Common School Movement emphasized learning cooperatively in groups (Johnson & Johnson, 1992). This initiative to promote

cooperative learning was one of the first in formal educational environments. Colonel Francis Parker, a superintendent of public schools, promoted group learning in public schools in the late 1800's. Parker's school district provided an example of the implementation of cooperative learning that was well known in educational realms, as thousands of educators flocked to view cooperative learning in action in the district's classrooms. Philosophies from the early and mid 1900's, however, have had the greatest impact on the current practice of group-based learning.

Three philosophical perspectives provided the basis for the evolution of group-based instructional strategies, such as cooperative learning. Philosophies from the Progressive Education Movement, the Gestalt School of Psychology, and the cognitive learning movement provided three major influences that have led to theories impacting development of interactive, group-based learning and the motivation for implementing change in the higher education classroom.

The Progressive Education Movement

The philosophies of three key leaders in the Progressive Education movement led to the development of cooperative learning. They included John Dewey, Eduard Lindeman, and Carl Rogers. Dewey, the initiator of the Progressive Education Movement, was perhaps one of the greatest contributors to adult education theory in the twentieth century (Elias & Merriam, 1980). His philosophies and ideas influenced the direction of adult education and many other theorists, such as Lindeman and Rogers, who have in turn, impacted adult education.

In the earliest stages, progressive education emphasized developing a child-centered approach to education (Elias & Merriam, 1980). The primary goal was to

develop the potential of the child, which necessitated removing the child from the passivity and uniformity of traditional education. In the second stage of development, social reform and reconstruction through changes in education became the thrust of progressive education. From contemporary developments in psychology and sociology and emphasis on democracy in education, Dewey's philosophies influenced key changes in society: the dependence of learning on participation in social activities, the influence of the physical environment on the development of culture, and the necessity of promoting individual differences to produce changes in society. The third phase of progressive education, experimentalism, represented the mature thought of Dewey. This phase encouraged the critical and controlled type of learning exemplified in science. From these various stages of progressive education, two key philosophies were important contributors to the development of cooperative learning, and were promoted by Dewey, Lindeman, and Rogers—democracy in education and socially interactive learning.

Democracy in education. A key philosophy that influenced cooperative learning was the notion of democracy in education. Dewey (1897), in his essay, "My Pedagogic Creed," promoted several key proponents of "democratic education." First, Dewey (1897) believed "that all education proceeds participation of the individual in the social consciousness of the race" (p. 77). In addition to promoting participation, this statement emphasized the connection between civil society and the individual, beginning at birth. Second, the educational environment is critical in the development of learning. Dewey (1897) said, "I believe that the only true education comes through the stimulation of the child's powers by the demands of the social situations in which he finds himself" (p.

77). Dewey spoke about the “spirit” of the atmosphere and becoming “saturated” in the environment. The educational process has two sides—one psychological and one sociological; neither can be supported independent of the other, or the other neglected without harm. Third, Dewey (1897) suggested that service, or civic education, was a vital part of education. Fourth, the idea of integrating experience through active learning was found in most of Dewey’s writings. Dewey (1916) explained that experience in education from a broader scope brings people together in civic association and participation. Fifth, Dewey (1897) believed that community was the center of education—which included the school, the family, the political party, and the general public. In-school experiences represented only one part of education, as the community provided education through the arts, amusement, and recreation. Sixth, Dewey (1897) promoted action as an integral part of education—that every process should begin with doing something. Education is a hands-on affair and happens interactively, face to face.

Democracy in education, as promoted by Dewey (1897), Lindeman (1926), Rogers (1969), and others, influenced all areas of adult education and many instructional models. The concept of cooperative learning and other group-based learning models as promoting democracy is prevalent in the literature. Democracy in the classroom reduces the hierarchy of the traditional classroom—making learners and teachers equal partners in the educational process. Dewey argued that learning occurs when teachers exercise control indirectly through work completed as a social enterprise in which everyone has an opportunity to contribute and to which all feel a responsibility (Bruffee, 1999).

Socially interactive learning. The philosophies of the progressive education movement promoted interactive, group learning in a social context, which inspired group-learning instructional models, such as cooperative learning. From the influence of Dewey, both Lindeman (1926) and Rogers (1969) promoted the participation of all learners in the educational process, not only in the classroom through collaboration, but education in general—formal and informal. Lindeman (1926) emphasized that the resource of highest value in adult education is the learner's experience. Lindeman (1926) noted that life experiences played a significant role in adult learning. Socially interactive learning captured the value of the learner's experience by providing a means to share that experience with other learners. He noted that too much of education consists of explicit substitution of someone else's experience and knowledge. He promoted a "situation" or experiential approach to learning through the interaction of students with their social environment, whether in the classroom, at work, or in recreational settings. Lindeman (1926) asserted that "all genuine education will keep doing and thinking together" and that "experience is the adult learner's living textbook" (p. 7). As a gifted teacher, Rogers (1969) saw himself as a facilitator in developing interpersonal relationships through participative learning. Using the principles of client-centered therapy, Rogers promoted person-centered education, focusing on the needs of the learner in a dialogical and social learning environment.

The Gestalt School of Psychology

The philosophies of the Gestalt School of Psychology originated as general concepts of form and organization that would lay the ground work for several domains of scientific endeavor (Rosenthal & Visetti, 1999). The philosophies that influenced

Gestalt included several central features: (a) a phenomenological approach to philosophy and science; (b) grounding in the field theory of physics and in the theory of dynamical systems in mathematics; (c) perception viewed as a general structure of cognition; (d) intrinsic interrelatedness of forms and values; and (e) a unitary approach to perceiving, action, and expression. Gestalt concepts continue to exert substantial influence in cognitive and language sciences.

The basic philosophies of the Gestalt School of Psychology are that: (a) the learner should be encouraged to discover the underlying nature of a topic or problem, such as the relationship among the elements; (b) gaps, incongruities, or disturbances are an important stimulus for learning; and (c) instruction should be based upon the laws of organization: proximity, closure, similarity, and simplicity (Wertheimer, 1959). Gestalt theory, constructed from these basic philosophical principles, applies to all aspects of human learning, although it applies directly to perception and problem solving.

A foundation theory that evolved from the philosophies of the Gestalt School of Psychology is the theory of social interdependence, which provides the framework for group dynamics and small group learning such as cooperative learning (Koffka, 1935). Johnson, Johnson, and Smith (1998b) explained that, “social interdependence views cooperation as resulting from positive interdependence among individuals’ goals” (p. 28). The concept of positive interdependence moves the student from a private, individualized classroom to a cooperative, public, social learning environment. Koffka (1935), one of the early founders of the Gestalt School of Psychology, proposed in the early 1900’s that groups were dynamic wholes in which the interdependence among members could vary. Lewin (1936) refined the theory in the 1920’s and 1930’s and

stated that the essence of a group lies in the interdependence of its members created by common goals (Johnson, Johnson, Smith, 1998b). Lewin added to the theory, stating that an intrinsic state of tension within group members motivates movement toward the accomplishment of the desired common goals. Deutsch (1949), a graduate of Lewin, extended the theory and proposed that the basic premise of social interdependence theory is that the way social interdependence is structured determines how individuals interact, which in turn determines outcomes, whether it is positive interdependence (cooperative), negative interdependence (competitive), or absent (individualistic) (Johnson, Johnson, and Smith, 1998b).

The philosophies of the Gestalt School of Psychology resulted in key theories related to group dynamics. Cooperation in education and industry are concepts that are continually explored to increase learning and work efficiency. The Applied Group Dynamics Movement led to changes in the way industry approached the work environment in the 1950's, and in research, such as Deutsch's work in the National Training Laboratories and research on trust and cooperation and competition (Johnson & Johnson, 1999). These historical perspectives are summarized in Table 1.

Cognitive-Developmental Theory

The philosophies of two key cognitive-developmental psychologists, Vygotsky and Piaget, influenced the development of cooperative learning. While diverse in basic viewpoints, both were influenced by the philosophies of the Gestalt School of Psychology. In the late 1920's the Gestalt psychologists challenged the behavioral learning theories led by Skinner (Merriam & Caffarella, 1991). Their major criticism was that behaviorists' theories were too dependent on overt behavior and single actions

to explain learning. Through the philosophies and research of Gestaltists Wertheimer, Kohler, Koffka, and Lewin (Hergenhahn, 1988), Gestalt views of learning rivaled behaviorism by the 1950's. The philosophies of the Gestaltists have been adapted into the current cognitive or information-processing learning theories (Merriam & Caffarella, 1991).

Key contributions to cognitivism from the Gestalt philosophies include perception, insight, and meaning (Merriam & Caffarella, 1991). From the cognitivists' viewpoint, the human mind is not just a passive exchange terminal where the stimuli arrive and the appropriate response leaves. Instead, the thinking person interprets sensations and gives meaning to the events that invade his or her consciousness (Grippen & Peters, 1984). Learning involves the reorganization of experiences to make sense of stimuli, which may come as flashes of insight (Hergenhahn, 1988). The major difference between behaviorists and the cognitivists is the locus of control over the learning activity (Merriam & Caffarella, 1991). For cognitivists, it lies with the learner; with behaviorists, it lies with the environment. This shift to the individual and to the learner's mental processes is characteristic of cognitive learning theories.

Vygotsky (1962) extended the philosophies of the Gestalt psychologists, which became part of the cognitive-developmental theory. Vygotsky called for a reconstruction of the classroom to generate vigorous and reasonable dialogue, which in turn would generate vigorous and reasonable thinking (Lipman, 1991). Vygotsky (1962) emphasized a close connection between thought and language word in human studies. Before the age of two, the development of thought and speech are separate; they then combine at two years of age to initiate a new form—thought becomes verbal

and speech becomes rational. Speech serves the intellect as thoughts are spoken. Social environment is so important to children's development because it can accelerate or decelerate development. Language is a tool for organizing thinking. This principle of the cognitive-developmental theory is the underlying theme in group learning, that interactive discussion an assignment with a "knowledgeable peer" accelerates learning (Tharpe & Gallimore, 1988). Knowledge is constructed actively in the learning community, not by the passive transfer of knowledge from the instructor to the student. While Vygotsky's work focused on children, his instructional insights are equally applicable to adult learning. Vygotsky (1962) noted that learning depends on development, but development is not dependent on learning.

Jean Piaget (1966), a cognitive psychologist, clarified the focus on internal cognitive processes through his studies of how children learn. His philosophies provided an alternate view of how learning occurs. Piaget's insight opened a new window into how the mind works (Papert, 1999). Inspired by the belief that children are not empty vessels to be filled with knowledge (as traditional education promoted), but rather, are active builders of knowledge. Influenced by both the behaviorists and the Gestalt schools of thought, Piaget proposed that one's internal cognitive structure changed as a result of maturational changes in the nervous system and the result of the organism interacting with the environment and exposure to a variety of experiences (Merriam & Caffarella, 1991). Current research efforts evolving from Piaget's work in cognitive-developmental theory considered research on information-processing theories, work on memory and metacognition, theories of transfer, mathematical learning theory models, computer simulations, and artificial intelligence. The influence

of cognitive learning theories, past and present, guided the development of learning models, such as group-based learning, by defining how students learn best, and ideally, have a direct impact on practice in the classroom.

Summary

The philosophies of the Progressive Education Movement in promoting democracy in the classroom and socially interactive learning, the Gestalt Psychologists in the development of the theory of social interdependence and group dynamics, and the theorists in the development of the cognitive learning theories have all played an important role in the development of both small group learning and adult education. The strength of group learning is the foundation of the instructional model—insightful research, theory refinement, and extended practice over 100 years. In the adult education setting, Knowles led the research of group learning in the 1930's inspired by the Research Center for Group Dynamics at the University of Michigan and Kurt Lewin's research efforts in field theory (Rose, 1996). The research in group dynamics led to four general areas of study that included leadership training, the invention of new techniques, the study of the culture of groups, and community relations and social change (Knowles & Knowles, 1959). All of these were immensely important in the field of adult education, which had just begun the study of the educational process during this same time period (Rose, 1996). For adult educators, the understanding of group processing became a central part of adult education (Bergevin & Morris, 1950). A summary of historical events leading to the development of cooperative learning was presented in Table 1 (Johnson & Johnson, 1992; Johnson, Johnson, & Smith, 1998a).

Table 1. Time-line: History of Cooperative Learning

Date	Related Event
Early 1800's	Lancaster School established in the United States (Joseph Lancaster and Andrew Bell used cooperative learning groups extensively in Europe and brought the idea to the United States in 1806, New York) Common School Movement in the United States: Strong emphasis on cooperative learning
Late 1800's	Colonel Frances Parker: Promoted cooperative learning, democracy, devotion to freedom in the public schools
Early 1900's	Progressive Education Movement: John Dewey and others; Dewey promoted cooperative learning groups as a part of his famous project method of instruction. Social Interdependence Theory & Group Dynamics: Kurt Koffka & Kurt Lewin, Gestalt Psychologists
1940's	Theory and research on cooperation and competition: Morton Deutsch
1950's	Cognitive Learning Theory: Jean Piaget, Lev Vygotsky Applied Group Dynamics Movement, Deutsch, National Training Laboratories Deutsch research on trust, individualistic situations; Naturalistic studies
1960's	Stuart Cook research on cooperation Spencer Kagan research on cooperation and competition in children Inquiry (discovery) Learning Movement: Bruner, Suchman B. F. Skinner, Programmed Learning, Behavior Modification David and Roger Johnson began training teachers in cooperative learning at the University of Minnesota
1970's	David Johnson wrote <u>Social Psychology of Education</u> Robert Hamblin: Behavioral research on cooperation/competition First Annual Symposium of APA (Presenters included David and Roger Johnson, Stuart Cook, Elliot Aronson, Elizabeth Cohen, and others) David and Roger Johnson research review of cooperation/competition Robert Slavin began development of cooperative curricula Shlomo and Yael Sharan, Small Group Teaching (Group Investigation) Elliot Aronson, Jigsaw Classroom Cooperation issue of the <u>Journal of Research and Development in Education</u> First International conference on cooperative learning, Tel Aviv, Israel
1980's	David and Roger Johnson, Meta-Analysis of Research on Cooperation Elizabeth Cohen, <u>Designing Groupwork</u> Spencer Kagan developed Structures Approach to Cooperative Learning David and Roger Johnson wrote, <u>Cooperation & Competition: Theory & Research</u>
1990's	Cooperative learning gains popularity among educators in higher education First Annual Cooperative Learning Leadership Conference, Minneapolis David and Roger Johnson and Karl Smith adapted cooperative learning to the college classroom, and wrote: <u>Active Learning: Cooperation in the College Classroom</u>

Note: Adapted from Johnson, D. W., & Johnson, R. T. (1992). Implementing cooperative learning. Contemporary Education, 63(3), 173-181.

Johnson, D. W., Johnson, R. T., & Smith, K. A. (1998a). Active learning: Cooperation in the college classroom (pp. A:2 – A:4). Edina, MN. Interaction Book Company.

Research on Cooperative Learning

Introduction

Research on cooperative learning is extensive and comprehensive. The volume of studies, the variety of studies, and the range of education levels used in studies provide broad-based empirical support for cooperative learning. The widespread use of cooperative learning is largely due to the fact that it is clearly based on theory, validated by research, and operationalized into clear procedures for educators (Johnson, Johnson, & Stanne, 2000). The generalizability, breadth, and applicability of the research on cooperative, competitive, and individualistic efforts provide considerable validation of the use of cooperative learning. The research on cooperative efforts has focused on a wide variety of diverse outcomes including achievement, higher-level reasoning, retention, transfer of learning, time on task, transfer of learning, achievement motivation, intrinsic motivation, social and cognitive development, moral reasoning, social support, valuing differences, psychological health, self-esteem, social competencies, the quality of learning environments, and many others.

Cooperative Learning Studies in Higher Education

The majority of studies on cooperative learning have taken place in the elementary and secondary schools (Johnson & Johnson, 1989). A limited number of studies, however, have investigated the effectiveness of cooperative learning at the higher education level, mostly in four-year universities. Over 168 studies conducted between 1924 and 1997 focused on the comparison of cooperative, competitive, and individualistic learning on the achievement of students 18 years of age or older in higher education (Johnson, Johnson, & Smith, 1998b). Nearly 700 studies exist on

cooperative learning at a variety of educational levels (Johnson & Johnson, 1989). Since 1898, over 550 experimental and 100 correlational studies have been conducted at the elementary, secondary, and postsecondary levels. These studies affirmed that cooperative learning was more effective in knowledge acquisition, retention, accuracy, creativity in problem solving, and higher-level reasoning than the competitive or individualistic learning. The research at the higher education level was summarized by three broad categories of focused discussion, which include effort to achieve, positive interpersonal relationships, and psychological health (Johnson & Johnson, 1989). The synthesis of this research was summarized to provide direction for future research, theory, and practice (Johnson, Johnson, & Smith, 1998a). The category, efforts to achieve, represented the most comprehensive and extensive research in social psychology. In addition, between 1898 and 1989, researchers conducted over 375 experimental studies on social interdependence and productivity and achievement. In this research, achievement in cooperative learning groups involved more than the level of learning of its members. This research provided an increased understanding of the extent to which members of cooperative learning groups influenced each other's achievement and the direction of the influence (higher or lower achievement) within the group.

From a search of a database of previous dissertation research, 37 studies on cooperative learning in the community college were found (WebSPIRS, 2001). The majority of these studies were narrow in scope, comparing a few courses taught cooperatively with courses not taught cooperatively in one subject area. Students from a variety of course subjects were the participants in these studies, including medical

assisting, business, physics, engineering, mathematics, microeconomics, child care, history, computer science, biology, English, and developmental courses. Of the 37 studies, 24 compared the impact of cooperative learning with classrooms in which cooperative learning was not used. Of these 24 quantitative comparative studies, 16 found significant differences (favoring cooperative learning) between courses taught cooperatively and those not taught cooperatively. Eight studies found no significant differences when comparing courses taught cooperatively and courses not taught cooperatively. A variety of variables were measured in these 37 studies including exam scores, retention, GPA's, and student satisfaction.

Eight studies were found through ERIC (Educational Resources Information Center) (U. S. Department of Education, 2000) that explored the use of cooperative learning in community colleges. All eight of these studies found positive results in the implementation of cooperative learning. One of these studies, a longitudinal study, investigated cooperative learning (CL) strategies in relation to academic need (Tinto & Love, 1995). The findings indicated that when compared to traditional students, the CL students' perceptions of classes, other students, faculty, counselors, campus climate, and their own involvement were generally more positive. CL students earned more credits and had a higher grade point average than traditional students and were significantly more likely to express interest in continuing in higher education. The CL students indicated a higher satisfaction with the learning environment (cooperative group work) than the traditional students.

One study was found that was similar to this investigation on cooperative learning in the community college setting. Dozark (1998) investigated the role of

quality practices and cooperative learning using student ratings of satisfaction across a wide range of courses at a comprehensive community college (n = 368 from a population of 10,000). The students were enrolled in 23 sections of 13 different courses taught by 12 different instructors in the Arts and Sciences and Applied Science Divisions of the community college. Other independent variables measured in addition to cooperative learning included age, assessment techniques used by the instructor, GPA, marital status, enrollment status, credits earned, gender, household income, program type, employment status, student involvement, and student expectations. Data were analyzed using t-tests, ANOVA, and linear regression. Dozark's study found that cooperative learning significantly increased student satisfaction ratings of courses and instruction for the sample population studied. Student involvement and student expectations were found to be significant predictors of student satisfaction. No studies were found that used student ratings to measure the impact of cooperative learning on learning outcomes or course learning environment factors, as investigated in this study.

Comparison Studies of Cooperative, Competitive, and Individualistic Efforts

The effects of cooperative, competitive, and individualistic efforts have been studied in over 375 research studies between 1898 and 1989 (Johnson & Johnson, 1989). Analysis of these 375 studies indicated that cooperative learning is effective in producing higher achievement and productivity under certain conditions of: (a) clearly perceived positive interdependence which supports personal responsibility to achieve the goals of the group, (b) multiple face-to-face interactions, (c) frequent and regular use of interpersonal and small group skills, (d) individual accountability, and (e) group processing to improve the group's future effectiveness. Between 1940 and 1989, 7

correlation studies and 106 comparison studies were conducted on cooperative learning. The 106 studies compared the relative impact of cooperative, individualistic, and competitive learning structures (Johnson & Johnson, 1989). A meta-analysis of these studies suggested that cooperative learning structures promoted greater social support than did competitive or individualistic. Further, application to the real world indicated that whenever pressure is placed on individuals for higher achievement and productivity, considerable social support should be provided to buffer the inherent stress, confirming the integration of instructional methods such as cooperative learning.

In summarizing results of the research of cooperative learning, Natası and Clements (1991) noted that the research on cooperative learning conducted at all educational levels indicated that benefits are universal, regardless of the age of the student. Cognitive-academic and social-emotional benefits were evident at all educational levels and in all types of cultural ethnic environments. The research studies indicated that participation in cooperative learning enhanced academic achievement and cognitive growth, motivation and positive attitudes toward learning, social competence, and interpersonal relations. Cooperative learning has been used effectively across a variety of content areas, including mathematics, reading, social studies, and science. The studies consistently showed that cooperative goal structures are more effective than individualistic or competitive structures of the traditional classroom.

Studies conducted at California State University by Dansereau (1983), Treisman (1985), and Freirson (1986) indicated that the overwhelming majority of students preferred cooperative learning. Outcome measures such as higher-level thinking skills,

interest in the subject matter, general class morale, and frequency/quality of interactions with classmates received particularly favorable ratings.

Summary

Cooperative learning is one of the most researched and empirically well-documented forms of group-based learning in terms of its positive impact on a variety of outcomes. Most of the research on cooperative learning has been conducted to validate specific cooperative learning procedures (Johnson, Johnson, & Stanne, 2000). These studies are classified as effectiveness, or efficacy, studies. These are typically laboratory studies of short-term effects. The majority of these studies, however, did not measure the effectiveness of cooperative learning. Effectiveness studies—“real-world” studies of how cooperative learning is actually delivered or the outcomes of cooperative learning—have not been reviewed collectively. The two types of effectiveness studies, studies aimed at testing theory and those demonstrating that a cooperative learning method worked in a specific situation, complement each other. A need exists for a comprehensive, meta-analysis of effectiveness studies.

Using Student Ratings to Measure Instructional Effectiveness

Introduction

This study investigated the impact of cooperative learning as an instructional strategy using a student-rating instrument to measure learning outcomes and overall excellence in instruction and courses. A review of the literature on the definition of effective instruction, the measurement of effective instruction, and the use of student ratings in measuring instructional effectiveness provided a broader understanding of accountability in education, institutional effectiveness, and the assessment process.

Defining Quality Instruction

What is effective instruction? In measuring instruction, it must be accurately and clearly defined. Simply put, teaching effectiveness is the degree to which one has facilitated student achievement of educational goals (McKeachie, Chism, Menges, Svinicki, & Weinstein, 1994). Much of student achievement, however, is determined by factors other than teaching—student ability or previous experience, for example. The Education Commission of the States (1995), in its report Making Quality Count in Undergraduate Education, proposed 12 quality attributes of good practice in delivering instruction in undergraduate programs. “Extensive research on American college students reveals...that when colleges and universities systematically engage in these good practices, student performance and satisfaction will improve” (Education Commission of the States, 1996, p. 5). These attributes, as illustrated in Table 2, address aspects of an institution’s organizational culture and values, its curriculum, and the type of instruction that is provided.

Table 2. Attributes of Quality Undergraduate Education: What the Research Says

Attributes of Quality Undergraduate Education	
Quality begins with an organizational culture that values:	<ol style="list-style-type: none"> 1. High expectations 2. Respect for diverse talents and learning styles 3. Emphasis on early years of study
A quality curriculum requires:	<ol style="list-style-type: none"> 4. Coherence in learning 5. Synthesizing experiences 6. Ongoing practice of learned skills 7. Integrating education and experience
Quality instruction builds in:	<ol style="list-style-type: none"> 8. Active learning 9. Assessment and prompt feedback 10. Collaboration 11. Adequate time on task 12. Out-of-class contact with faculty

Note: Adapted from Education Commission of the States. (1995). Making quality count in undergraduate education. Denver, CO: Education Commission of the States.

Quality begins with a culture that values high expectations, respect for diverse talents and learning styles, and an emphasis on the early years of study. Students learning more effectively when expectations are placed at a high but attainable level and when communicated early in the course (Education Commission of the States, 1996). In a learner-centered assessment environment, students know the faculty's

intended learning outcomes before instruction begins. Through rubrics, an assessment technique, a description of the characteristics that are present in quality work are provided to the students. Then students are held accountable for reaching these standards. Tasks are designed so that students can effectively complete them in a variety of ways—not just one right answer, providing students with the opportunity to do excellent work that reflects their own unique way of implementing their abilities and skills. An emphasis on engaging the student in meaningful intellectual work is critical during the first years of undergraduate study.

Defining Quality Programs

A quality program requires coherence in learning. The curriculum should be structured in a way that sequences individual courses and reinforces specific outcomes and purposefully guides instruction toward attaining those outcomes (Education Commission of the States, 1996). Learner-centered instruction frequently includes projects, papers, and exhibitions in which students are required to use higher-level skills, such as synthesis of knowledge. Quality programs provide opportunities for students to integrate their education with their previous experiences.

Quality instruction builds in active learning (Education Commission of the States, 1996). Students are socially and experientially involved in the learning process, promoting the continuous focus on achieving the intended learning outcomes. Instructors provide timely assessment of learning on frequent intervals. Collaboration is built into the learning process to enhance retention of learning, to develop skills in teamwork and cooperation. As students discuss what they know and what they are learning, their knowledge and understanding increases. Opportunities to interact with

the instructor outside of class increases the support in helping students meet the increased expectations.

These attributes reflect a trend in teaching and learning, and assessment—a learner-centered approach. There is a slow, but growing trend to practice quality in the classroom, focusing on learning rather than teaching (Freed & Klugman, 1997). Faculty are finding ways to involve students so that students take more ownership for their learning. Frequent feedback by faculty gives students the opportunity to make incremental improvement during the course rather than only one time at mid-term or at the end of the term. In learner-centered assessment, the focus is on learners and learning outcomes rather than on teachers and teaching, which is typical of teacher evaluations (Angelo, 1994).

Assessing Effective Instruction

Huba and Freed (2000) noted that gathering data to determine instructional effectiveness and in producing desired student learning outcomes is a primary function of curriculum and course evaluation. “Assessment is more than the collection of data. To make assessment work, educators must be purposeful about the information they collect” (Palomba & Banta, 1999, p. 4). Principles of good assessment practice include two important components: a focus on improvement and on the need to involve constituents across the institution (Huba & Freed, 2000). First, the need to improve instruction must be grounded in a set of conditions promoting change from the organizational structure and climate (American Association of Higher Education, 1992). Assessment of student learning begins with educational values and is most effective when it reflects an understanding of learning as multidimensional, integrated,

and revealed in performance over time. The program it seeks to improve should have clear, explicitly stated purposes. The focus should be on outcomes but also on the experiences that lead to those outcomes—the process and the product are equally important. Assessment should be continuous rather than episodic, providing an opportunity for student improvement. Representatives from across the campus should be involved in the assessment development process to provide a broader perspective. Through assessment, educators become accountable to students and the public.

Successful assessment flows from the institution's mission and is grounded in a conceptual framework (North Central Association of the Commission on Institutions of Higher Education, 1994). Faculty take ownership and responsibility of assessment and it maintains an institution-wide support based on the participation level at the development stage. Multiple measures are used to produce viable data for a comprehensive assessment program. Students, faculty and administration receive feedback from the process. Successful assessment does not impede or restrict goals of access, equity, and diversity established by the institution. Good practice in assessment is cost-effective and includes a process for evaluating the assessment program.

If assessment is ultimately about making changes leading to improvement the identification of key questions concerning student learning is necessary to guide the process (Huba & Freed, 2000). “What do we want to know about our students’ learning? What do we think we already know? How can we verify what we think we know? How will we use the information we get to make changes” (Huba & Freed, 2000, p. 72)? Providing answers to these questions through discussion with faculty and

administrators will move the process toward the ultimate goal—using data for improved learning in courses and programs.

Student Ratings

The need to meet accountability measures in course and program development requires a comprehensive assessment program. Evaluation of instruction through the use of student ratings is only one component of campus-wide assessment programs that are being implemented in most institutions of higher education to address accountability measures established by various governing bodies. In the mid-1980's, the need for campus-wide assessment strategies in higher education moved to the forefront of educational priorities (Palomba & Banta, 1999). A new focus on the preparation of college graduates initiated concern at all levels of higher education, driving change in assessment at this level. "The number of colleges and universities engaged in assessment has increased substantially in the past decade" (Palomba & Banta, 1999, p. 3).

Are student ratings valid measures of instructional effectiveness? Numerous studies indicate that student-rating instruments have high face validity and content validity. Cashin (1995) noted that there are more than 1500 references dealing with research on student ratings of instruction. Some of the research focused on which variables impact student ratings in a positive or negative way. Student variables not related to student ratings are the age of the student, gender of the student, level of the student, the student's GPA, and the student's personality. In addition, class size and the time of day when the course is taught is not related to student ratings of instruction. Instructor variables that impact student ratings include faculty rank and expressiveness,

indicating that the instructor's style of presentation rather than the substance of the content may influence student ratings. Student variables that impact student ratings include student motivation, the reason the student took the course, and expected grades.

Student ratings of instructors and courses are one of the most common systems used to evaluate instruction (Braskamp & Ory, 1994). Student ratings are valid to the extent that they assess an appropriate dimension of instructional effectiveness. Cashin (1988) noted that numerous studies have been conducted to examine the validity of student ratings. From the research, several factors influencing student ratings are noted. Ratings tend to be more positive when students sign them, when the instructor remains in the room, if the stated use is for promotion, if the survey is administered before final exams. Student ratings are more reliable if administered after the mid-term. Ideally, the student-rating instrument should be administered after the mid-term and before final exams. There is no significant relationship of the results of student ratings and the gender of the instructor or student; rank, age, or years of experience of the instructor; placement of items on the instrument; and negative wording of items. Using six-point scales for responses on the instrument yields only slightly more varied responses and higher reliabilities than five-point scales. Students expecting high grades tend to give higher ratings than do students expecting low grades. Ratings in elective courses are higher than in required courses. Ratings in higher-level courses are generally higher than in lower-level courses. Smaller classes tend to receive higher ratings, yet low correlations between class size and student ratings suggest class size is not a serious source of bias. Murray, Rushton, and Paunonen (1990) noted that weight of evidence on the reliability suggests that student ratings are reasonably stable across items, raters,

and time periods, indicating that they are sufficiently reliable and cannot automatically be discredited by faculty.

Based on the research of Centra (1993) and Braskamp and Ory (1994), six factors are commonly found in student rating forms: (a) course organization and planning, (b) clarity and communication skills, (c) course difficulty and workload, (d) grading and examinations, (e) student self-rated learning, and (f) teacher-student interaction. The IDEA Center Survey Form (1998b), selected for this study, is an example of a model student rating system that focuses on student learning outcomes rather than teacher behavior and is not biased toward a particular teaching strategy, but rather, the development is based on effective teaching and learning principles established by empirical research (Cashin, 1995).

Summary

In measuring instructional effectiveness, quality instruction must be defined. Measuring quality instruction requires a comprehensive evaluation system, from many points of view. Student ratings of instruction are only one component of an effective instructional evaluation program. Many variables influence instruction, such as instructional variables, student variables, and course variables—creating a difficult problem for effective measurement. Selecting items for survey instruments requires extensive research, development, and testing.

Chapter III: Methodology

Introduction

The purpose of this study was to test the theory of social interdependence through the implementation of the instructional method—cooperative learning. A comparison of student ratings of courses taught using cooperative learning (CL) and courses in which cooperative learning was not used (NCL) provided an increased understanding of how social interdependence in the classroom changed student perceptions of the instructional environment and learning. Student ratings of the impact of the instructional method (CL or NCL) on course learning environment factors, learning outcomes, and overall excellence of instruction and courses were investigated. Student ratings of the impact of course learning environment factors on learning outcomes and overall excellence of instruction and courses were also examined. Correlation and multiple regression analyses were used to analyze a variety of factors that influence student ratings.

The Research Site

Haywood Community College (HCC) served as the research site for this study. HCC is a comprehensive community college with a wide variety of programs including liberal arts and sciences, business, natural resources, and vocational/technical programs. Nearly 1300 students were enrolled in regular-schedule academic credit courses in the Spring Semester, 2001, at HCC. The courses at HCC were one semester (four months) in length, taught by fulltime and part-time instructors, and offered in the day and evening.

Haywood Community College (HCC) implemented the Entrepreneurial Learning Initiative (ELI) as part of an alternative reaccreditation model. One phase of the ELI initiative involved integrating active learning, technology, and Entrepreneurial Skills Sets in the classroom. The Entrepreneurial Learning Skills Sets (ELSS) articulated competencies designed to develop and enhance the following skills in students: (a) written, visual, and oral communication; (b) teamwork; (c) responsibility; (d) problem solving; (e) information processing; and (f) adaptability. Cooperative learning was selected as a model instructional method to be implemented voluntarily by faculty to facilitate the integration process of the ELSS and to move the college toward a learner-centered classroom environment.

To initiate the implementation phase of the ELI, three HCC faculty were sent to cooperative learning workshops in 1997. These workshops were based on the principles of the Cooperative Learning Center, University of Minnesota, directed by David and Roger Johnson. Several training sessions for faculty with the Cooperative Learning Center were conducted on the HCC campus over a three-year period from 1997 to 2001. HCC faculty who had been trained in cooperative learning also facilitated workshops for faculty during this three-year period. A network of these faculty met monthly to enhance the promotion and integration of the ELSS and cooperative learning.

Selection of the Target Population

The target population of this study included all HCC students in face-to-face, academic credit courses on a regular semester schedule, Spring Semester, 2001. The study excluded students in distance learning courses, short-session courses, independent

study courses, and college courses taught to high school students on the high school schedule. Distance learning courses and independent study courses were excluded from the study because the instructional methodology was not comparable to either CL (cooperative learning) or NCL (not using cooperative learning) instructional methods. The 339 high school students who took college courses at the high school were on a different semester schedule (ending one month after HCC courses), were taught by qualified high school faculty, were not classified as regular adult community college students (between 16 and 18 years of age), and were in a different learning environment than the college setting.

The remaining 1264 students in regular-schedule academic credit courses served as the unduplicated headcount for the study. These students made up 3069 duplicated enrollments in 227 regular-schedule academic credit courses used in the study. Each of the 1264 students enrolled took one or more courses and completed a student survey form of instruction and courses for each course, creating over 3000 completed survey forms. Students were not randomly assigned to classes—they voluntarily registered for courses in their selected program of study. The final number of surveys completed was dependent on the number of students still enrolled and attending class the day the survey was administered. The entire student population in regular-schedule academic credit courses at HCC was selected for the study to increase the strength of the research design, the generalizability of the results, and to control for the many variables that influence student ratings of instruction.

Permission to administer the student survey instrument was obtained from the Dean of Academic Services of Haywood Community College, Clyde, NC. (Appendix

G). The distribution, administration, and collection of the IDEA Center Survey Form—Student Reactions to Instruction and Courses, ICSF—SRIC, (IDEA Center, 1998b) would be performed under the direction of the HCC Research Office. The Dean of Academic Services of HCC informed division chairs and faculty that the ICSF—SRIC was to be administered in place of the student evaluation form normally given each semester to students to rate instruction and courses. The participation of faculty in administering the surveys was expected, as evaluation of courses was a required process within the guidelines of the regular evaluation system of instruction and courses used at the college.

Permission from the North Carolina State University Institutional Review Board on Research Involving Human Subjects (Appendix H) was obtained to perform the study. The research project was exempt from the policy on the research involving human subjects, outlined in the Code of Federal Regulations, because the study involved the administration of student evaluation forms of instruction and courses, which was standard procedure and a required function of the college. Copies of the three instruments used in this study were provided to the board for review. Measures to ensure the confidentiality of students and faculty were established. Completed student and faculty forms were to be returned to the HCC Research Office in sealed envelopes, labeled by course number and section only. The student identity was to remain anonymous. The staff of the HCC Research Office would then organize and pack the student and faculty forms for scanning by the IDEA Center. The data were to be coded by number and analyzed in the aggregate form to protect the confidentiality of the faculty. The completed faculty surveys on the use of cooperative learning were to be

distributed, collected, scanned, and coded by the HCC Research Office to protect the confidentiality of the faculty.

The Instruments

The IDEA Center Survey Form—Student Reactions to Instruction and Courses

The IDEA Center Survey Form—Student Reactions to Instruction and Courses (IDEA Center, 1998b), ICSF—SRIC, measured student ratings of instruction and courses for this study (Appendix A). This survey was designed for a variety of instructional environments and factors influencing student satisfaction (Cashin, 1995). Some of the key strengths of the survey were that it focused on student learning outcomes and was based on “best practice” of teaching and learning. The instrument measured a variety of instructional strategies and course-related variables, overall excellence of instruction and courses, and self-assessment. The multidimensionality of the student survey instrument increased the content validity, addressing student variables, instructional variables, and course variables. While the instrument measured several different aspects of teaching, no single student-rating item, nor set of related items, is useful for all purposes. The IDEA Center Survey Form—Student Reactions to Instruction and Courses (IDEA Center, 1998b) was extensively researched and documented over a 20-year period and is currently one of two student-rating systems most frequently used in higher education in the evaluation of instruction in the nation (Cashin, 1990). Educational Testing Services (ETS) produced the other most frequently used student-rating system, the SIR, Student Instructional Report. The comparative data collected by ETS and the IDEA Center of Kansas State University constitutes the broadest sample of academic-field data available. Permission from the IDEA Center,

Kansas State University (see Appendix I), was secured to use their instruments, IDEA Center Survey Form—Student Reactions to Instruction and Courses (IDEA Center, 1998b), presented in Appendix A, and IDEA Center Faculty Information Form (IDEA Center, 1998a), shown in Appendix J, to collect the data for the proposed study. The faculty form was used to collect demographic data from the course, such as the number of students enrolled, the type of course, and the course prefix and section.

Several studies performed by the IDEA Center established the validity of the ICSF—SRIC (IDEA Center, 1998b) instrument used in this study. Construct validity was defined as the extent to which this instrument measured the construct student learning. “Theoretically, the best criterion of effective teaching is student learning” (Cashin, 1995, p. 3). Indirect correlation and multiple regression studies on the ICSF—SRIC (IDEA Center, 1998b) indicated high relationships between (a) individual variables on the survey (methods of instruction, students’ report on progress, course objectives) and progress on student learning; (b) item analysis and progress on student learning; and (c) methods of instruction and learning objectives (IDEA Center, 2000). Through an extensive process of empirical study and administrative decisions, the items on the survey were established by IDEA Center as valid measures of the construct, student learning.

Each of the items on the ICSF—SRIC (IDEA Center, 1998b) was methodically selected to insure content validity. Content validity was defined as the degree to which the scores on the instrument adequately represented the content that these scores purport to measure. For example, instructional strategies (items 1-20 on the ICSF—SRIC) were developed by the IDEA Center through empirical research of the

correlational relationship between specific behaviors and effectiveness of instruction (IDEA Center, 2000). A questionnaire format was developed to include items which: (a) represented a meaningful dimension along which instructors might vary, (b) gave evidence of a relationship to instructional effectiveness, and (c) described teacher behavior in specific terms. Other instruments were reviewed in the item-selection process. Through factor analyses, redundant items were reduced, and the list was submitted to selected faculty, recognized for their outstanding teaching ability, for editing. Additional statistical analyses reduced this list to include items that consistently met the criteria previously established.

The development of the learning outcomes (items 21-32 on the survey) resulted from extensive study and research of general objectives that might be used to describe any undergraduate course (IDEA Center, 2000). The IDEA Center determined that if effectiveness was to be judged by the amount of student progress on learning objectives, then a method must be derived for identifying those objectives. A number of taxonomies and resources on educational objectives were used to prepare a tentative list. This list was submitted to selected professors who had been recognized for outstanding teaching, and to members of student and faculty committees on effective instruction in several colleges at Kansas State University. The list was finalized and included on the student survey.

The development of the remaining items on the survey (33-47) resulted from a major assumption that specific teacher behaviors did influence certain types of student progress under certain circumstances (IDEA Center, 2000). The goal in researching these items was to establish the relevance of a given instructional method or approach

for a particular goal. Additional items resulted from the recognition that progress of students might also be dependent upon course management decisions. In experimenting with these items, the guiding principle was how much useful information did the item yield, especially with respect to efforts to sort out effects due to the instructor in comparison to those resulting from course or student characteristics. These items have been continually researched and tested from the data produced from the administration of the surveys in hundreds of classrooms.

The reliability coefficient of the ICSF—SRIC (IDEA Center, 1998b) was above the required norm for 10 or more raters, indicating a high rate of consistency in measuring student satisfaction of courses and instruction. The ICSF—SRIC (IDEA Center, 1998b), a five-point Likert scale survey, had a reliability coefficient of .69 for 10 student raters, .70 to .83 for 11 to 15 student raters, .84 to .88 for 16 to 30 raters, .89 to .91 for 31 to 40 student raters, and .91 for 40 or more student raters (Cashin, 1995). The mean score of each item or group of items on the survey was used for comparison in performing the statistical procedures, such as descriptive statistics, correlations, or multiple regression statistical analysis. The five-point scale indicated that the higher the score on each item the higher the rate of satisfaction with the course or instruction.

The key emphasis in the development of the ICSF—SRIC (IDEA Center, 1998b) was to improve teaching, learning, and the higher education instructional process (IDEA Center, 2000). The IDEA Center has continually evaluated and updated their assessment products through periodic pilot testing of new learning-related items and program objectives. Over a twenty-year period, extensive data collection, research, and user feedback has enabled product-enhancing modifications of the survey to meet

the needs of educational institutions. The ICSF—SRIC (IDEA Center, 1998b) focuses on student learning (particularly section two) rather than instructor behavior—a more positive approach to the evaluation of instructional effectiveness. As an additional service, the IDEA Center has provided diagnostic assistance to faculty seeking to improve their effectiveness. The research by IDEA Center allows for the analysis of factors outside the instructor's control, such as student-related variables and course-related variables. The IDEA Center's national database of more than 100,000 classes and from more than 130 colleges, including 17 community colleges, provides comparative norms that permit the evaluation of results in a national context and dependable research analysis for more than 20 years. Over 200 institutions of higher education worldwide use the IDEA Center products.

Cashin (1995), director of the IDEA Center, emphasized that while the student survey was very effective in assessing student satisfaction of instruction and courses, multiple sources of data should be used in the evaluation of instruction. No single source of data, such as student ratings, provides sufficient information to make a valid judgment about overall teaching effectiveness. Despite some inconsistencies, certain conclusions have been relatively well accepted by researchers and practitioners in the use of student ratings to measure instructional effectiveness. Marsh (1987) concluded that student ratings are: (a) multidimensional, (b) reliable and stable, (c) primarily a function of the instructor who teaches a course rather than the course that is taught, (d) relatively valid against a variety of indicators of effective teaching, and (e) relatively unaffected by a variety of variables hypothesized as potential biases. As noted by Schmelkin, Spencer, and Gellman, (1997) the focus on the use of student ratings was

that they are primarily used for: (a) diagnostic feedback to faculty for instructional improvement—formative purpose, (b) evaluative personnel decisions—summative purpose, and (c) assisting students in course selection.

The rationale for selecting the ICSF—SRIC (IDEA Center, 1998b) was based on the congruency of the content of the items on the survey and the definition of cooperative learning as previously defined. In addition, the high reliability coefficient, the extensive research and development of the instruments, including reliability and validity, contributed to the selection of this survey instrument. In addition, the extensive use of the instrument in providing data from student ratings of over 100,000 courses (IDEA Center, 1998b) increased the integrity of this student-rating instrument.

In summary, the ICSF—SRIC (IDEA Center, 1998b) has several components: (a) instructional strategies, (b) learning outcomes, (c) self-assessment of student motivation, and (d) course related items. The items in the first section address instructional strategies, student-teacher interaction, and other items related to the instructor. Section two includes items related to student progress on learning outcomes and section three includes variables related to the course and student. Learning outcomes, one of the dependent variables addressed in this study, included the following items from section two of the survey (IDEA Center, 2000):

1. Gaining factual knowledge.
2. Learning fundamental principles, generalizations or theories.
3. Learning to apply course material (to improve thinking, problem solving, and decisions).

4. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course.
5. Acquiring skills in working with others as a member of a team.
6. Developing creative capacities (writing, inventing, designing, performing in art, music, drama, etc.).
7. Gaining a broader understanding and appreciation of intellectual/cultural activity (music, science, literature, etc.).
8. Developing skill in expressing myself orally or in writing.
9. Learning how to find and use resources for answering questions or solving problems.
10. Developing a clearer understanding of, and commitment to, personal values.
11. Learning to analyze and critically evaluate ideas, arguments, and points of view.
12. Acquiring an interest in learning more by asking my own questions and seeking answers.

The IDEA Center Faculty Information Form

The IDEA Center Faculty Information Form (IDEA Center, 1998a) was used to collect descriptive and demographic data concerning the courses taught at HCC (see Appendix J). Faculty were asked to identify the objectives of the course, the time and date of class meetings, course information, the number of students enrolled, the primary and secondary instructional approaches, and the requirements of work related skills. The data were not used directly in the study, but were used to identify and code student surveys from each course for the purpose of comparing CL and NCL classes. The administration of the faculty survey was required by the IDEA Center with the use of

the student-rating instrument, primarily to provide individual reports to faculty on the results of their course evaluations and to provide demographic data about students in each course. IDEA Center granted permission to use the faculty survey in the proposed study (Appendix I).

The Questionnaire on the Use of Cooperative Learning

The Questionnaire on the Use of Cooperative Learning (Cooperative Learning Center, 1991) developed by the Cooperative Learning Center, University of Minnesota, was selected to collect descriptive and demographic data relating to the use of cooperative learning in the classroom (Appendix K). The Cooperative Learning Center granted permission for the use of the QUCL in this study (Appendix L). The descriptive data from the QUCL were used to identify the instructional method implemented in the classroom—cooperative learning environments (CL) and non-cooperative learning environments (NCL). The students in the CL and NCL groups were identified through the determination of the courses that were taught using cooperative learning (CL) and those courses that were not taught using cooperative learning (NCL). The courses were selected for each group based on the instructional method used by the faculty. The faculty who implemented CL in their classrooms were asked to complete the entire QUCL. The items on the QUCL helped to determine (a) if the faculty used CL, (b) the amount of faculty training in CL, (c) the percent of time CL was used in the classroom, (d) the number of CL elements used, and (e) the courses in which they used CL. The faculty who did not use CL were asked to mark the first section of the QUCL accordingly. All the questionnaires were returned to the Research Office for scanning and coding of the courses as CL or NCL.

The students were then placed into groups based on the courses they took that were coded as either CL or NCL. The students of the CL courses comprised the experimental group and the students in the NCL courses comprised the comparison group. To qualify for inclusion in the experimental group of this study, CL course instructors must have had CL training, implemented CL 10% or more of their classroom time, and must have used the two primary CL elements, ‘individual accountability,’ and ‘positive interdependence.’ These two primary CL elements were defined in Chapter I.

Design of the Study

The design of the study was based on several factors. The nature of investigating the effects of instructional strategies, such as cooperative learning, was complex and involved a number of variables and problematic research design and analysis issues. The setting in which the study takes place generally limits control of the many variables that impact instructional effectiveness. These limitations include: (a) random assignment of faculty to use a specific instructional strategy, (b) controlling the implementation of specific instructional strategies, (c) random assignment of students to courses and instructors, (d) controlling variables to confirm that a specific instructional strategy actually created variance in achievement, student satisfaction, or other measures of instruction, (e) measuring all variables that impact instructional effectiveness and student satisfaction, and (f) gaining access and permission to use entire colleges or even classrooms for a research study.

The research design selected for this study, a representative design with a post-test only model, was based on the limitations of the instructional setting as previously

discussed. One of the problems in researching behavioral science, such as the impact of an instructional strategy, has been the random assignment of students and faculty to treatment groups and control groups. Systematic, experimental design often produces artificial learning situations and unnatural behavior in the learning (Gall, Borg, & Gall, 1996). In this study, a representative design using the entire population of non-equivalent intact classes at Haywood Community College in the Spring Semester, 2001, was selected to minimize the lack of control of variables that is generally enhanced when randomization can be used. The large number of subjects used (the entire population of students in regular-schedule academic credit courses) increased the control of the many factors influencing instructional effectiveness and the generalizability of the results. Representative design is a process for planning an experiment that accurately reflects both the real-life environments in which learning occurs and the natural characteristics of learners and increases the generalizability of the findings (Gall, Borg, & Gall, 1996). Thus, this design was most appropriate for this study due to the instructional setting selected for investigation. The desirability of representative design was based on several assumptions about the learning environment and the human learner (Gall, Borg, & Gall, 1996):

1. The characteristics of the natural environment are complex and interrelated.
2. We cannot choose to vary one environment characteristic and hold others constant.
3. Human beings are active processors of information; they do not react passively to experimental treatments.
4. Learners will adjust and adapt to their environment.

5. Any experimental intervention is likely to affect the learner in complex ways because of the complexity of the human being.

The post-test only comparison group design was the ideal model selected for use with the five point Likert scale student-rating survey instrument. This post-test only model was classified as a quasi-experimental design because of the instructional setting used, a representative design in which students were not randomly assigned to the experimental group. In this study, all the participants in the target population (students in regular-schedule academic credit courses) were selected to minimize the effects of non-randomization. Multiple regression analysis was used to increase the statistical control of variables. The treatment (use of the cooperative learning instructional strategy) was administered to the experimental group and alternative treatments (traditional classroom instruction) to the comparison group. The Questionnaire on the Use of Cooperative Learning (Cooperative Learning Center, 1991), QUCL, was a descriptive survey that was used to identify instructors implementing cooperative learning. The students in these CL courses were selected as the experimental group.

The dependent variables addressed in this study were student learning outcomes and overall excellence of instruction and courses (Appendix D) and were measured with the ICSF—SRIC (IDEA Center, 1998b). Independent variables that influence student ratings were identified through factor analysis by the IDEA Center (Pallett, 2000) based on a large database of previous results of the survey instrument used in numerous higher education courses. These factors or scales, labeled course learning environment factors (CLEF) for this study, were measured with the ICSF—SRIC (IDEA Center, 1998b) and then analyzed using correlational analysis and the multiple

regression test statistic and prediction equation to determine their relationship with the dependent variables. The independent variables (CLEF) measured by the student ratings of courses and instruction were outlined earlier in the chapter and were listed in Appendix C. The relationship of the dependent and independent variables was illustrated in Figure 2.

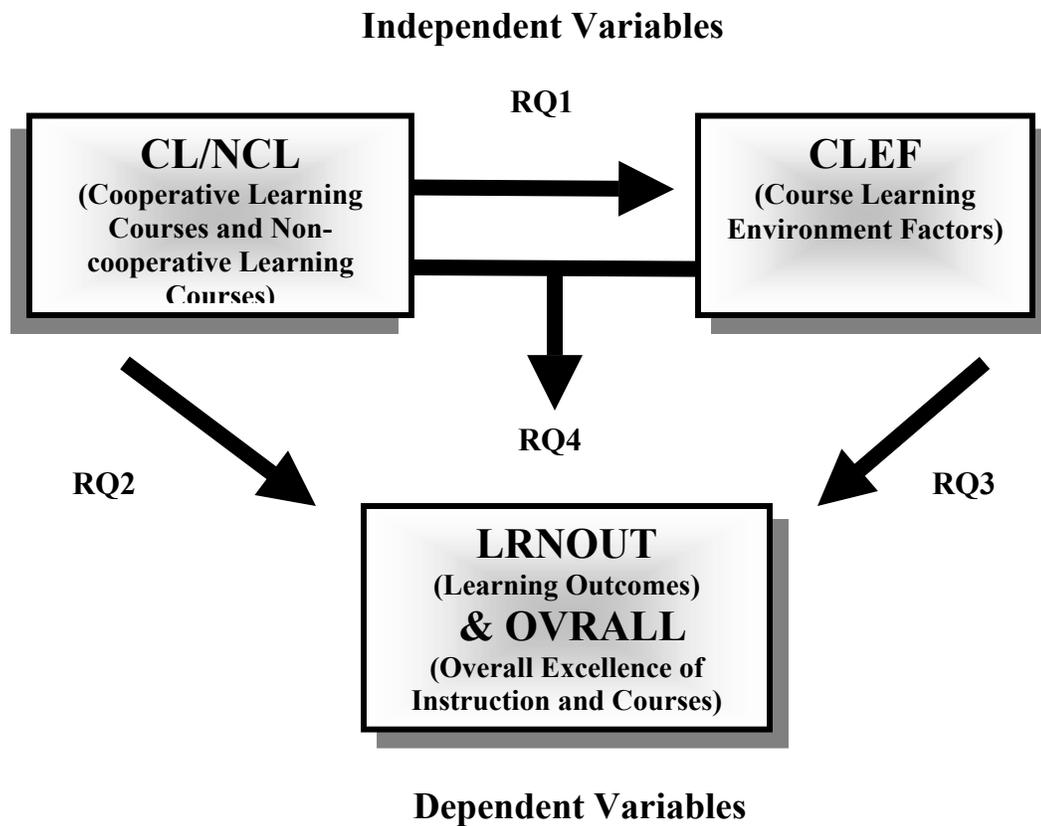


Figure 2. The Conceptual Model of the Relationships of the Variables in the Study

Hypotheses

The following null hypotheses for each of the four research questions were tested. Hypotheses were rejected at the .05 alpha level.

Research Question One. What is the impact of the instructional method (CL and NCL courses) on student ratings of CLEF (course learning environment factors) in the community college classroom?

Hypotheses:

H_{1a} There is no difference in student perceptions of CL and NCL courses for INSTMETH (implementation of techniques for learning engagement) as measured by student ratings of courses and instruction in the community college classroom.

H_{1b} There is no difference in student perceptions of CL and NCL courses for DIFF (degree of course difficulty) as measured by student ratings of courses and instruction in the community college classroom.

H_{1c} There is no difference in student perceptions of CL and NCL courses for SELFASMT (self-assessment of participation and motivation) as measured by student ratings of courses and instruction in the community college classroom.

H_{1d} There is no difference in student perceptions of CL and NCL courses for STUFAC (degree of student faculty contact) as measured by student ratings of courses and instruction in the community college classroom.

H_{1e} There is no difference in student perceptions of CL and NCL courses for INVOLVE (level of interactive student involvement) as measured by student ratings of courses and instruction in the community college classroom.

H_{1f} There is no difference in student perceptions of CL and NCL courses for HIGHEXP (faculty emphasis on high expectations) as measured by student ratings of courses and instruction in the community college classroom.

H_{1g} There is no difference in student perceptions of CL and NCL courses for COMM (clarity of instructor's perspective on content) as measured by student ratings of courses and instruction in the community college classroom.

H_{1h} There is no difference in student perceptions of CL and NCL courses for ASSESS (emphasis on assessment and feedback) as measured by student ratings of courses and instruction in the community college classroom.

H_{1i} There is no difference in student perceptions of CL and NCL courses for STFOCUS (faculty emphasis on key elements of the course) as measured by student ratings of courses and instruction in the community college classroom.

H_{1j} There is no difference in student perceptions of CL and NCL courses for INTRST (promoting student interest in the course) as measured by student ratings of courses and instruction in the community college classroom.

H_{1k} There is no difference in student perceptions of CL and NCL courses for GRPSKLS (faculty emphasis on group learning/team skills) as measured by student ratings of courses and instruction in the community college classroom.

H_{1l} There is no difference in student perceptions of CL and NCL courses for MULTIPLE (the use of multiple instructional approaches) as measured by student ratings of courses and instruction in the community college classroom.

Research Question Two. What is the impact of the instructional method (CL and NCL) on student ratings of LRNOUT (learning outcomes) and OVRALL (overall excellence of courses and instruction) in the community college classroom?

Hypotheses:

H_{2a} There is no difference between student perceptions of CL and NCL courses on learning outcomes as measured by student ratings of courses and instruction in the community college classroom.

H_{2b} There is no difference between student perceptions of CL and NCL courses on overall perception of course and instructional excellence as measured by student ratings of courses and instruction in the community college classroom.

Research Question Three. What is the impact of CLEF (course learning environment factors) on student ratings of LRNOUT (learning outcomes) and OVRALL (overall excellence of courses and instruction) in the community college classroom?

Hypotheses:

H_{3a} There is no impact of course learning environment factors on student perceptions of learning outcomes measured by student ratings of courses and instruction in the community college classroom.

H_{3b} There is no impact of course learning environment factors on the overall student perceptions of course and instructional excellence as measured by student ratings of courses and instruction in the community college classroom.

Research Question Four. What is the impact of the instructional method (CL and NCL) and CLEF (course learning environment factors) on student ratings of LRNOUT (learning outcomes) and OVRALL (overall excellence of courses and instruction) in the community college classroom?

Hypotheses:

H_{4a} There is no relationship between CLNCL and CLEF and LRNOUT in the community college classroom as measured by student ratings of instruction and courses.

H_{4b} There is no relationship between CLNCL and CLEF and OVRALL in the community college classroom as measured by student ratings of instruction and courses.

Collection of Data

Overview of the Collection of Data

The collection of the data involved the administration of three instruments, the IDEA Center Survey Form—Student Reactions to Instruction and Courses (IDEA Center 1998b), the IDEA Center Faculty Information Form (IDEA Center, 1998a), and the Questionnaire on the Use of Cooperative Learning (Cooperative Learning Center, 1991). Permission from the HCC Dean of Academic Services to administer the surveys and permission from the North Carolina State University Institutional Review Board on Research Involving the Use of Human Subjects were obtained as noted previously. Guidelines to ensure the confidentiality of the subjects involved were established and followed in this study.

Description of the Data Collection

The Dean of Academic Services notified the faculty on the procedure for the administration of the student and faculty surveys and the requirement of their participation. Full compliance in completing the surveys was important not only for the purposes of this study but also for use by the college in the normal process of evaluation of instruction and for evaluation of the implementation of the college's

Entrepreneurial Learning Initiative in promoting the use of active learning, technology, and employability skills as part of instruction. Faculty were notified that the information collected would be strictly confidential and that all responses would be analyzed in the aggregate form, rather than individual classrooms.

Students were to be surveyed within a two-week period at the end of the semester before final exams (April 23 – May 4, 2001). Faculty were given instructions, provided by the IDEA Center, on how to administer the IDEA Center Survey Form—Student Reactions to Instruction and Courses (IDEA Center, 1998b) during the designated times. Faculty completed the IDEA Center Faculty Information Form (IDEA Center, 1998a) and the Questionnaire on the Use of Cooperative Learning (Cooperative Learning Center, 1991) during the designated time period (April 23 – May 4, 2001).

Collection of data was performed in a professional manner, protecting the confidentiality of the student and the faculty. Selected HCC personnel from the Academic and Research Divisions were given instructions on the distribution, administration, and collection of survey forms from each of the college divisions. Completed surveys were placed in envelopes identified by course number and section only to protect the confidentiality of the participants. Upon collection of all the forms in sealed envelopes, they were packed and secured by the HCC Research Division for mailing to the IDEA Center for processing. The Research Division Staff normally process faculty evaluations. The IDEA Center returned the aggregate data of the scanned surveys to the investigator in the form of a data disk, allowing further manipulation of the data by the investigator for the purposes of this study. A copy of

the aggregate data was provided to the Academic Services and Research Divisions for their archives. The IDEA Center provided descriptive data on the survey results and reports to individual faculty members with recommendations for improvement, which were not viewed by the researcher. Upon receipt from the IDEA Center, these faculty reports were delivered, still secured, to the Research Division for distribution by appropriate support staff in each instructional division, maintaining the confidentiality of the data and without knowledge of the researcher. Individual faculty diagnostic reports were not part of this study, but were provided to the college as part of the IDEA Center evaluation system.

The HCC Research Division personnel distributed and collected the descriptive surveys for faculty, the Questionnaire on the Use of Cooperative Learning (Cooperative Learning Center, 1991). The completed forms were returned to the HCC Research and Development Office for scanning and coding. The researcher used the data from the QUCL to select courses (and thus, students) for the CL experimental group and the NCL comparison group for this study. The course number and section was used to identify CL and NCL courses for the purposes of this study. The aggregate data, rather than individual faculty information, was used for analysis in comparing the two learning environments.

Analyses

The purpose of this study was aimed at comparing the relationship of student ratings of overall excellence of instruction and courses and learning outcomes in CL and NCL environments. Student ratings of CL and NCL courses and the CLEF (course learning environment factors) were compared to test for statistical relationships. The

relationship of the CLEF (course learning environment factors), learning outcomes and overall excellence of instruction and courses were also analyzed. Descriptive statistics and correlational analysis were used in the preliminary analysis of the data (mean scores of designated groups of items from the student-rating survey instrument) in preparation for hypothesis testing. The descriptive statistics gave the measures of central tendency. The correlational analysis established the strength, significance, and direction of the relationship of the variables. The multiple regression test statistic and prediction equation was used to further analyze the data produced from the student-rating instrument to explain the variance in student ratings on the dependent variables (research questions one, two, three and four). The purpose of the regression analysis was to establish the strength and significance of the relationship of the variables and whether the relationship produced a predictive, linear model. Using multiple regression, the relationship of the variables was expressed through an equation for predicting typical values of one variable given the value of another variable. The simplest equation is that of a straight line. For example, a strong positive linear relationship (near 1.0) indicated that as the value of one variable increased the value of the other variable increased (SPSS Incorporated, 1999).

The research questions investigated in this study are part of the behavioral science milieu in which research is difficult and complex due to the nature of the research setting, evaluating instructional excellence and learning outcomes using student ratings. Multiple regression has been increasingly used in representative designs typical of behavioral science due to its efficiency in handling multiple variables, the accessibility to software that can address the numerous and complex computations of

multiple regression, increased understanding of multiple regression and its advantages—particularly in behavioral sciences, and the statistical control of variables in quasi-experimental designs (Pedhazur, 1997). Simple regression could be used to measure each independent variable, but overlooks the possibility that the independent variables may be intercorrelated or that they may interact their effects on the dependent variable. Multiple regression analysis (MR) was especially designed for analyzing collective and separate effects of two or more independent variables on a dependent variable. Thus, it was the ideal analytical tool for analyzing the relationship of student ratings of overall excellence of courses and instruction, learning outcomes, course learning environment factors, and instructional methods (CL and NCL classrooms). It would be difficult, if not impossible to use other comparison test statistics, as only one independent variable would be measured at a time. Many factors influence student ratings of instruction, courses and learning outcomes. In using multiple regression analysis, this study measured several selected course learning environment factors (CLEF) that impact student ratings of instruction, courses, and learning outcomes. Not all variables can be measured, however, as no study is completely comprehensive in measuring all variables.

The study attempted to shed light on the social interdependence theory and how effective it was when applied to the community college instructional environment through cooperative learning. The variables related to the theory were many and were the primary consideration in the selection of the CLEF (course learning environment factors) measured in the study and the selection of an analytical tool that could analyze numerous variables, how they related to the dependent variables (instructional

effectiveness and learning outcomes), how they were correlated to each other in relation to the dependent variables, and how they explained the theory of social interdependence, operationalized through cooperative learning.

Upon administering the student survey to all HCC students enrolled in regular-schedule academic courses in Spring Semester, 2001, the resulting data were analyzed using the multiple regression test statistic and the multiple regression prediction equation. The analyses determined how much each of the independent variables (CLEF) influencing student satisfaction contributes to the overall predictive relationship, independent of the others, of student ratings of learning outcomes and overall instructional effectiveness. Part I of the analyses involved four major steps (research questions), each requiring multiple regression analyses: (a) analysis of the data from student ratings of CL and NCL courses in relation to the dependent variables, CLEF (course learning environment factors), (b) analysis of the relationship of the instructional method (CL and NCL) and the dependent variables, learning outcomes overall excellence of instruction and course, (c) analysis of the data from student ratings of the independent variables, CLEF (course learning environment factors in relation to the dependent variables, learning outcomes and overall excellence of courses and instruction, and (d) analysis of the data from student ratings of the combined impact of the independent variables CLNCL and CLEF in relation to the dependent variables, learning outcomes and overall excellence of courses and instruction. In two of the four multiple regression analyses, the best regression model fit was the goal of the first step, where multiple independent variables existed. Multiple regression analysis provided an estimate of the overall degree of the predictive relationship of the

independent variables with the dependent variables through the multiple regression equation. The second step of the analysis of each hypothesis was to determine the individual contribution (or strength) of each independent variable in predicting (or explaining) the student satisfaction rating of instructional effectiveness and learning outcomes. Finally, the significance of the relationship of the variables was also determined by multiple regression.

Assumptions

Assumptions of multiple regression (MR) statistical analysis include (Agresti & Finlay, 1997):

1. The population of the distribution of Y is normal, for each combination of values $X_1 \dots X_k$.
2. Random sampling is used.
3. In the multiple regression model, for quantitative variables, statistical interaction exists when the slope of the relationship between the response variable and an explanatory variable changes as the levels of the other variables change.

Chapter IV: Findings

Introduction

Overview of the Study

The purpose of this study was to test the theory of social interdependence through the implementation of cooperative learning with adult students across curricula in a comprehensive community college. The theory of social interdependence, through the practice of cooperative learning, expanded the learning circle from individuals competing alone to groups learning together (Lewin, 1935; Deutsch, 1949). Goal interdependence, resource and role interdependence, and reward and task interdependence guided the success of the group members (Johnson, Johnson, & Smith, 1998a). Students constructed knowledge as they worked in groups in a task-oriented learning environment. Through promotive interaction individual learning and productivity was enhanced. If the learning environment was not cooperative, it was defined as two differing types of learning environments that promoted either competition or individualistic efforts (found in the traditional passive lecture-based classroom environment) (Johnson, Johnson, & Smith, 1998a). In this study, the operationalized function of social interdependence was to determine the relationships among the following variables: cooperative learning and traditional learning, factors that impact the classroom environment, learning outcomes, and the overall excellence of instruction and courses at one institution, Haywood Community College.

The quasi-experimental representative design proposed that two groups of data would be compared on three variables: course learning environment factors, learning outcomes, and overall excellence of instruction and courses. These variables were

measured using the IDEA Center Survey Form—Student Reactions to Instruction and Courses, ICSF—SRIC, (IDEA Center, 1998b) in courses taught cooperatively (CL) and courses not taught cooperatively (NCL). The relationship of the three variables (course learning environment factors, learning outcomes, and overall excellence of instruction and courses) was also measured. The four research questions explored (a) the comparison of the two instructional methods (CL and NCL) with regard to CLEF (course learning environment factors), (b) the comparison of CL and NCL courses with regard to learning outcomes and overall excellence of instruction and courses, (c) the relationship of the CLEF and learning outcomes and overall excellence of instruction and courses, and (d) the relationship of the combined variables, CLEF and CL/NCL, with learning outcomes and overall excellence of instruction and courses.

The conceptual model of the relationships of the variables was displayed in Figure 2, Chapter III. To better understand each research question, the sub-component of the overall model illustrating each research question was displayed after each question in this chapter. In the analysis, descriptive statistics, correlation, and multiple regression statistical procedures provided data to establish the impact of the instructional method (CL or NCL) and CLEF (course learning environment factors) on learning outcomes and overall observation of instruction and courses, and further, to determine the relationship between each of the variables.

Description of the Respondents and the Related Data

The Target Population

Haywood Community College, a comprehensive community college in Clyde, North Carolina, was the research site used in this study. HCC offered 37 programs of

study which included college transfer programs, natural resources, business, health, human services, computer science, engineering, and vocational programs. In the Spring Semester, 2001, nearly 75% of the students were enrolled in vocational-technical programs at Haywood Community College. The remaining 25% were enrolled in the college transfer programs. The average age of these adult students for Spring Semester, 2001, was 32, with 55% female and 45% male students. The ethnic distribution was 95.6% white Caucasian, 1.4% African American, 0.6% Asian, 0.8% American Indian, and 1.6% Hispanic. The ethnic population of the college (4.4%) was more than double the size of that in the rural service area of Haywood County (2.1%) (U.S. Census Bureau, 2001). Haywood County has a population of just over 52,000 and a poverty rate of 13.7%. This study examined the target population of all students who took face-to-face, academic credit courses taught on the regular semester schedule at HCC for adult community college students during Spring Semester 2001. The study excluded students in distance learning courses, eight-week or short-session courses, independent study courses with one or two students, and college courses taught to high school students at the high school on the high school schedule. The survey instrument was not suitable for students in distance learning or independent courses. The survey was administered during a two-week period near the end of the regular semester schedule before final exams, which did not coincide with the short-session or the high school course schedule.

The unduplicated headcount of enrolled students was 1603—339 of which were high school students taking college courses at the high school (Haywood Community College, 2001). These 339 high school students were not included in the study as stated

previously, leaving 1264 as the unduplicated headcount of students included in this study. These 1264 students took one or more courses and completed the student-rating instrument in each course. As a result, over 3000 student-rating forms were collected for this study. The average credit hour load was 9.1 semester hours per student. The majority of students (77%) were from Haywood County; the remaining students were from 49 other counties in North Carolina (18%) and 7 other states (5%). Over 58% of the students were enrolled on a part-time basis, and 42% were enrolled fulltime. Nearly 67% of the students worked either part-time or fulltime jobs. Over 29% of the students transferred credits from other postsecondary institutions and 15% had earned a bachelor's degree or higher. Nearly 46% of the students received some type of financial aid.

Description and Selection of Faculty and Courses Used in the Study

The students in the CL and NCL groups were identified through the determination of the courses that were taught using cooperative learning (CL) and those courses that were not taught using cooperative learning (NCL). The courses were selected for each group based on the instructional method used by the faculty. The students were then placed into groups based on the courses they took that were identified as either CL or NCL, which was determined by the instructional method used. To ascertain if cooperative learning was used in the course, faculty who implemented CL completed the entire Questionnaire on the Use of Cooperative Learning (QUCL) (Cooperative Learning Center, 1991). This instrument established the CL training of the faculty, the percent of class time CL was used, and how the CL elements were integrated. To meet the criteria for a CL course, the faculty must have

had training in CL, used CL 10% or more of the classroom time, and implemented the two primary elements of cooperative learning, ‘individual accountability,’ and ‘positive interdependence.’ The faculty who did not use CL marked the survey accordingly and did not complete the remainder of the items on the QUCL related to the implementation of CL.

Of the 104 HCC faculty in Spring Semester 2001, there were 24 who met the criteria for a CL course described in Chapter III. Of the remaining faculty, 76 were classified as teaching NCL courses, and 4 were excluded from the study. These four excluded faculty did not meet the criteria established for this study for implementing CL their courses, but stated they used cooperative group learning. The student ratings from this group were not for either CL or NCL courses, as the faculty did not meet the qualifications for either group.

Faculty who used cooperative learning varied in the amount of training, time CL was used in the classroom, and the implementation of the CL elements as shown in Tables 3, 4, and 5. As noted in Table 3, 50% of the CL 24 faculty received 1 to 20 hours of training in cooperative learning, 42% received 20-39 hours of training, and 8% received more than 60 hours of training. The amount of time that faculty utilized cooperative learning in the classroom ranged from 10% to over 76%. As presented in Table 4, 54% of the CL faculty used cooperative learning 10 to 25% of the time, 21% used cooperative learning 26 to 50% of the time, 17% used cooperative learning 51 to 75% of the time, and 8% used cooperative learning more than 76% of the class time.

Table 3. Summary of the Data from the QUCL (Cooperative Learning Center, 1991) on the Hours of CL Training

Hours of CL Training	Frequency by Number of Instructors	Percent
Between 1 and 20 hours	12	50.00
20 – 39 hours	10	42.00
40 – 59 hours	0	0
60 – 79 hours	1	4.00
More than 80 hours	1	4.00
Total Instructors Using CL	24	100

Table 4. Summary of the Use of CL in the Classroom from the Results of the QUCL (Cooperative Learning Center, 1991)

Percent of Class Time CL is Used	Frequency by Number of Instructors	Percent
10-25% of the time	13	54.17
26-50% of the time	5	20.83
51-75% of the time	4	16.67
More than 76% of the time	2	8.33
Totals	24	100.00

Table 5. Summary of the Implementation of the CL Elements from the Results of the QUCL (Cooperative Learning Center, 1991)

Cooperative Learning Elements	Frequency by Number of Instructors Using Element	Percent
Individual Accountability	24	100.00
Positive Interdependence	24	100.00
Promotive Interaction	23	95.83
Social/Team Skills	15	62.50
Group Processing	15	62.50

As shown in Table 5, all 24 of the CL faculty indicated they implemented the two primary elements of cooperative learning—‘individual accountability’ and ‘positive interdependence.’ These two elements support the individual and the group members as a whole in the cooperative learning environment. The goal of cooperative learning groups was to make each member stronger in his or her own right through ‘individual accountability’ (Johnson, Johnson, & Smith, 1998a). ‘Positive interdependence’ in cooperative group learning indicated that the group had a clear, measurable task, and that learning was structured so that each student was responsible for the learning of others as well as his/her own learning.

The remaining three cooperative learning elements established the structure for the cooperative learning environment. The element ‘promotive interaction’ was used by 96% of the instructors. ‘Promotive interaction’ required that students work ‘face-to-face’ and actively promote each other’s success. Both CL elements ‘social/team skills’ and ‘group processing’ were used by 63% of the instructors. ‘Social skills’ were

necessary for students to work effectively with others in small groups. ‘Group processing’ ensured that members of the group reflected (processed) how well they were functioning.

To further clarify the type of instructors in each of the CL and NCL groups, the number of part-time and fulltime instructors was reviewed. The number of fulltime and part-time instructors in each of the two groups (CL and NCL) were very similar. In the group of 24 CL instructors, 37% were part-time faculty and 63% were fulltime faculty. In the group of 76 NCL instructors, 43% were part-time faculty and 57% were fulltime faculty. The similarity of the number of courses in each group taught by part-time and fulltime instructors was presented in Table 6. Part-time instructors taught 41% of the CL courses and fulltime instructors taught 59% CL of the courses. Part-time faculty taught 37% of the NCL courses and fulltime faculty taught 63% of the NCL courses. The fulltime or part-time status of the faculty did not appear to be a factor in the results of this study. A statistical comparison indicated there was no significant difference between CL and NCL courses on part-time or fulltime instructional status, with a *p-value* of .622 measured at the .05 alpha level.

Table 6. Summary of Courses Taught by Part-time and Fulltime Faculty

Description	N	Courses taught by Part-time Instructors	Percent of N	Courses taught by Fulltime Instructors	Percent of N
CL Courses	54	22	40.74	32	59.26
NCL Courses	165	61	36.96	104	63.04
Total Courses	219	83	37.90	136	62.10

Description of Students in CL and NCL Groups

This study looked at all students in CL and NCL courses. The Questionnaire on the Use of Cooperative Learning (QUCL) (Cooperative Learning Center, 1991) was used to identify the CL and NCL courses based on the instructional method used by the faculty. The experimental group included all students in CL courses in the Spring Semester, 2001, at HCC. The corresponding data from student surveys administered in these courses were then coded as CL courses (identified by the numerically as '1'). The comparison group included all students in NCL courses, and the corresponding data were coded as NCL courses (identified by the numerically as '0'). The summary of the data results was presented in Table 7.

Table 7. Summary of Student Respondents on the ICSF—SRIC (IDEA Center, 1998b)

Groups used in Study by Type of Instructional Method	Number of Faculty	Number of Courses	Number of Students Enrolled	Number of Students Completing Survey	Completion Rate for Group	Percent of Total Students Completing Survey
CL Courses (Experimental Group)	24	54	620	508	81.93	21.60
NCL Courses (Comparison Group)	76	165	2377	1782	74.97	75.77
Group Excluded (did not meet CL criteria)	4	8	72	62	76.74	2.63
Totals	104	227	3069	2352	76.63	100

A total of 219 courses were included in the study—54 of which were taught using cooperative learning (CL) instructional methods. The remaining 165 were NCL courses (courses not taught cooperatively). A total of 3069 students (duplicated headcount) were enrolled in all courses, with 2997 (98%) eligible for inclusion in the study as a result of the selection of faculty who met the CL criteria using the QUCL (Cooperative Learning Center, 1991). Of the 3069 total students, 2352 (77%) completed the student survey. Of these, 2290 (97%) were used in the study as a result of the criteria for selection of CL courses.

Of the 620 students who were enrolled in the 54 CL courses (22% of the total number of courses), 508 completed the student survey (an 82% completion rate) as described in Table 7. Of the total number of students, 2377 were enrolled in the 165 NCL courses (78% of the total number of courses). Of the 2377 total students enrolled in NCL courses, 1782 completed the survey—a 75% completion rate. The number of students enrolled and the number of students responding in each of the CL and NCL groups was not a factor in the study. A statistical comparison of the number of students enrolled in CL and NCL courses (class size) indicated there was no significant difference between the two groups on enrollment (class size), resulting in a *p-value* of .125 measured at the .05 alpha level. A statistical comparison of the number of students responding in the CL and NCL courses resulted in no significant difference between the two groups, indicated by a *p-value* of .351 measured at the .05 alpha level. The comparisons indicated that the number of students enrolled (class size) and the number of students responding to the student rating survey in CL and NCL courses were similar.

Description of Programs

A broad array of academic programs was represented in both CL and NCL groups used in the study. College transfer programs as well as vocational and technical programs were represented in both the CL and NCL groups (see Appendix K). The CL experimental group, however, consisted of a higher percentage of students in vocational-technical courses in comparison to the NCL group as presented in Table 8. In the CL group, 82% of the students enrolled completed the survey. Of these students, 75% of the college transfer students enrolled in CL courses completed the survey, while 85% of the vocational-technical students enrolled in CL courses completed the survey. In the NCL group, 75% of the students completed the survey. Of these students, 73% of the college transfer students enrolled in NCL courses complete the survey and 78% of the vocational-technical students enrolled in NCL courses completed the survey.

Table 8. Summary of Student Respondents on the ICSF—SRIC (IDEA Center, 1998b) by General Program Type

Groups used in Study by General Program Type	Number of Students Enrolled	Percentage of Students Enrolled in the Group	Number of Respondents	Percent of Students Enrolled in the Group	Percent of Respondents for Group
CL Courses					
College Transfer	200	32.26	149	29.33	74.50
Vocational-Technical	420	67.74	359	70.67	85.48
CL Total	620	100.00	508	100.00	81.94
NCL Courses					
College Transfer	1411	59.36	1026	57.58	72.71
Vocational-Technical	966	40.64	756	42.42	78.26
NCL Total	2377	100.00	1782	100.00	74.97

Based on headcount enrollment data for the spring semester 2001 (Haywood Community College, 2001) 25% of the students enrolled were college transfer majors while 75% were vocational-technical majors. Nearly 50% of the students who took college transfer courses were actually vocational-technical students taking academic courses required for the diploma and associate degree programs. When combining the CL and NCL groups, 54% were students enrolled in college transfer courses, while 46% were enrolled in vocational-technical courses. Over 26% of the total students responding were in the CL group and 74% were in the NCL group.

Preliminary Statistical Analysis

Descriptive Statistics

Preliminary statistical analysis was used to lay the groundwork for hypotheses testing by establishing the measures of central tendency of each of the variables, the significance of the relationships between the variables, and the direction and strength of the relationships of the variables used in the study. Descriptive and correlational statistics provided the statistical foundation for hypotheses testing. Table 9 presented each of the abbreviations for instruments used to measure variables and for each of the variables used in the study.

Table 9. Abbreviated Terms Used in the Study and Their Description

Term	Description
Instruments	
ICSF-SRIC	IDEA Center Survey Form—Student Reactions to Instruction and Courses (IDEA Center, 1998b).
ICFIF	IDEA Center Faculty Information Form (IDEA Center, 1998a).
QUCL	Questionnaire on the Use of Cooperative Learning (Cooperative Learning Center, 1991).
Variables	
CLNCL (Independent Variable)	Cooperative Learning (CL) and Non-Cooperative Learning Courses (NCL) as measured by the Questionnaire on the Use of Cooperative Learning (Cooperative Learning Center, 1991). See Appendix J.
CLEF (Independent Variable/Dependent Variable)	Course learning environment Factors; determined by the IDEA Center through factor analysis on the items (1-20 and 33-47) on the ICSF—SRIC (IDEA Center, 1998b). See Appendix D.
LRNOUT (Dependent Variable)	Learning Outcomes; measured by items 21-32 on the ICSF—SRIC (IDEA Center, 1998b). See Appendix A.
OVRALL (Dependent Variable)	Overall excellence of instruction and courses as measured by items 41 and 42 on the ICSF—SRIC (IDEA Center, 1998b). See Appendix E.
CLEF	Course learning environment factors:
ASSESS	Faculty emphasis on assessment and feedback.
COMM	Clarity of instructor's perspective on content.
DIFF	Degree of course difficulty.
GRPSKLS	Faculty emphasis on group learning/team skills.
HIGHEXP	Faculty emphasis on high expectations.
INSTMETH	Implementation of techniques for learning engagement.
INTRST	Promoting student interest in the course.
INVOLVE	Level of interactive student involvement.
MULTIPLE	The use of multiple instructional approaches.
SELFASMT	Self-assessment of the level of student participation and motivation.
STFOCUS	Faculty emphasis on key elements of the course.
STUFAC	Degree of student-faculty contact.

Descriptive statistics explained each of the variables in terms of the measures of central tendency (mean) and measures of variability (standard deviation) (Table 10).

The higher the mean score, the more common the phenomenon was observed. In comparing the CL group and the NCL group, the mean score was typically higher for each of the variables in the CL group. The lower the standard deviation, the less the variance among the distribution of the scores. Less variance occurred in the CL group scores on each of the variables than in the NCL group scores.

Table 10. Descriptive Statistics of the Variables

Variable	Group	N Students	N Courses	Min	Max	Mean	SD	SE
LRNOUT	NCL	1782	165	26.80	60.00	48.067	6.895	--
	CL	508	54	26.80	60.00	50.895	5.807	
OVRALL	NCL	1782	165	4.20	10.00	8.654	1.269	--
	CL	508	54	5.40	10.00	9.037	0.948	
CLEF:								
INSTMETH	NCL	1782	165	40.00	100.00	85.525	10.783	0.840
	CL	508	54	54.20	100.00	90.452	8.326	1.133
DIFF	NCL	1782	165	5.80	14.40	10.193	1.510	0.118
	CL	508	54	8.60	14.20	10.487	1.163	0.158
SELFASMT	NCL	1782	165	13.70	29.30	22.899	3.164	0.246
	CL	508	54	16.80	27.80	23.946	2.578	0.351
STUFAC	NCL	1782	165	6.00	15.00	13.014	1.627	0.127
	CL	508	54	7.40	15.00	13.578	1.318	0.179
INVOLVE	NCL	1782	165	9.80	25.00	20.105	3.468	0.270
	CL	508	54	12.20	25.00	22.317	2.472	0.336
HIGHEXP	NCL	1782	165	12.60	25.00	21.815	2.352	0.183
	CL	508	54	16.40	25.00	22.633	1.876	0.255
COMM	NCL	1782	165	6.00	15.00	12.878	1.716	0.134
	CL	508	54	7.60	15.00	13.539	1.303	0.177
ASSESS	NCL	1782	165	6.20	20.00	17.201	2.166	0.169
	CL	508	54	11.60	20.00	18.074	1.687	0.230
STFOCUS	NCL	1782	165	10.00	25.00	22.366	2.567	0.200
	CL	508	54	16.20	25.00	23.069	1.923	0.262
INTRST	NCL	1782	165	4.40	10.00	8.774	1.109	8.637E-02
	CL	508	54	5.40	10.00	9.107	0.924	0.126
GRPSKLS	NCL	1782	165	6.80	20.00	16.021	2.814	0.219
	CL	508	54	10.20	20.00	17.785	1.896	0.258
MULTIPLE	NCL	1782	165	8.20	20.00	16.170	2.633	0.205
	CL	508	54	7.80	20.00	17.669	2.294	0.312

Correlational Statistics

As a second part of the preliminary analysis, correlational relationships of the variables used in the study indicated comparative associations (direction and significance) and established the foundation for regression statistical analysis used for hypothesis testing. There was a statistically significant and positive relationship among a large number of the variables explored in the study, as indicated in Tables 11, 12, and 13. The *p-value* of a number of the variables was below the alpha level 0.05, and some were measured at less than the alpha level 0.01. A highly significant association was found between LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) with a *p-value* of .000, and LRNOUT (learning outcomes) and CLNCL (CL or NCL instructional method), with a *p-value* of .007. The relationship of CLNCL (CL or NCL instructional method) and 10 of the 12 CLEF (course learning environment factors) variables were also statistically significant. The direction of the relationship favored CL, in that when CL was used, the mean scores of the variables were higher on 10 of the 12 CLEF. CLNCL (CL or NCL instructional method) and the CLEF (course learning environment factors) variables INSTMETH (techniques for learning engagement), INVOLVE (level of student involvement), ASSESS (emphasis on assessment and feedback), GRPSKLS (emphasis on group learning skills), and MULTIPLE (use of multiple instructional approaches) associations were significant at the .01 alpha level. There was no statistically significant relationship between CLNCL (CL or NCL instructional method) and the CLEF (course learning environment factors) variables DIFF (degree of course difficulty) and STUFOCUS (faculty emphasis on key elements of the course). All the remaining CLEF (course learning environment factors)

variables SELFASMT (self-assessment of the level of student participation and motivation), STUFAC (degree of student-faculty contact), HIGHEXP (emphasis on high expectations), COMM (instructor's clarity of content), and INTRST (promoting student interest in the course)) and CLNCL (CL or NCL instructional method) had a marginal association with a significance level of less than .05. The relationship between LRNOUT (learning outcomes) and each of the CLEF (course learning environment factors) was significant at the .01 level. The correlation between OVRALL (overall excellence of instruction and courses) and each of the CLEF (course learning environment factors) was significant at the .01 level, except for DIFF (degree of course difficulty), which had a *p-value* of .082.

Table 11. Correlations of the Dependent Variables, CLEF, LRNOUT, and OVRALL, and the Independent Variable, CLNCL

Correlations	r	P
LRNOUT VS OVRALL	0.767	.000**
LRNOUT VS CLNCL	0.181	.007**
OVRALL VS CLNCL	0.137	.042*
CLNCL and CLEF (course learning environment factors) Variables:		
CLNCL VS INVOLVE	0.282	.000**
CLNCL VS GRPSKLS	0.280	.000**
CLNCL VS MULTIPLE	0.246	.000**
CLNCL VS INSTMETH	0.204	.002**
CLNCL VS ASSESS	0.181	.007**
CLNCL VS COMM	0.174	.010*
CLNCL VS HIGHEXP	0.156	.021*
CLNCL VS STUFAC	0.155	.022*
CLNCL VS SELFASMT	0.148	.029*
CLNCL VS INTRST	0.134	.048*
CLNCL VS STFOCUS	0.124	.066
CLNCL VS DIFF	0.089	.192

** Correlation is significant at the .01 level (2-tailed).

* Correlation is significant at the .05 level (2-tailed).

Table 12. Correlations of the Dependent Variable, LRNOUT, and the Independent Variables, CLEF

Correlations	r	P
LRNOUT VS INSTMETH	0.884	.000**
LRNOUT VS INVOLVE	0.837	.000**
LRNOUT VS COMM	0.828	.000**
LRNOUT VS INTRST	0.827	.000**
LRNOUT VS STUFAC	0.826	.000**
LRNOUT VS MULTIPLE	0.825	.000**
LRNOUT VS HIGHEXP	0.823	.000**
LRNOUT VS GRPSKLS	0.822	.000**
LRNOUT VS ASSESS	0.813	.000**
LRNOUT VS STFOCUS	0.742	.000**
LRNOUT VS SELFASMT	0.714	.000**
LRNOUT VS DIFF	0.262	.000**

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 13. Correlations of the Dependent Variable, OVRALL, and CLEF Independent Variables

Correlations	r	P
OVRALL VS HIGHEXP	0.846	.000**
OVRALL VS INSTMETH	0.831	.000**
OVRALL VS INTRST	0.823	.000**
OVRALL VS STFOCUS	0.820	.000**
OVRALL VS SELFASMT	0.801	.000**
OVRALL VS STUFAC	0.787	.000**
OVRALL VS COMM	0.784	.000**
OVRALL VS ASSESS	0.776	.000**
OVRALL VS MULTIPLE	0.755	.000**
OVRALL VS INVOLVE	0.684	.000**
OVRALL VS GRPSKLS	0.649	.000**
OVRALL VS DIFF	0.118	.082

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Hypotheses Testing

Research Question One

Research Question One investigated the difference between the two groups, CL and NCL, with regard to CLEF (course learning environment factors) in the community college classroom as measured by student ratings of instruction and courses. A conceptual model of the relationship of the variables was illustrated in Figure 3. The null hypotheses (H_{1a-1}) stated there were no differences in student perceptions of courses taught cooperatively and courses not taught cooperatively on each of the course learning environment factors as measured by student ratings of instruction and courses in the community college classroom.

strength of the relationships was marginal. The strongest associations, indicated by *R square*, were between the following CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method): (a) INVOLVE (level of student involvement), (b) GRPSKLS (emphasis on group learning skills), (c) MULTIPLE (use of multiple instructional approaches), and (d) INSTMETH (techniques for learning engagement). For these CLEF (course learning environment factors), the total variation in INVOLVE (level of student involvement) accounted for by CLNCL (CL or NCL instructional method) was 8.0%; in GRPSKLS (emphasis on group learning skills), 7.8%; in MULTIPLE (use of multiple instructional approaches), 6.1%; and in INSTMETH (techniques for learning engagement), 4.2%. Based on the regression statistics, the ability to predict the results for a new set of data with accuracy was moderately low. Each of the regression analyses for CLNCL (CL or NCL instructional method) and the CLEF (course learning environment factors) were listed individually in Tables 14-25, and summarized and listed by strength of the relationship in Table 26.

The Standard Error of the Coefficients shown in the descriptive statistics in Table 10 compared favorably with the Standard Deviation, indicating the accuracy of the prediction. The Standard Error of the Estimate for each of the CLEF (course learning environment factors) was near and less than the Standard Deviation. The larger the value of the *F* statistic, the stronger is the indication that the independent variable helped to explain the variation in the dependent variable. The *F* statistic was largest when comparing CL and NCL (CL or NCL instructional method) on INVOLVE (level of student involvement), 18.809; GRPSKLS (emphasis on group learning skills), 18.457; MULTIPLE (use of multiple instructional approaches), 14.000; and

INSTMETH (techniques for learning engagement), 9.424. While these highest *F-values* were modest, they indicated marginal strength in explaining the variation of the scores on the CLEF (course learning environment factors) when comparing the two groups of CL and NCL. The null hypotheses (H_{1a-i}) were not retained for ten of the twelve variables measured, as there was a significant difference between CL and NCL groups. The null hypotheses H_{1b} , related to DIFF (degree of course difficulty) and H_{1i} , related to STFOCUS (emphasis on key elements of the course), were retained.

Table 14. Regression Statistics for the Dependent Variable, INSTMETH, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
INSTMETH	CLNCL	4.927	1.605	0.204	3.070	.002**
	Constant	85.525	0.797		107.309	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	987.739	987.739	9.424	.002**	
Residual	217	22743.463	104.809			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.204	.042	.037	10.2376	.05	.002**	1.344

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Table 15. Regression Statistics for the Dependent Variable, DIFF, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
DIFF	CLNCL	0.294	0.225	0.089	1.309	.192
	Constant	10.193	.112		91.371	.000
ANOVA						
	DF	SS	MS	F	Sig F	
Regression Residual	1	3.518	3.518	1.713	.192	
	217	445.582	2.053			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.089	.008	.003	1.4330	.05	.192	11.442

Table 16. Regression Statistics for the Dependent Variable, SELFASMT, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
SELFASMT	CLNCL	1.047	0.475	0.148	2.204	.029*
	Constant	22.899	0.236		97.033	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression Residual	1	44.627	44.627	4.856	.029*	
	217	1994.049	9.189			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.148	.022	.017	3.0314	.05	.029*	1.258

*Regression is significant at the .05 level.

Table 17. Regression Statistics for the Dependent Variable, STUFAC, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
STUFAC	CLNCL	0.564	0.244	0.155	2.311	.022*
	Constant	13.014	0.121		107.360	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	12.948	12.948	5.341	.022*	
Residual	217	526.085	2.424			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.155	.024	.020	1.5570	.05	.022*	1.481

*Regression is significant at the .05 level.

Table 18. Regression Statistics for the Dependent Variable, INVOLVE, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
INVOLVE	CLNCL	2.212	0.510	0.282	4.337	.000**
	Constant	20.105	0.253		79.395	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	199.004	199.004	18.809	.000**	
Residual	217	2295.964	10.580			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.282	.080	.076	3.2528	.05	.000**	1.206

* **Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Table 19. Regression Statistics for the Dependent Variable, HIGHEXP, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
HIGHEXP	CLNCL	0.819	0.352	0.156	2.326	.021*
	Constant	21.815	0.175		124.804	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	27.268	27.268	5.409	.021*	
Residual	217	1093.909	5.041			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.156	.024	.020	2.2452	.05	.021*	1.451

*Regression is significant at the .05 level.

Table 20. Regression Statistics for the Dependent Variable, COMM, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
COMM	CLNCL	0.661	0.255	0.174	2.596	.010**
	Constant	12.878	0.127		101.797	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	17.796	17.796	6.740	.010**	
Residual	217	572.981	2.640			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.174	.030	.026	1.6250	.05	.010**	1.524

* **Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Table 21. Regression Statistics for the Dependent Variable, ASSESS, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
ASSESS	CLNCL	0.874	0.323	0.181	2.706	.007**
	Constant	17.200	0.160		107.284	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	81.049	31.049	7.321	.007**	
Residual	217	920.358	4.241			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.181	.033	.028	2.0594	.05	.007**	1.415

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Table 22. Regression Statistics for the Dependent Variable, STFOCUS, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
STFOCUS	CLNCL	0.702	0.380	0.124	1.847	.066
	Constant	22.366	0.189		118.442	.000
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	20.062	20.062	3.410	.066	
Residual	217	1276.783	5.884			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.124	.015	.011	2.4257	.05	.066	1.498

Table 23. Regression Statistics for the Dependent Variable, INTRST, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
INTRST	CLNCL	0.333	0.167	0.134	1.991	.048*
	Constant	8.774	0.083		105.622	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	4.513	4.513	3.963	.048*	
Residual	217	247.095	1.139			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.134	.018	.013	1.0671	.05	.048*	1.371

*Regression is significant at the .05 level.

Table 24. Regression Statistics for the Dependent Variable, GRPSKLS, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
GRPSKLS	CLNCL	1.764	0.411	0.280	4.296	.000**
	Constant	16.021	0.204		78.562	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	126.747	126.647	18.457	.000*	
Residual	217	1488.994	6.862			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.280	.078	.074	2.6195	.05	.000**	1.265

**Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Table 25. Regression Statistics for the Dependent Variable, MULTIPLE, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
MULTIPLE	CLNCL	1.498	0.400	0.246	3.742	.000**
	Constant	16.170	0.199		81.315	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	91.346	91.346	14.000	.000**	
Residual	217	1415.900	6.525			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.246	.061	.056	2.5544	.05	.000**	1.092

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Table 26. Summary of the Regression Statistics for CLNCL, Independent Variable, and Each of the CLEF, Dependent Variables

CLEF (course learning environment factors): Dependent Variables	Multiple R	R Square	F	T	P-Value
INVOLVE	.282	.080	18.809	4.337	.000**
GRPSKLS	.280	.078	18.457	4.296	.000**
MULTIPLE	.246	.061	14.000	3.742	.000**
INSTMETH	.204	.042	9.424	3.070	.002**
ASSESS	.181	.033	7.321	2.706	.007**
COMM	.174	.030	6.740	2.596	.010**
HIGHEXP	.156	.024	5.409	2.326	.021*
STUFAC	.155	.024	5.341	2.311	.022*
SELFASMT	.148	.022	4.856	2.204	.029*
INTRST	.134	.018	3.963	1.991	.048*
STFOCUS	.124	.015	2.457	1.847	.066
DIFF	.089	.008	1.713	1.309	.192

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Research Question Two

Research Question Two explored the impact of CLNCL (CL or NCL instructional method) on LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) from the student ratings of courses and instruction in the community college classroom. A conceptual model of the relationship of the variables was presented in Figure 4. In the preliminary analysis, the descriptive statistics presented in Table 10 indicated a higher mean for the CL group than for the NCL group for both dependent variables LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses). The correlational analysis indicated a marginally strong, positive, and significant association between CLNCL (CL or NCL instructional method) and each of the dependent variables, LRNOUT (learning outcomes) (r was 0.181 and the p -value was .007) and OVRALL (overall excellence of instruction and courses) (r as 0.137 and the p -value was .042).

Independent Variable

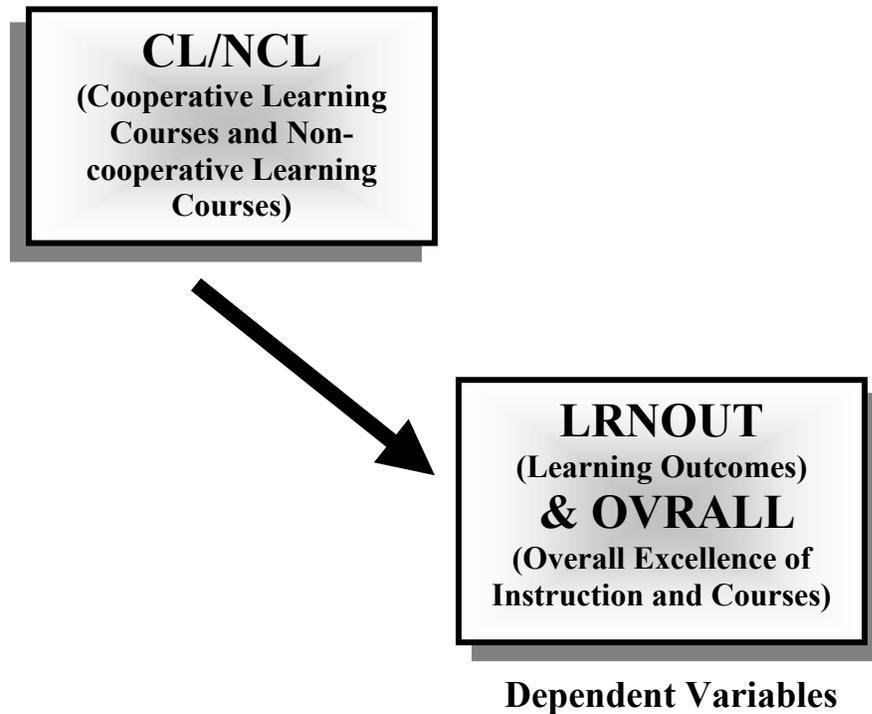


Figure 4. The Conceptual Model of the Relationships of the Variables in Research Question Two

Regression statistical analysis was used to test the hypotheses, measuring any differences between the CL and NCL groups on the dependent variables, LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses). The null hypothesis, H_{2a} , stated, there was no difference between student perceptions of courses taught cooperatively and courses not taught cooperatively on learning outcomes as measured by student ratings in the community college classroom. The difference in the two groups was significant with a *p-value* of .007, significant at the .01 alpha level,

shown in Table 30. The strength of the predictive value was marginal. The total variation of the dependent variable LRNOUT (learning outcomes) attributable to CLNCL was 3.30% or, CLNCL explained 3.30% of the variability of LRNOUT (learning outcomes). The F statistic was a modest 7.360, indicating the linear relation was somewhat significant and positive but a low degree of association. While the relationship of the variables was marginal, it was significant. Therefore, the null hypothesis, H_{2a} , was not retained.

Table 27. Regression Statistics for the Dependent Variable, LRNOUT, and the Independent Variable, CLNCL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
LRNOUT	CLNCL	2.827	1.042	0.181	2.713	.007**
	Constant	48.068	0.517		92.905	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	325.094	325.094	7.360	.007**	
Residual	217	9584.572	44.169			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.181	.033	.028	6.6459	.05	.007**	1.453

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

To explore the hypothesis further, the learning outcomes were divided into five categories. The classification of these items was based on a study by Hoyt and Perera (2000) focusing on the learning outcomes, items 21 through 32 on the ICSF—SRIC (IDEA Center, 1998b). Hoyt and Perera (2000) investigated the relationship of the instructional approach and learning outcomes, categorized into five types. Their

research suggested that approaches that encouraged ‘student-faculty interaction’ and ‘student involvement’ were especially likely to promote the broadest conceptions of student learning. The five categories were presented in Table 28 with the short term and the number of the item from the student survey form, Appendix A.

Table 28. The Five Categories of Learning Outcomes and Related Item Number on the Student Survey Form, ICSF—SRIC (IDEA Center, 1998b)

Learning Outcome	Description	Item Number on Student Survey Form
KNOWLEDGE	Faculty emphasis on substantive knowledge	21, 22, 23
LIFELONG	Faculty emphasis on lifelong learning	29, 32
ACADEMIC	Faculty emphasis on general intellectual/academic skills	28, 31
SKILL	Faculty emphasis on the development of specific skills and competencies	24, 25, 26
PERSDEV	Faculty emphasis on personal development of the student	27, 30

As shown in Table 29, regression statistical analysis revealed that CLNCL (CL or NCL instructional method) had the greatest impact on learning outcomes related to SKILL (gaining specific skills or competencies) and PERSDEV (faculty emphasis on personal development of the student). The comparison of the CL and NCL groups on these variables revealed that the differences were significant with each of the five groupings at the .05 level or lower. The variable SKILL was significantly different at the .01 alpha level, with a *p-value* of .001.

Table 29. Summary of the Regression Statistics for CLNCL, Independent Variable, and the Five Categories of LRNOUT, Dependent Variable

Learning Outcome Category	Multiple R	R Square	F	T	P-Value
SKILL	.215	.046	10.476	3.237	.001**
PERSDEV	.162	.026	5.876	2.424	.016*
ACADEMIC	.129	.025	5.619	2.370	.019*
LIFELONG	.152	.023	5.136	2.266	.024*
KNOWLEDGE	.139	.019	4.272	2.067	.040*

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

The null hypothesis, H_{2b} , stated that there was no difference between student perceptions of courses taught cooperatively and courses not taught cooperatively on the overall excellence of courses and instruction as measured by student ratings in the community college classroom. A comparative analysis using statistical regression indicated a positive but very modest strength of association, with the F statistic of 4.167, and a p -value of .042, significant at the .05 alpha level, as shown in Table 30. The R Square indicated that 1.9% of the variation in the dependent variable OVRALL (overall excellence of instruction and courses) could be explained by CLNCL (CL or NCL instructional method). While the null hypothesis, H_{2b} , was not retained, the findings revealed that the predictive strength of the model was marginal at best.

Table 30. Regression Statistics for the Independent Variable, CLNCL, and the Dependent Variable, OVRALL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
OVRALL	CLNCL	0.384	0.188	0.137	2.041	.042*
	Constant	8.654	0.093		92.760	.000*
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	1	5.984	5.984	4.167	.042*	
Residual	217	311.606	1.436			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.137	.019	.014	1.1983	.05	.042*	1.535

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Research Question Three

Research Question Three examined the impact of CLEF (course learning environment factors) on student perceptions of LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) in the community college classroom, illustrated in Figure 5. In the preliminary analysis, the correlation of each of the CLEF (course learning environment factors) with the dependent variables LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) was presented in Tables 12 and 13.

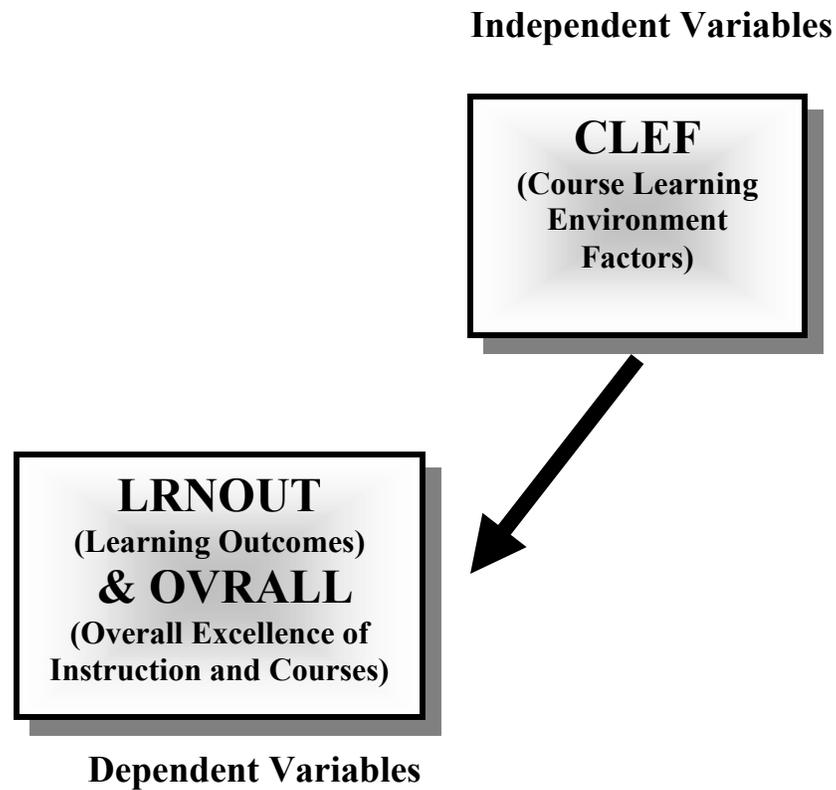


Figure 5. The Conceptual Model of the Relationships of the Variables in Research Question Three

The correlational analysis indicated a positive and very strong relationship between each of the CLEF (course learning environment factors) and LRNOUT (learning outcomes). The strength of the associations and the significance at the .01 level (all with a *p-value* of .000) were very positive indicators of the strong relationship between each of the CLEF (course learning environment factors) and the dependent variable LRNOUT (learning outcomes). The correlational analysis between each of the CLEF (course learning environment factors) and the dependent variable OVRALL

(overall excellence of instruction and courses) also showed strong, positive, and significant associations, except for the independent variable DIFF (degree of course difficulty) and the dependent variable OVRALL (overall excellence of instruction and courses), which had a *p-value* of .082.

The combined and individual impact of each the CLEF (course learning environment factors) were analyzed using multiple regression to test the hypotheses. The null hypothesis, H_{3a} , stated that there was no impact of course learning environment factors on student ratings of learning outcomes in a community college classroom. The combined effect of the CLEF (course learning environment factors), independent variables, explained 82% of the variability in LRNOUT (learning outcomes), shown in Table 31. The strongest individual predictors in the assessment of the combined impact of the CLEF (course learning environment factors) on the dependent variable LRNOUT (learning outcomes) include SELFASMT (self-assessment of student participation and motivation), with a *p-value* of .000; STFOCUS (emphasis on key elements of the course), with a *p-value* of .003, and INSTMETH (techniques for learning engagement), with a *p-value* of .006 level, all significant at the .01 level. The *F* statistic, 76.678, was significant, indicating the strength of the combined CLEF (course learning environment factors) in explaining the variation in LRNOUT (learning outcomes).

Table 31. Regression Statistics for the Independent Variables, CLEF, and the Dependent Variable LRNOUT

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
LRNOUT	INSTMETH	1.356	0.490	2.098	2.769	.006**
	DIFF	3.599E-02	0.165	0.008	0.218	.828
	SELFASMT	0.417	0.118	0.189	3.543	.000**
	STUFAC	-0.841	0.772	-0.196	-1.089	.277
	INVOLVE	-1.519	0.788	-0.762	-1.929	.055
	HIGHEXP	-0.580	0.395	-0.195	-1.469	.143
	COMM	0.203	0.557	0.050	0.365	.715
	ASSESS	-0.518	0.579	-0.161	-0.895	.372
	STFOCUS	-1.298	0.425	-0.470	-3.052	.003**
	INTRST	-0.527	0.926	-0.084	-0.570	.570
	GRPSKLS	0.688	0.575	0.278	1.197	.233
	MULTIPLE	0.212	0.295	0.083	0.721	.472
	Constant	1.788	2.745		0.651	.516
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	12	8134.750	677.896	78.678	.000**	
Residual	206	1774.916	8.616			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.906	.821	.810	2.9353	.05	.000*	1.931

* **Regression is significant at the .01 level.

*Regression is significant at the .05 level.

The individual comparative associations of each of the CLEF (course learning environment factors) and the dependent variable LRNOUT (learning outcomes) were listed by order of strength in Table 32. The statistical regression analysis indicated a positive and very strong value for each of the CLEF (course learning environment factors) in predicting LRNOUT (learning outcomes). The *F* statistic was very large for each the CLEF (course learning environment factors) except for DIFF (level of course difficulty), which was marginal. The *p-value* for each of the CLEF (course learning environment factors) was .000, significant at the .01 alpha level. The *R Square* values

for each of the CLEF (course learning environment factors) indicated that a large portion of the variance in LRNOUT (learning outcomes) was explained by each the CLEF (course learning environment factors), except for DIFF (degree of course difficulty). The predictive value of the model was very high; knowledge of the student ratings of CLEF (course learning environment factors) would allow prediction of LRNOUT (learning outcomes) with a high degree of accuracy given a new set of data. The null hypothesis was not retained.

Table 32. Summary of the Regression Statistics for the Dependent Variable, LRNOUT, and Individual Comparisons with the Independent Variables, CLEF

Variable	R	R Square	SE	SD	F	T	Sig
INSTMETH	.884	.782	3.158	10.434	776.812	27.871	.000**
INVOLVE	.837	.701	3.693	3.383	509.496	22.572	.000**
COMM	.828	.686	3.786	1.646	474.195	21.776	.000**
INTRST	.827	.683	3.802	1.074	468.517	21.645	.000**
STUFAC	.826	.682	3.810	1.573	465.837	21.583	.000**
MULTIPLE	.825	.681	3.819	2.629	462.364	21.503	.000**
HIGHEXP	.823	.677	3.841	2.268	454.820	21.327	.000**
GRPSKLS	.822	.675	3.851	2.722	451.341	21.245	.000**
ASSESS	.813	.661	3.932	2.089	423.879	20.588	.000**
STFOCUS	.742	.550	4.533	2.439	265.279	16.287	.000**
SELFASMT	.714	.510	4.732	3.058	225.539	15.018	.000**
DIFF	.262	.069	6.521	1.435	16.055	4.007	.000**

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

The null hypothesis, H_{3b} , stated that there was no impact of course learning environment factors on the overall excellence of instruction and courses in the community college classroom. Multiple regression was used to measure the combined

impact of the CLEF (course learning environment factors) on the dependent variable OVRALL (overall excellence of instruction and courses). As shown in Table 33, the *R Square* value was very high, indicating that 87.9% of the variability in OVRALL (overall excellence of instruction and courses) was explained by the CLEF (course learning environment factors). The *F* statistic, at 125.177, indicated the strong degree of the significance of association of and the predictive value of the CLEF (course learning environment factors) in explaining OVRALL (overall excellence of instruction and courses). The *p-value* of .000 was highly significant at the .01 level.

Table 33. Regression Statistics for the Combined Impact of the Independent Variables, CLEF, and the Dependent Variable, OVRALL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
OVRALL	INSTMETH	9.511E-02	0.072	0.822	1.322	.187
	DIFF	-7.894E-02	0.024	-0.094	-3.256	.001**
	SELFASMT	0.177	0.017	0.499	10.260	.000**
	STUFAC	0.137	0.113	0.179	1.211	.227
	INVOLVE	-0.253	0.116	-0.708	-2.184	.030*
	HIGHEXP	2.504E-02	0.058	0.047	0.432	.666
	COMM	-0.372	0.082	-0.508	-4.551	.000**
	ASSESS	-0.323	0.085	-0.559	-3.800	.000**
	STFOCUS	0.266	0.062	0.537	4.256	.000**
	INTRST	0.196	0.136	0.174	1.441	.151
	GRPSKLS	0.152	0.084	0.343	1.799	.073
	MULTIPLE	0.108	0.043	0.234	2.486	.014*
	Constant	-1.460	0.403		-3.620	.000
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	12	279.289	23.274	125.177	.000**	
Residual	206	38.301	0.186			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.938	.879	.872	0.431	.05	.000*	1.930

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Regression analysis indicated the strength of each of the CLEF (course learning environment factors) in predicting OVRALL (overall excellence of instruction and courses), listed in descending order in Table 34. Each of the CLEF (course learning environment factors) had a *p-value* of .000, significant at the .01 level, except for DIFF (degree of course difficulty), with a *p-value* of .082, which was not significant. The strongest individual predictors of OVRALL (overall excellence of instruction and courses) were the independent variables HIGHEXP (emphasis on high expectations), INSTMETH (techniques for learning engagement), INTRST (promoting student interest in the course), and STFOCUS (emphasis on key elements of the course), all with *F-values* over 400. The predictive value of the model was very high; knowledge of the student ratings of CLEF (course learning environment factors) would allow prediction of OVRALL (overall excellence of instruction and courses) with a high degree of accuracy given a new set of data. The null hypothesis was not retained, as the impact of the CLEF (course learning environment factors) on OVRALL (overall excellence of instruction and courses) was significant.

Table 34. Summary of the Regression Statistics for the Dependent Variable, OVRALL, and Individual Comparison with the Independent Variables, CLEF

Variable	R	R Square	SE	SD	F	T	Sig
HIGHEXP	.846	.715	0.645	2.2678	545.600	23.358	.000**
INSTMETH	.831	.690	0.673	10.4335	484.114	22.003	.000**
INTRST	.823	.678	0.687	1.0743	456.144	21.358	.000**
STFOCUS	.820	.673	0.692	2.439	445.855	21.115	.000**
SELFASMT	.801	.641	0.725	3.058	387.686	19.690	.000**
STUFAC	.787	.620	0.746	1.573	353.449	18.800	.000**
COMM	.784	.615	0.751	1.646	346.260	18.608	.000**
ASSESS	.776	.602	0.763	2.089	328.051	18.112	.000**
MULTIPLE	.755	.569	0.794	2.629	287.033	16.942	.000**
INVOLVE	.684	.467	0.883	3.383	190.393	13.798	.000**
GRPSKLS	.649	.421	0.921	2.722	157.562	12.552	.000**
DIFF	.118	.014	1.201	1.435	3.061	1.750	.082

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Research Questions Four

Research Question Four investigated the combined impact of independent variables CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) on LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) in the community college classroom as measured by student ratings of instruction and courses, illustrated in Figure 6. As discussed previously, there was a strong correlation between independent and dependent variables, presented in Tables 11, 12, and 13.

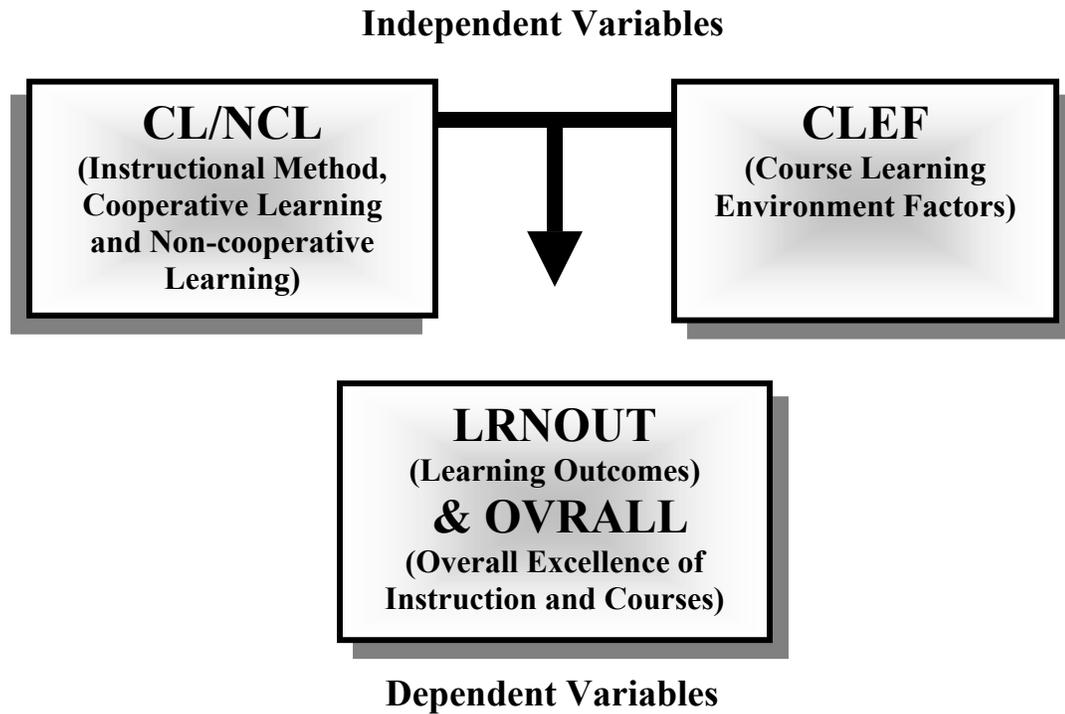


Figure 6. The Conceptual Model of the Relationships of the Variables in Research Question Four

In Research Question Four, multiple regression was used to test the relationship between the combined impact of CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) on the dependent variables LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses). A very strong, positive significant relationship was found in the analysis.

In Research Question Four Part A, the null hypothesis, H_{4a} , stated there was no relationship between the independent variables, CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors), and the dependent variable, LRNOUT (learning outcomes), in the community college classroom as measured by student ratings of instruction and courses. With the *R Square* at .821, 82% of the

variation in LRNOUT (learning outcomes) was attributed to the combined impact of CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors). As presented in Table 35, the F statistic, 72.307, indicated moderate strength in explaining the impact of CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) on LRNOUT (learning outcomes). The strength of the predictive relationship was significant at the .01 level, with a p -value of .000. The predictive value of the model was very high, indicated by the strong linear relationship of the variables. Knowledge of the student ratings of CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) would allow prediction of LRNOUT (learning outcomes) with a strong degree of accuracy given a new set of data. Based on these findings, the null hypothesis was not retained.

Table 35. Regression Statistics for Student Ratings with the Combined Effect of the Independent Variables, CLNCL and CLEF, and the Dependent Variable, LRNOUT

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
LRNOUT	INSTMETH	1.347	0.492	2.084	2.738	.007**
	DIFF	3.525E-02	0.165	0.008	0.213	.831
	SELFASMT	0.418	0.118	0.190	3.544	.000**
	STUFAC	-0.844	0.774	-0.197	-1.091	.276
	INVOLVE	-1.503	0.791	-0.754	-1.900	.059
	HIGHEXP	-0.579	0.396	-0.195	-1.464	.145
	COMM	0.219	0.561	0.053	0.390	.697
	ASSESS	-0.507	0.582	-0.157	-0.872	.384
	STFOCUS	-1.291	0.427	-0.467	-3.024	.003**
	INTRST	-0.539	0.929	-0.086	-0.581	.562
	GRPSKLS	0.690	0.576	0.279	1.198	.232
	MULTIPLE	0.216	0.296	0.084	0.730	.466
	CLNCL	-0.138	0.494	-0.009	-0.780	.780
	Constant	1.781	2.751		0.647	.518
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	13	8135.425	625.802	72.307	.000**	
Residual	205	1774.241	8.655			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha*	P-Value	Durbin-Watson
.906	.821	.810	2.9419	.05	.000*	1.935

* **Regression is significant at the .01 level.

*Regression is significant at the .05 level.

In Research Question Four, Part B, multiple regression was used to test the hypothesis, H_{4b} . The null hypothesis stated there was no relationship between the independent variables, CLNCL (instructional method) and CLEF (course learning environment factors), and the dependent variable, OVRALL (overall excellence of instruction and courses), in the community college classroom as measured by student ratings of instruction and courses. Table 36 showed the combined predictive model of CLEF (course learning environment factors) & CLNCL (CL or NCL instructional method) on OVRALL (overall excellence of instruction and courses). The *R Square*

revealed that 82% of the variation in OVRALL (overall excellence of instruction and courses) was attributable to the combined impact of CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors). The predictive relationship was significant at the .01 alpha level, with a *p-value* of .000. The *F* statistic, 115.577, indicated moderate strength of the combined impact of CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) in explaining the dependent variable OVRALL (overall excellence of instruction and courses). The strength of the predictive relationship was significant at the .01 level, with a *p-value* of .000. The predictive value of the model was very high; knowledge of the student ratings of CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) would allow prediction of OVRALL (overall excellence of instruction and courses) with a high degree of accuracy given a new set of data. The null hypothesis was not retained, as the impact of CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) had a very significant and positive impact on OVRALL (overall excellence of instruction and courses).

Research Question Three and Four were similar in that they explored the relationship of the CLEF (course learning environment factors) with the dependent variables LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses). The difference was that Research Question Four looked at the combined impact of CLEF (course learning environment factors) and CLNCL on the dependent variables LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses). The analysis indicated that on LRNOUT (learning outcomes), when CLNCL and CLEF (course learning environment factors) were

combined, a slightly large F statistic was produced, but the R Square was exactly the same (.821). In the analysis of OVRALL, when CLNCL and CLEF were combined, a slightly lower F statistic was produced, but the R Square (.88) was, again, exactly the same. Adding CLNCL (CL or NCL instructional method did not change the statistical impact of CLEF (course learning environment factors) on LRNOUT (learning outcomes) or OVRALL (overall excellence of instruction and courses).

Table 36. Regression Statistics for the Combined Effect of the Independent Variables, CLNCL and CLEF, and the Dependent Variable, OVRALL

Dependent Variable	Independent Variable	B	SE of B	Beta	T	Sig T
OVRALL	INSTMETH	9.981E-02	0.403	0.863	1.384	.168
	DIFF	-7.856E-02	0.072	-0.093	-3.240	.001**
	SELFASMT	0.177	0.017	0.447	10.208	.000**
	STUFAC	0.139	0.113	0.181	1.226	.222
	INVOLVE	-0.261	0.116	-0.730	-2.246	.026*
	HIGHEXP	2.460E-02	0.058	0.046	0.424	.672
	COMM	-0.380	0.082	-0.519	-4.624	.000**
	ASSESS	-0.329	0.085	-0.569	-3.856	.000**
	STFOCUS	0.263	0.063	0.530	4.194	.000**
	INTRST	0.202	0.136	0.180	1.484	.139
	GRPSKLS	0.151	0.084	0.340	1.787	.075
	MULTIPLE	0.106	0.043	0.231	2.446	.015*
	CLNCL	6.961E-02	0.072	0.025	0.961	.338
	Constant	-1.456	0.403		-3.611	.000
ANOVA						
	DF	SS	MS	F	Sig F	
Regression	13	279.461	21.497	115.577	.000**	
Residual	205	38.129	0.186			
CORRELATION						
Multiple R	R Square	Adjusted R Square	SE	Alpha	P-Value	Durbin-Watson
.938	.880	.872	0.4313	.05	.000*	1.933

* *Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Summary of the Findings

An overview of the implementation of the research design; the research questions and hypotheses; the target population, selection of the faculty and courses, description of the students used in the study; descriptive and correlational statistics; the research procedures used for hypothesis testing; and interpretation of the findings have been presented. The purpose of this study was to test the social interdependence theory using a representative, quasi-experimental design. The impact of the instructional method (CLNCL) on course learning environment factors, learning outcomes, and overall excellence of instruction and courses were measured using student ratings. The impact of the CLEF (course learning environment factors) on the dependent variables LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) was also measured.

In Research Question One, 10 of 12 null hypotheses were not retained. In the comparison of the instructional methods CL and NCL with regard to CLEF (course learning environment factors) student ratings of CL courses were significantly different (higher) than NCL courses on CLEF. In Research Question Two Part A, the comparison of the instructional methods CL and NCL with regard to learning outcomes revealed a statistically significant difference. The null hypothesis was not retained. In Part B, the comparison of the instructional method CL and NCL and overall excellence of instruction and courses showed a significant difference, but the statistic was marginal. The null hypothesis was not retained. In Research Question Three, the impact of course learning environment factors on learning outcomes and overall excellence of instruction and courses was positive and very significant. The two null hypotheses were

not retained. In Research Question Four, the combined impact of CLNCL and CLEF on learning outcomes and overall excellence of instruction and courses revealed a positive, significant relationship between the variables. The two null hypotheses were not retained.

Studies comparing CL groups and NCL groups in small, controlled environments reducing the impact of extraneous variables have provided the basis for previous research supporting the theory of social interdependence. This study was significant from the viewpoint that few studies on cooperative learning have been performed using the entire student population of a community college campus. Based on a meta-analysis of several hundred studies, there were no studies involving more than 1400 participants (Johnson & Johnson, 1989). These studies looked at cooperative learning within no more than three subject areas, typically only one. Only two studies were reviewed in the meta-analysis that investigated all subject areas in one study, and these were at the junior high school level, none at the college level.

This study expands the current body of empirical research that was typically performed with highly controlled experimental groups comparing students in courses within a single subject matter. This study contributed to the understanding of how course learning environment factors (such as the faculty promoting the involvement of students in the learning process, using multiple instructional approaches, teaching group skills, emphasizing student focus on content, increasing student faculty contact, using techniques to increase learning engagement, emphasizing high expectations, the clarity of communication, the level of difficulty of the course, and student self-assessment) impact learning outcomes and overall excellence of instruction and courses

from the student's viewpoint. No studies were found in the literature review that investigated the course learning environment variables with regard to instructional method (cooperative learning), learning outcomes and overall excellence of instruction and courses using a student-rating instrument. In summary, this study explored how the phenomena of cooperative learning and course learning environment factors impacted student ratings of learning outcomes and the overall excellence of instruction and courses. The findings supported the positive results of previous studies on the impact of cooperative learning in the classroom.

Chapter V: Conclusions, Recommendations, and Implications

Introduction

This study was conducted at a comprehensive two-year public community college, Haywood Community College, using a student-rating instrument to measure instruction and courses on a variety of variables in all regular-schedule academic credit courses in the Spring Semester of 2001. The purpose of this study was to test the theory of social interdependence through the examination of the impact of the instructional method (CL, courses taught using cooperative learning, or NCL, courses not taught using cooperative learning) on course learning environment factors, learning outcomes, and overall excellence of instruction and courses. Additionally, the impact of the course learning environment factors on learning outcomes and overall excellence of instruction and courses was measured. This chapter was divided into four sections to increase the understanding of the conclusions, recommendations and implications: (a) overview of the study, research questions, hypotheses, and findings; (b) key findings and conclusions; (c) recommendations for future research; and (d) implications for practice.

Overview of the Study, Research Questions, and Hypotheses

Overview of the Study

This quantitative study explored the impact of the cooperative learning instructional method on 12 course learning environment factors, learning outcomes, and overall excellence of instruction and courses in a small rural comprehensive community college. This study also investigated the relationship of the 12 course learning environment factors on learning outcomes and overall excellence of instruction and

courses. The IDEA Center student rating form (IDEA Center, 1998b) was used to measure these variables. The Questionnaire on the Use of Cooperative Learning (Cooperative Learning Center, 1991) was used to identify courses integrating cooperative learning and those not integrating cooperative learning for comparison on several variables. All students enrolled in courses in regular-schedule academic credit courses were used in the study. Over 3000 student ratings were collected for analysis.

A quasi-experimental representative design proposed that an experimental group (students in courses taught cooperatively) and a comparison group (students in courses not taught cooperatively) be compared on course learning environment factors, learning outcomes, and overall excellence of instruction and courses. The theory of social interdependence provided the foundation for the study. The conceptual model of the theory of social interdependence, illustrated in Figure 1, guided the operationalization of the theory—learning in cooperative groups, for this study. The implementation of five key elements ensured the success of cooperative learning: (a) positive interdependence, (b) individual accountability, (c) promotive interaction, (d) group processing, and (e) social/team skills. Integration of ‘positive interdependence’ and ‘individual accountability’ were part of the criteria to discern courses taught cooperatively from those not taught cooperatively for the purposes of this study.

Overview of the Research Questions

Four research questions guided the study. First, a comparison was made of the student ratings of courses taught using cooperative learning instructional methods and courses not taught using cooperative learning with regard to course learning environment factors, learning outcomes and overall excellence of instruction and

courses, comprising Research Questions One and Two. Second, the relationship between CLEF (course learning environment factors) and LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) was explored in Research Question Three. Third, the relationship between the combined independent variables, CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method), and the dependent variables, LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) was investigated in Research Question Four.

The mean scores of student ratings for each of the variables were used in the analysis. In a preliminary analysis of the data, descriptive statistics and correlational analyses were used to describe the variables and measure relationships of the variables. Multiple regression statistical procedures were used to test the hypotheses. A summary of the research questions, hypotheses, variables, findings, and *p-values* are listed in Table 36.

Research Question One

What is the impact of CL and NCL courses on student perceptions of CLEF (course learning environment factors) in the community college classroom? The impact of the independent variable, CLNCL (CL or NCL instructional method), on the dependent variables, CLEF (course learning environment factors), was measured with regression statistical analysis.

H_{1a-1} There is no differences in student perceptions of CL and NCL courses for each of the 12 course learning environment factors (CLEF) as measured by student ratings of courses and instruction in the community college classroom.

The null hypotheses, H_{1a-b} , were not retained for 10 of the 12 CLEF. The null hypotheses related to dependent variables, DIFF and STFOCUS, were retained.

Research Question Two

What is the impact of CL and NCL courses on student perceptions of LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) in the community college classroom? The impact of the independent variable, CLNCL (CL or NCL instructional method), on the dependent variables LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses), was measured by regression analysis.

H_{2a} There is no difference between student perceptions of CL and NCL courses on learning outcomes as measured by student ratings of courses and instruction in the community college classroom.

The null hypothesis, H_{2a} , was not retained.

H_{2b} There is no difference between student perceptions of CL and NCL courses on overall excellence of courses and instruction as measured by student ratings of courses and instruction in the community college classroom.

The null hypothesis, H_{2b} , was not retained.

Research Question Three

What is the impact of CLEF (course learning environment factors) on student perceptions of LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) in the community college classroom? The impact of the independent variables, CLEF (course learning environment factors), on the dependent

variables, LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses), was measured by multiple regression statistical analysis.

H_{3a} There is no impact of course learning environment factors on student perceptions of learning outcomes measured by student ratings of courses and instruction in the community college classroom.

The null hypothesis, H_{3a}, was not retained.

H_{3b} There is no impact of course learning environment factors on the overall student perceptions of instruction and courses as measured by student ratings of courses and instruction in the community college classroom.

The null hypothesis, H_{3b}, was not retained.

Research Question Four

What is the impact of CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) on LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) in the community college classroom as measured by student ratings of instruction and courses? The impact of the independent variables, CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors), on the dependent variables, LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses), was measured using multiple regression statistical analysis.

H_{4a} There is no relationship between CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) and LRNOUT (learning outcomes) in the community college classroom as measured by student ratings of instruction and courses.

The null hypothesis, H_{4a} , was not retained.

H_{4b} There is no relationship between CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) and OVRALL (overall excellence of instruction and courses) in the community college classroom as measured by student ratings of instruction and courses.

The null hypothesis, H_{4b} , was not retained.

Table 37. Summary of the Research Questions, Hypotheses, Variables, Findings, and P-Values

Research Question	Null Hypotheses	Dependent Variables	Independent Variables	Findings of Hypotheses Testing	P-Value
One	H_{1a}	INSTMETH	CLNCL	Not retained	.002**
	H_{1b}	DIFF	CLNCL	Retained	.192
	H_{1c}	SELFASMT	CLNCL	Not retained	.029*
	H_{1d}	STUFAC	CLNCL	Not retained	.022*
	H_{1e}	INVOLVE	CLNCL	Not retained	.000**
	H_{1f}	HIGHEXP	CLNCL	Not retained	.021*
	H_{1g}	COMM	CLNCL	Not retained	.010**
	H_{1h}	ASSESS	CLNCL	Not retained	.007**
	H_{1i}	STFOCUS	CLNCL	Retained	.066
	H_{1j}	INTRST	CLNCL	Not retained	.048*
	H_{1k}	GRPSKLS	CLNCL	Not retained	.000**
Two	H_{1l}	MULTIPLE	CLNCL	Not retained	.000**
	H_{2a}	LRNOUT	CLNCL	Not retained	.007**
Three	H_{2b}	OVRALL	CLNCL	Not retained	.042*
	H_{3a}	LRNOUT	CLEF	Not retained	.000**
Four	H_{3b}	OVRALL	CLEF	Not retained	.000**
	H_{4a}	LRNOUT	CLEF & CLNCL	Not retained	.000**
	H_{4b}	OVRALL	CLEF & CLNCL	Not retained	.000**

* **Regression is significant at the .01 level.

*Regression is significant at the .05 level.

Note: Abbreviations are defined in Table 9.

Key Findings and Conclusions

This study investigated the relationship of CL and NLC (instructional method), CLEF (course learning environment factors), LRNOUT (learning outcomes), and OVRALL (overall excellence of instruction and courses). The exploration of the impact of the independent variable, CL and NCL (instructional method) and the dependent variables, CLEF, LRNOUT (learning outcomes), and OVRALL (overall excellence of instruction and courses) indicated moderately or marginally significant differences. The relationship of the independent variable, CLEF (course learning environment factors), and the dependent variables, LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses), was highly significant, more so than the findings related to CL and NCL (instructional method). The key findings and conclusions were presented in order of statistical strength and significance.

Course Learning Environment Factors and Learning Outcomes

The key finding of the study was based on the analysis of the relationships among three variables: (a) course learning environment factors, (b) learning outcomes, and (c) the overall excellence of instruction and courses. Research Question Three examined the impact of the independent variables, CLEF (course learning environment factors), and the dependent variables, LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses). The data from student ratings of instruction and courses suggested that the impact of the CLEF (course learning environment factors) was much greater than the impact of cooperative learning. The CLEF addressed many variables that impacted learning in the classroom, while

cooperative learning was a single instructional method used to enhance the classroom learning environment and overall excellence of instruction and courses.

Part A of Research Question Three explored the impact of the CLEF (course learning environment factors) on LRNOUT (learning outcomes). The statistical evidence found in this study implies that the CLEF (course learning environment factors) can be used to enhance the achievement of learning outcomes and student ratings of instruction and courses. First, course learning environment factors (CLEF) had a highly significant impact on student ratings of learning outcomes, explored in Research Question Three, part A. These variables were measured in all courses, CL and NCL, as one group. The proportion of variance in student ratings of the achievement of learning outcomes (as listed see Appendix E) was substantially attributable to the CLEF (course learning environment factors) (82%). The strength of the predictive value of the CLEF (course learning environment factors) was significant at .01 level, with a p-value of .000. The individual values of each of the CLEF (course learning environment factors) were also significant at the .01 level.

Considerable statistical evidence in this study supported the conclusion that the course learning environment factors greatly impacted student ratings of their achievement of learning outcomes. From the community college student perspective, the level of student involvement, the faculty use of multiple approaches, the degree of course difficulty, the faculty emphasis on high expectations, the clarity of communication of the course content, faculty emphasis on assessment and feedback, faculty emphasis on key elements, promoting student interest, faculty emphasis on

group learning/team skills, and instructional techniques to promote learning engagement positively impacted their achievement of learning outcomes.

Further evidence from the analysis of Research Question Three, part B confirmed the relationship of the CLEF (course learning environment factors) with OVRALL (overall excellence of instruction and courses). Substantial statistical evidence indicated a very strong and positive relationship between CLEF (course learning environment factors) and OVRALL (overall excellence of instruction and courses), significant at the .01 level and with a *p-value* of .000. The proportion of the variance in student rating scores on OVRALL (overall excellence of instruction and courses) attributable to CLEF (course learning environment factors) was 88%. Only 12% of the variance in OVRALL (overall excellence of instruction and courses) was attributable to variables other than CLEF (course learning environment factors). When analyzing the relationship of the CLEF (course learning environment factors) individually with OVRALL (overall excellence of instruction and courses), each was significant at the .01 level, except DIFF, which was not significantly related to OVRALL (overall excellence of instruction and courses). Thus, it can be concluded that the level of difficulty of the course had no impact on student ratings of overall excellence of instruction and courses.

The strength of CLEF (course learning environment factors) in predicting OVRALL (overall excellence of instruction and courses) was very high. Thus, the statistical evidence that a very strong predictive linear relationship existed between the CLEF (course learning environment factors) and overall excellence of instruction and courses and that student rating scores on individual (except DIFF, level of difficulty of

the course) or the combined set of CLEF (course learning environment factors). The results of this study suggested, indicated by the strong linear model, that if the mean scores of CLEF were known, they could be used to predict OVRALL (overall excellence of instruction and courses) mean scores on a new set of data with a strong degree of accuracy. In conclusion, students perceived that faculty attention to the CLEF (course learning environment factors) positively impacted student ratings on overall excellence of instruction and the course.

CLNCL Instructional Methods and Course Learning Environment Factors

Significant differences were found in the investigation of the comparison of the instructional method (CL or NCL) on CLEF (course learning environment factors). The strength and the predictive value of the statistical findings, however, were moderately low. This second key finding of the study was addressed in Research Question One, which explored the impact of the independent variable, (CL and NCL instructional method) on the dependent variables, CLEF (course learning environment factors). The analysis suggested that the use of cooperative learning significantly increased student ratings on 10 of the 12 course learning environment factors that impact learning in the classroom (the level of student involvement, faculty emphasis on group/team skills, the use of multiple instructional techniques for learning engagement, faculty emphasis on assessment and feedback, clarity of the instructor's perspective on content, the degree of student-faculty contact, self-assessment on the level of student participation and motivation, promoting student interest in the course, and faculty emphasis on high expectations) when compared to courses in which cooperative learning was not used. There was no significant difference on student ratings between CL and NCL groups on

DIFF (the level of difficulty of the course) or STFOCUS (faculty emphasis on key elements of the course). While the proportion of the variance of student ratings of CLEF (course learning environment factors) attributable to cooperative learning was relatively low, the difference was statistically significant, nonetheless, between the student ratings courses taught cooperatively and courses not taught cooperatively. The low strength of the relationship revealed that other variables contributed to the variance of student ratings of CLEF (course learning environment factors). For those CLEF variables significant at the .05 alpha level, the probability of making a Type I error, rejecting the null hypothesis when in fact it was true, was much higher than for those CLEF variables that were significant at the .01 level.

In Table 26, the summary of the relationships of CLNCL (CL or NCL instructional method) and CLEF (course learning environment factors) indicated that student ratings of six of the CLEF (course learning environment factors) were significant at the .01 level, or lower, student ratings of four of the CLEF were significant at the .05 level, and the student ratings of two of the CLEF indicated no significant difference. From the analysis of the relationship of CLNCL (CL or NCL instructional method) and these six CLEF (course learning environment factors), INVOLVE, GRPSKLS, MULTIPLE, ASSESS, COMM, and HIGHEXP; findings suggested that cooperative learning had a moderately significant impact on student ratings in the CL courses when compared to the NCL courses. It can be concluded that cooperative learning can be used to enhance student ratings of the course learning environment of factors, particularly these six: INVOLVE (the level of interactive student involvement), GRPSKLS (faculty emphasis on group/team skills), MULTIPLE

(the use of multiple instructional approaches), ASSESS (faculty emphasis on assessment and feedback), COMM (clarity of the instructor's perspective on content), and HIGHEXP (faculty emphasis on high expectations). The cooperative learning instructional method moderately contributed more to the positive impact of six of the course learning environment factors and marginally contributed to four additional course learning environment factors (SELFASMT, STUFAC, HIGHEXP, and INTRST) than did the NCL instructional method. There was no difference in the impact of the CLEF, DIFF and STFOCUS, in CL and NCL courses. The student ratings on DIFF (the level of difficulty of the course) or STFOCUS (the faculty emphasis on key elements of the course) were similar in CL and NCL courses, suggesting that the instructional method (CL or NCL) had no influence on these two dependent variables. Cooperative learning was successfully used to enhance the learning environment, particularly the six factors identified that were significant at the .01 alpha level (Table 26).

CLNCL Instructional Methods and Learning Outcomes

In examining the comparison of CL courses and NCL courses on LRNOUT (learning outcomes), significant differences were found in favor of cooperative learning, but the strength and predictive value of the statistical findings were moderately low. This third key finding of the study was explored in Research Question Two, Part A. This inquiry focused on the comparison of CL and NCL classes on student ratings of learning outcomes. Students in CL courses rated the achievement of learning outcomes significantly higher than students in NCL courses. The mean scores, correlations, and regression analysis all contributed to the statistical evidence that

students rated CL courses higher than NCL courses on achieving learning outcomes and the difference was significant at the .01 alpha level.

While the proportion of variance of student ratings of LRNOUT (learning outcomes) attributable to CLNCL (CL or NCL instructional method) was low (3%), the difference between the CL and NCL groups was statistically significant at the .01 level, with a *p-value* of .007. The low predictive value of the CLNCL (CL or NCL instructional method) variable determined by regression analysis indicated that other variables contributed more to the variation of student ratings of LRNOUT (learning outcomes) than CLNCL (CL or NCL instructional method). The overall conclusion can be made that cooperative learning was moderately successful in increasing student ratings of learning outcomes.

CLNCL Instructional Methods and Overall Excellence of Instruction and Courses

A fourth key finding was derived from the comparison of student ratings of the CL and NCL groups on OVRALL (overall excellence of instruction and courses), Research Question Two, part B. The data suggested that the difference between student ratings of the CL and NCL groups on the overall excellence of instruction and courses was marginally significant at the .05 level (with a *p-value* of .042). The proportion of the variance in student ratings of the dependent variable OVRALL (overall excellence of instruction and courses) attributable to CLNCL (CL or NCL instructional method) was minimal at 2%. The proportion of variance in student ratings of OVRALL (overall excellence of instruction and courses) attributable to variables other than CLNCL (CL or NCL instructional method) was 98%. While the null hypothesis was not retained, the probability of a Type I error was more likely at the .05 alpha level with a *p-value* of

.042. Even as the statistical evidence provided a small amount of support for the student ratings of the CL group being different from the NCL group, the conclusion must be drawn that additional research was needed before a statement could be made that cooperative learning increased student ratings of overall instruction and courses.

Possible variation in the implementation of cooperative learning could have negatively impacted the results of the impact of cooperative learning on overall excellence of instruction and courses. Based on the faculty questionnaire on the implementation of cooperative learning, 50% of the faculty had less than 20 hours of training. The amount of professional development on implementing CL could have made a difference in the results on this variable (overall excellence of instruction and courses) and could have made a stronger impact on learning outcomes and course learning environment factors. Increasing the criteria for implementation, such as requiring the use of all five elements of cooperative learning and increasing the amount of time cooperative learning was used in the classroom could have also made a difference in the results of this study.

Course Learning Environment Factors, CLNCL, and Learning Outcomes

A final key finding was based on the results of the investigation of the relationship of the combined impact of CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method) on LRNOU (learning outcomes), and OVRALL (overall excellence of instruction and courses) explored in Research Question Four. The combination of the independent variables, CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method), presented a very

strong model for predicting student ratings on LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses).

The proportion of variance in student ratings of LRNOUT (learning outcomes), which could be accounted for by CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method) was 82%. The regression analysis indicated a very strong linear relationship between the combined set of independent variables CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method) and the dependent variable LRNOUT (learning outcomes), significant at the .01 level and with a *p-value* of .000.

The combined impact of dependent variables CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method) on the dependent variable OVRALL (overall excellence of instruction and courses) was also significant. A large proportion (88%) of the variance in student rating scores of OVRALL (overall excellence of instruction and courses) was directly attributable to the combined set of variables CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method).

This exploration of the relationship between CLEF (course learning environment factors) and LRNOUT (learning outcomes) and OVRALL (overall excellence of instruction and courses) was similar to Research Question Three, but with the impact CLNCL (CL or NCL instructional method) added to the model. A very strong, positive linear relationship existed between the combined impact of the independent variables CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method) and the dependent variables LRNOUT (learning outcomes)

and OVRALL (overall excellence of instruction and courses), significant at the .01 level, with a *p-value* of .000. CLNCL (CL or NCL instructional method) was a minor contributor to the overall impact of the predictive linear model.

Based on these findings, it can be concluded that the combined set of variables of CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method) made a substantial and positive impact on student ratings of OVRALL (overall excellence of instruction and courses). The combined scores of CLEF (course learning environment factors) and CLNCL (CL or NCL instructional method) can be used to predict OVRALL (overall excellence of instruction and courses) with a high degree of accuracy. The course learning environment factors and the instructional method (CL or NCL) impacted student ratings of overall excellence of instruction and courses. Student ratings on learning outcomes and overall excellence of instruction and courses were significantly influenced by the course learning environment factors, with cooperative learning playing a minor role as indicated by the regression statistic. The faculty emphasis on the specific course learning environment factors examined in this study was critical in enhancing the student ratings of their achievement of learning outcomes and overall excellence of instruction and courses.

In the review of literature, some studies looked at factors measured by student ratings that impact effective instruction. Frey (1978) suggested that most student rating items dealt with either “skill” of the instructor, such as in presenting, or “rapport,” interacting with the students. Feldman (1976) categorized rating items as “presentation,” “facilitation,” and “regulation.” In a review of student rating literature, Feldman (1989) concluded that student rating items could logically be separated into as

many as 28 different categories. No studies were found that compared the 12 course learning environment factors identified in this study with learning outcomes, instructional methods, such as cooperative learning, or with overall excellence of the course and instruction. The 12 course learning environment factors were determined by the IDEA Center through factor analyses of the student rating items of the ICSF—SRIC (IDEA Center, 1998b).

These findings suggest that faculty should critically monitor their use of the 12 course learning environment factors to increase the achievement of learning outcomes and overall excellence of the course and instruction, and thus learning as indicated in the research.

Summary

In testing the theory of social interdependence, this study indicated that the interaction of students and their dependence on each other for learning impacts their perceptions of their learning environment, learning outcomes, and to a minor degree, the overall excellence of instruction and courses. As an instructional method that enhanced the learning environment, cooperative learning positively influenced the student ratings of learning outcomes and overall excellence of instruction and courses. The results of this study confirmed the findings of previous studies. When positive social interdependence was established and promoted in the classroom, through cooperative learning and a socially interactive environment, students perceived that learning increased and the overall quality of the classroom was better than in the traditional, non-cooperative environment.

Recommendations for Future Research

1. Additional research is needed to confirm the findings based on the relationship of cooperative learning and student ratings of CLEF (course learning environment factors), particularly the factors that appeared to have limited impact.
2. Additional research is recommended to further explore student ratings on CL and NCL courses on learning outcomes and particularly, overall excellence of instruction and courses.
3. Faculty who volunteer to learn and implement new methods of instruction may use other methods of instruction in the classroom with CL that could have impacted student ratings. A recommendation would be to randomly assign faculty to use CL in courses in a controlled instructional environment. Extensive training and critical implementation of the cooperative learning elements could be verified to increase the rigor of the verification of the use of cooperative learning. Observation of the implementation of CL could be used to verify the use of CL in addition to self-reporting instruments.
4. Future research could explore how the amount of cooperative learning training and level of implementation impacts the results in comparing CL and NCL classes in the community college using student ratings or other instruments.
5. Further investigation could explore a variety of independent variables that impact the learning environment, learning outcomes, or overall excellence

of courses and instruction. Other dependent variables could be compared on the instructional method, CL and NCL, such as end of semester grades of students, exam scores, or other student behavior or characteristics to control for extraneous variables and to provide a broader view of the impact of cooperative learning in comparison to traditional instruction. A comparison of the variables might indicate which of the variables have the most impact on student ratings and learning, instructional methods or student behaviors and characteristics.

6. The exploration of the use of other instruments or tools to measure the impact of cooperative learning in an entire college setting could provide another dimension to the impact of cooperative learning.
7. Further study could compare colleges on the implementation of cooperative learning. An increasing number of colleges are implementing cooperative learning college-wide. Colleges who were not implementing CL, but similar in other ways, could be compared with those who are to measure the impact of CL across diverse campuses. This would further broaden the study to a much larger population.

Implications for Practice

Four key implications for practice were identified based on the results of this study. Student-rating instruments could be used as a viable assessment tool to improve instructional practice (such as cooperative learning) and the learning environment. The investigation of the course learning environment factors yielded strong support for the

12 factors that would enhance the classroom through multiple instructional approaches, including cooperative learning. The results of this study provided strong support for the concept of the learning organization, or learning college, through student-centered approaches related to assessment, the learning environment, and instructional methods, such as cooperative learning. The results of the investigation of the course learning environment factors implied that 12 critical areas focusing on student learning could improve learning outcomes, the learning environment, and overall excellence of instruction and courses. The implication of how the focus of this study impacted classrooms in a community college at the local level provided a model for implementing change. The theory of social interdependence was structured in the classrooms of this college and research site through cooperative learning. Cooperative learning was an instructional strategy used to implement the learning college initiative in the classroom.

Using Student Ratings to Improve the Learning Environment

This study used a student-rating instrument to measure a variety of variables related to the learning environment: (a) instructional method (CL or NCL), (b) course learning environment factors, (c) learning outcomes, and (d) overall excellence of instruction and courses. The instrument used in this study, IDEA Center Survey Form—Student Reactions to Instruction and Courses (IDEA Center, 1998b), provided an additional component not found on many student rating forms—learning outcomes or objectives. This component was a key element of this study. This instrument focused more on student behavior and learning than the traditional format that focuses on faculty behavior. As colleges continue to become more student-centered through the

learning college movement, instruments such as these will play an integral part in the assessment of the learning environment.

Student ratings are a key component of instructional improvement in most colleges and universities and carry substantial weight in the evaluation of faculty. While student ratings should never be used alone to measure the success of a course or instruction, many colleges rely on student ratings as part of a comprehensive assessment. Student ratings are used for many purposes (Schmelkin, Spencer, & Gellman, 1997). Despite some inconsistencies, certain conclusions have been relatively well accepted by researchers and practitioners. Marsh (1987, p. 255) concluded that student ratings are:

- (a) Multidimensional, (b) reliable and stable, (c) primarily a function of the instructor who teaches a course rather than the course that is taught, (d) relatively valid against a variety of indicators of effective teaching, and (e) relatively unaffected by a variety of variables hypothesized as potential biases.

Schmelkin, Spencer, and Gellman (1997) noted that:

Less clear is the extent to which student ratings have been accepted and used for the purposes attributed to them, rather than just being administered. The focus of their use is primarily: (a) as diagnostic feedback to faculty for instructional improvement—formative purpose, (b) for evaluative personnel decisions—summative purpose, (c) as an aid to students in course selection (p. 576).

Cashin, (1995) compared student ratings of learning outcomes, student learning, and grades. Cashin stated that theoretically, the best criterion of effective instruction was student learning. Students of more effective instructors should learn more. Cohen

(1981) and Feldman (1989) reviewed several studies comparing student grades on an external exam, as the measure of student learning, and the correlations between the exam grade and various student ratings items. Their study results supported a strong relationship between the student ratings and exam grades. Classes in which the students gave the instructor higher ratings tended to be the classes where the students learned more. Cashin (1995) noted that while the correlation of these variables listed was strong, many other variables impact student learning, grades, and student ratings, such as the students' characteristics (motivation and ability) and instructor characteristics (such as presentation style, methods of instruction used).

Student ratings of instruction are best used as one part of the overall assessment of instruction and courses, all of which are used to improve instruction, make curricular decisions, and make personnel decisions (Cashin, 1995). Student ratings can be used in conjunction with other forms of assessment, such as self-ratings of instructor performance, peer reviews, portfolios, alumni ratings, trained observers, and administrative reviews. While students are valid evaluators of courses and instruction, student ratings of instruction are one-dimensional. Instruction is multi-faceted and requires many perspectives for comprehensive assessment and improvement.

A limited number of studies have been conducted using student ratings to measure the impact of cooperative learning. An even fewer number of studies have used student ratings to measure learning outcomes or achievement in the community college. The format of the student-rating instrument, which included a section on learning outcomes, contributed to the significance of the study. The construction of the IDEA Center Survey Form—Student Reactions to Instruction and courses (IDEA

Center, 1998b) was based on learning-centered principles, particularly items 21 through 32 that measured the achievement of learning outcomes. On this section of the instrument, students were asked to rate how the course helped them to gain factual knowledge, learn fundamental concepts, apply course material to increase problem solving abilities, work in teams, think critically, and develop creativity, oral communication skills, and career related competencies. Few evaluation instruments of instruction and courses were found that included learning outcomes and a focus on student behavior rather than teacher behavior.

A major implication in this study was that the format of the instrument used for student ratings of instruction was a viable part of measuring the impact of the instructional method (CL and NCL), learning outcomes, and overall excellence of instruction and courses. The quality of the instrument insured valid, reliable results. These results can then be used to improve instruction and improve the learning environment. Based on the results of the student ratings in this study, it was implied that to enhance student ratings and learning as proposed by Cohen (1981) and Feldman (1989), faculty should address course learning environment factors explored in this study, of which cooperative learning was a component. The results of this study implied that cooperative learning was one instructional method used successfully to improve the learning environment, especially these six course learning environment factors that were significant at the .01 alpha level (see Table 26): (a) the level of interactive student involvement (INVOLVE), (b) faculty emphasis on group learning/team skills (GRPSKLS), (c) the use of multiple instructional approaches (MULTIPLE), (d) implementation of techniques for learning engagement (INSTMETH), (e) emphasis on

assessment and feedback (ASSESS), and (f) clarity of the instructor's perspective on content (COMM).

Multiple Instructional Approaches

The results of this study implicated the use of a variety of instructional strategies to enhance learning. The lecture-based traditional classroom is assumed to be the norm. McKeachie, Chism, Menges, Svinicki, and Weinstein (1994) stated that, "The lecture is probably the oldest teaching method and still the method most widely used in American colleges and universities" (p. 53). McKeachie, Pintrich, Lin, Smith, and Sharma (1990) noted that the research on the lecture instructional method indicated that the lecture was as efficient as other methods, such as discussion methods. The results of studies involving measures of retention of information after the end of a course, measures of transfer of knowledge to new situations, or measures of problem solving, thinking, or motivation for further learning showed differences favoring interactive discussion methods over the lecture.

While the lecture may be as efficient as other methods, the benefits of alternative methods are well documented. Smith and Waller (1997) stated that, "Cooperative learning researchers and practitioners have shown that peer relationships are essential to success in college" (p. 188). Tinto (1994) noted that two major reasons that students drop out of college are the failure to establish a social network of friends and classmates and the failure to become academically involved in classes. Astin (1993) noted that the results of a longitudinal study conducted with 27,064 students and 309 baccalaureate-granting institutions supported the use of different approaches in the classroom environment. Astin (1993) explained that this study was the first attempt to

investigate the impact of different approaches to education on student development. He particularly emphasized how the learning environment affected outcomes. In the study, 192 environmental factors were investigated to determine which factors influenced students' academic achievement, personal development, and satisfaction with college. Astin (1993) found that two environmental factors were most predictive of positive change—interaction among students and interaction between faculty and students. These two factors carried more weight and affected more general outcomes than any other environmental variables studied, including curriculum content variables. Student-faculty interaction produced significant effects on 17 outcomes and student-student interaction produced significant effects on 18 of the top 22 outcomes.

Other studies indicated evidence for change. Van Der Vleuten, Dolmans, & Scherpbier (2000) noted that in scientific research in the health care industry medical practice changes as a result of continued research. Continued improvements in the healthcare industry are the result of applying results from research to the treatment of disease. In education, practice has changed little over time. Tradition and intuition guide faculty choices of instructional methods rather than research (Van Der Vleuten, Dolmans, & Scherpbier, 2000). There is substantial empirical evidence in social science research for implementing change in educational practice. While the lecture is still an excellent and efficient tool, scientific evidence supports the augmentation of the lecture. A variety of approaches, as concluded in this study of course learning environment factors, are prescribed for the community college classroom whose students are mature learners with multiple experiences that would supplement the lecture. Actively engaging students through strategies such as cooperative learning is not only desirable

but enhances learning and the learning environment. When students construct knowledge from their own perspective through interactive approaches, they retain the knowledge longer and reach a deeper level of understanding (Johnson, Johnson, & Smith, 1998a).

The lecture method is a viable instructional approach but is overused and misused in the community college undergraduate classroom. Some instructors are convinced that the lecture method is appropriate for every situation, while others feel that the lecture is almost never appropriate (Cashin, 1985). Cashin (1985) noted that the instructor must first decide on the instructional goals. A variety of instructional approaches should be used to accomplish as many instructional goals. The multidimensionality of the classroom requires multiple instructional approaches and rating systems Cashin (1994).

Other instructional approaches that engage the learner are effective in many ways. "Students learn by becoming involved" (Astin, 1985, p. 133-134). Astin (1985) theorized two major postulates in designing more effective educational programs that are directly related to the capacity to increase student involvement. The amount of learning is directly proportional to the quality and quantity of student involvement in that program. Traditional theories of learning, especially content theory, tend to assign students a passive role—as recipients of information. In contrast, the theory of involvement emphasizes active participation of the student, suggesting that learning will be greatest when the learning environment is structured to encourage active participation. The theory also encourages educators to focus less on what they do and

more on what the student does, such as how motivated the student is, and the level of time and energy the student spends on learning (Astin, 1985).

Thus, the findings of this study and many others suggested that faculty development for expanding instructional approaches, such as cooperative learning, is necessary and appropriate to engage the adult learner in the community college. A comprehensive assessment program should be implemented to find evidence that supports the changes. Continually monitoring and improving instruction based on empirical evidence will guide change and improvement of the classroom learning environment.

Theoretical and Practical Support for Changing the Learning Environment

The key focus of this study was to investigate the theory of social interdependence. Koffka (1935) stated that the essence of a group lies in the interdependence of its members created by common goals. Groups are dynamic wholes in which a change in the state of any member changes the state of other members. Cooperative learning was successfully used as an instructional tool to establish the positive interdependence of students in the classroom in this study. The strong positive relationship between cooperative learning and the course learning environment factors indicated that cooperative learning was successful in improving the learning environment. Acknowledgement of how the establishment of positive social interdependence played a key role in the classroom environment implied that faculty selection of instructional methods is critical in improving learning and the learning environment.

The broader implication from the findings on the relationship of the course learning environment factors suggested that many variables impact learning and the overall excellence of the course and instruction. Multiple instructional methods, including cooperative learning, can be successfully used to enhance learning. Student ratings of instruction and courses in this study strongly implied that focusing on the learning environment, student needs, and learning outcomes greatly enhanced student perceptions of their learning. The learning college movement is a national initiative to improve the learning environment and skills of our graduates by engaging them in the learning process (Barr & Tagg, 1995). While studies have provided evidence to support change to a learner-centered college and improving the learning climate, creating change is difficult in a traditional learning environment (O'Banion, 1997). A theoretical model for climate/culture change is necessary to guide organizational leaders in creating change. The principles of a learning organization provide a conceptual model for change, as presented by Senge (1994).

The concept of the learning college is directly related to Senge's (1994) concept of a learning organization. Directives for implementation of the learning college concept in the community college are not just a passing trend, but also a goal for the future. Using a systems approach, the learning college concept changes the culture of the traditional educational setting by focusing on the structure of the organization, as outlined in Senge's (1994) model for creating a learning organization. When applied to education, the student becomes the reason for existence, the focus of decision-making, and for creating change. This "learning paradigm" concept is rapidly becoming practice in the community college educational setting. Its counterpart for implementation,

cooperative learning, is also advancing in higher education. In implementing the learning college concept, leaders look for practical strategies, such as cooperative learning, that support the paradigm shift to a learner-centered classroom and learning organization through cooperative efforts.

A new initiative involving community colleges nationwide proposed strategies to implement the learning college principles. In 1998, the members of the New Expeditions Initiative, a collaborative effort of the American Association of Community Colleges and the Association of Community College Trustees, sought the input of educators, students, trustees, business and community leaders, and other stakeholders around the nation. Their findings were collectively presented in The Knowledge Net (American Association of Community Colleges and American Association of Community College Trustees, 2000). This initiative launched an array of recommendations for community colleges to move to the next level of service and commitment to students and their communities. Among those recommendations were directives to (a) view the preparation and development of the nation's workforce as a primary part of their mission; (b) provide students with the academic, technical, and workplace social skills necessary for successful careers, (c) expand services to support emerging, existing, transitional, and entrepreneurial workers, (d) embrace "learning" rather than "teaching" as the focus of their educational enterprise and should focus on how different learning styles affect outcomes; (e) provide learners with a variety of experiences that will help them gain skills than will enhance their participation in a democracy; (f) repackage courses, policies, and schedules to meet the needs of lifelong learners as customers; and (g) develop comprehensive strategies for providing

experiential learning opportunities that promote democratic skills along with the academic and technical competence.

While this list of recommendations was not the complete list found in The Knowledge Net (American Association of Community Colleges and the Association of Community College Trustees, 2000), those cited are related to this study. The concept of a 'learning college,' providing democratic and experiential learning, providing students with entrepreneurial workplace/social skills, and meeting the needs of our adult learners are the founding principles of cooperative learning. The results of this study indicate that when students are more engaged in learning through group learning and interactive, multiple instructional approaches, student ratings of instruction and courses student are significantly higher than in traditional, passive classrooms.

Further evidence in support of a learning-centered approach that improves the classroom environment was found in a national study of a project conducted across several campuses. The study explored variables related to the learning environment, student learning, and student satisfaction provides support to the growing movement to involve students as partners in the learning process. Actively engaging students is one of the components of this new national project to measure student satisfaction of their college experience and learning. A 3.3 million dollar study sponsored by the Pew Charitable Trusts gauges the extent to which colleges encourage actual learning (Reisberg, 2000). More than 63,000 undergraduates completed a questionnaire of 40 items, called the College Student Report. The survey offers a method to assess undergraduates' satisfaction—and possibly evaluation of colleges. The questions were clustered into five national benchmarks of effective educational practices. The clusters

included: (a) level of academic challenge; (b) the amount of “active and collaborative learning,” which includes how often students worked on group projects, made class presentations, and tutored others; (c) student interaction with faculty members; (d) access to enriching educational experiences like internships and study-abroad programs; and (e) level of campus support, such as help with non-academic responsibilities and social activities. The results of the study indicated that engaging the student through student-student interaction and student-faculty interaction and providing opportunities to apply learning were key elements in improving the learning environment.

Implications for Change in Practice Through Learning Initiatives at the Local Level

There are strong implications for change in practice for community colleges based on this study and the principles of the learning college movement. Key commonalities between the learning college concept and cooperative learning as tool for implementation provide strong support for use in the classroom, as shown in Table 38. Both theories promote student responsibility, interactive and cooperative learning environments, high expectations, a focus on work-place skills (such as team skills), and a student-centered learning environment. Each of these concepts is grounded in theories related to adult education, such as the cognitive learning theory and behavioral learning theory.

Table 38. A Comparison of the Learning College Paradigm and Cooperative Learning

Concepts of a Learning College (Barr & Tagg, 1995)	Elements of Cooperative Learning (Johnson, Johnson, & Smith, 1998)	Theoretical Foundation
Students take responsibility for learning.	Individual accountability ensures that students take responsibility for learning rather than passively accept knowledge from the instructor.	Cognitive Learning Theory
College provides environments that bring students to discover and construct knowledge for themselves.	Students construct knowledge through actively engaging with other students and the instructor in the learning process.	Cognitive Learning Theory
College requires mastery of skills that meet public standards.	High expectations of meeting academic objectives—students are held responsible for their own as well as their teammates learning.	Behavioral Learning Theory
Teachers maintain high expectations and develop every student's competencies and talents.	Students are expected to meet learning outcomes cooperatively; a high mastery of learning is required.	Behavioral Learning Theory and Theory of Social Interdependence
Learning environments are cooperative, collaborative, and supportive.	Promotive interaction and positive interdependence motivate students to help and support each other in achieving academic goals.	Theory of Social Interdependence
Active learning is required, learning is a nesting and interacting of frameworks.	Students are actively engaged in learning through interaction with other students and the instructor.	Cognitive Learning Theory
Learning is student-centered and controlled.	Students actively construct knowledge through cooperative learning; the instructor purposefully designs learning to meet the needs of the student.	Cognitive Learning Theory and Behavioral Learning Theory
Shared governance is promoted through teamwork; faculty and students work in teams.	Students learn team skills, group processing while learning context cooperatively; students and faculty are partners in the learning process.	Theory of Group Dynamics
Workplace skills are a focus of education, such as team skills.	Team skills taught in cooperative learning provide students with skills to be team players who can work cooperatively to solve problems and create ideas.	Theory of Social Interdependence
Students learn for understanding.	Cooperative learning promotes "deep learning" required for problem solving and critical thinking.	Cognitive Learning Theory
Faculty and students continuously improve learning strategies.	Continuous feedback from group processing and individual assessment are core principles of cooperative learning; feedback is used to design/improve next learning experience.	Quality theory

Note: Adapted from Barr, R. B., & Tagg, J. (1995). From teaching to learning: A new paradigm for undergraduate education. *Change*, 27(6), 12-25.

Johnson, D. W., Johnson, R. T., & Smith, K. A. (1998a). Active learning: Cooperation in the college classroom. Edina, MN: Interaction Book Company.

Implementation of theory to practice is one of the greatest challenges of leaders in creating change in any organization (Senge, 1994). Not only do the administrators have to be key players in the initiative, but also the culture of the organization must change to accept new practice. Framing change in a learning initiative was the focus of Haywood Community College, through the Entrepreneurial Learning Initiative (ELI) beginning in 1997 (Hodges, Gilliam, Clontz, Holcombe, Bleyl, & Moody, 1998). The initiative sought to create a learner-centered institution with an entrepreneurial focus—preparing students for the new global economic working environment. Changes for the classroom involved creating active learning environments, implementing technology, and emphasis on “Entrepreneurial Skills Sets” (ESS). Cooperative learning was selected as one instructional strategy for creating an active learning environment. Faculty development in CL strategies was provided over the three-year period. REAL (Rural Entrepreneurship through Action Learning) was a second instructional program implemented in curricula with an entrepreneurial focus, such as Professional Crafts, Horticulture, Business Administration, and Cosmetology. ESS involved establishing competencies in every course related to the following core skills: (a) teamwork, (b) responsibility, (c) communication (oral, written, and verbal), (d) problem-solving, (e) information processing, and (f) adaptability. Faculty developed strategies to incorporate some or all of these competencies in every course in every program. Advisory committees of some programs participated in verifying strategies to implement the ESS.

HCC President, Dr. Nathan Hodges, established strategies for creating change in the culture through the development of core values of the college (Hodges, et al. 1998).

His core-values model guided the function and development of cross-functional teams representing all areas of the college. The teams were created to determine the core values through a series of interactive meetings and assignments. Every employee of the college was involved in this effort. Each team contributed to the final list of core values: learning, innovation, community, integrity, student-centeredness, excellence, and positivity. The core values provided the foundation for decision-making and future projects in the ELI.

Haywood Community College (HCC) used both the learning college paradigm and cooperative learning to implement change in the college as a whole and in individual classrooms (Hodges et al, 1998). Key faculty and staff individually integrated these concepts in their programs and promoted others to do so based on personal experience in their classrooms. From the classroom focus, three examples of faculty integration of CL explained how CL was appropriate and beneficial in a variety of classroom settings and provided the foundation for this study. These faculty structured their classrooms (face-to face and virtual) to provide positive social interdependence among class members through cooperative learning. Each used different CL approaches to achieve positive social interdependence. Olivia Martin, HCC math instructor, used cooperative learning successfully in several math classes (Gilliam & Haynes, 1999). After a lecture on a key math concept she provided an opportunity for students to put into practice the theory she had presented by asking students to work in pairs to solve sample problems, an informal cooperative learning strategy. At first, some students were reluctant, but after realizing the benefits of the practice, they wanted to continue working with partners. The students left the class with

a much greater understanding of the math problems than if they had only received a lecture on the concepts. Martin found that students working in pairs the entire semester between lectures in each class session was the best format for the subject and time frame. She statistically confirmed significant differences favoring CL by comparing student exam grades and final course grades in CL math courses with those not using CL. She found the benefits of CL especially successful in developmental courses.

Hal Lander, Director of Distance Learning at HCC, implemented CL in online courses by requiring students in his English composition courses to work cooperatively via email and electronic discussion boards (Gilliam & Haynes, 1999). For example, students were assigned a partner at the beginning of the class and were required to work with this partner (electronically) throughout the semester. The partner provided a second support person in clarifying assignments and issues related to virtual learning in addition to helping complete the assignment. The students critiqued their partners' draft composition assignments and discussed selected topics electronically. The students had to learn the basic components of "good writing" in order to critique the other student's paper effectively. This process not only improved the student's writing but the writing of their partner (supporting the theory of social interdependence and a key element of CL, positive interdependence).

The Director of Engineering and Industrial Outreach at HCC, Timothy Haynes, was one of the first faculty members who completed CL training, implemented CL in engineering classes, and helped promote the HCC Entrepreneurial Learning Initiative (ELI) (Gilliam & Haynes, 1999). A formal (long-term, structured) cooperative learning strategy that he found useful and also entrepreneurial (workplace-focused) was a four-

week project that incorporated all five elements of cooperative learning. Haynes randomly assigned students to groups of three's in a computer-aided drafting design course. Each group of students had to design an industrial drawing to post for a contractual bid (illustrating CL element, positive interdependence—common goal and materials). Each person was assigned a role in the project and the group members were dependent on each other to complete the entire project (CL elements, individual accountability and positive interdependence). The students had to discuss, plan, and initiate the project under the careful monitoring of the instructor (CL element, promotive interaction). Team skills were emphasized during the project. Students had to resolve conflicts, stay on task, and move forward with the project as they would in the workplace (CL element, group/social skills). The students learned the process of bidding for a contract, worked as a team, and had to meet industrial specifications for their work. The students presented their final project using graphic presentation software to engineers from local industries. Engineers critiqued their work and students discussed how they could have improved the project and their team skills (CL element, group processing). Haynes stated that students learned much more from this interactive project than they would have from a lecture format. Key skills learned were communication, technical competencies, and team skills that are not promoted in the traditional classroom. In the traditional learning environment, there was minimal interaction—students were not encouraged to share information, work in teams or discuss the completion of an assignment. The CL environment promoted openness among students creating a more friendly, inviting classroom. CL did require more monitoring and planning on the part of the instructor to keep the students on task,

intervene when necessary, and to structure the project. Most of the students responded positively, but some preferred working individually. Haynes noted that the benefits outweighed the negative aspect of implementing CL in preparing students for the real workplace.

The culture of the college has gradually shifted toward a learner-centered organization. These “grassroots” efforts described as well as the administrative support for initiating change will continue to provide opportunities for success in the future at HCC. As faculty share their experiences through the campus newsletter, networking sessions, and word of mouth, continued success is inevitable. The concept of learning cooperatively has influenced the implementation of working cooperatively across educational communities at HCC. Campus-wide ELI efforts in Administrative Services, Continuing Education, and Student Services have put into practice decentralized budgeting, customer service training, and training sessions on how to work together cooperatively (rather than competitively or individualistically). These efforts have improved processes that impact staff, faculty, students, and our learning community.

This study provided an opportunity to investigate how instructional strategies, such as cooperative learning, and the learning environment impact learning and instruction. Structuring positive social interdependence in the classroom, through cooperative learning, provided students with competencies that will be valuable in the workplace. If students can learn cooperatively, then they can work cooperatively. Positive social interdependence provided the foundation for the success of the team-based approach and group dynamics in the work place (Lewin, 1935, 1936, 1951). The practical implication for this study was that the investigation of the theory of social

interdependence, through the implementation of cooperative learning, provided community college students with critical skills in preparing them for employment.

Summary

The findings of this study can be generalized to community colleges with similar student populations and community environments. The large number of participants in the study (over 3000) provided strength and increased the generalizability of the results. A key finding, the significant, positive impact of the course learning environment factors on learning outcomes and overall excellence of instruction provides direction for future research and implications for practice in the classroom. The use of cooperative learning was significantly different on 10 of 12 CLEF (course learning environment factors) (6 were significant at the .01 level) and learning outcomes, providing credible evidence for implementation and practice to improve the learning environment. The theory of social interdependence was positively confirmed through the investigation of cooperative learning and the learning environment. Students who were provided the opportunity to learn interactively, socially, and from other group members perceived that they learned more, the learning environment was more favorable, and to a minimal degree, that the overall excellence of instruction and courses was greater than in classes not taught cooperatively.

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Appendices

Appendix A

IDEA Center Survey Form: Student Reactions to Instruction and Courses
(IDEA Center, 1998b)

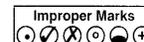
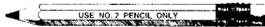
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SURVEY FORM - STUDENT REACTIONS TO INSTRUCTION AND COURSES

IMPORTANT!



Institution: _____

Instructor: _____

Course Number: _____

Time and Days Class Meets: _____

Your thoughtful answers to these questions will provide helpful information to your instructor.

Describe the frequency of your instructor's teaching procedures, using the following code:

1=Hardly Ever 2=Occasionally 3=Sometimes 4=Frequently 5=Almost Always

The Instructor:

1. (1) (2) (3) (4) (5) Displayed a personal interest in students and their learning
2. (1) (2) (3) (4) (5) Found ways to help students answer their own questions
3. (1) (2) (3) (4) (5) Scheduled course work (class activities, tests, projects) in ways which encouraged students to stay up-to-date in their work
4. (1) (2) (3) (4) (5) Demonstrated the importance and significance of the subject matter
5. (1) (2) (3) (4) (5) Formed "teams" or "discussion groups" to facilitate learning
6. (1) (2) (3) (4) (5) Made it clear how each topic fit into the course
7. (1) (2) (3) (4) (5) Explained the reasons for criticisms of students' academic performance
8. (1) (2) (3) (4) (5) Stimulated students to intellectual effort beyond that required by most courses
9. (1) (2) (3) (4) (5) Encouraged students to use multiple resources (e.g. data banks, library holdings, outside experts) to improve understanding
10. (1) (2) (3) (4) (5) Explained course material clearly and concisely
11. (1) (2) (3) (4) (5) Related course material to real life situations
12. (1) (2) (3) (4) (5) Gave tests, projects, etc. that covered the most important points of the course
13. (1) (2) (3) (4) (5) Introduced stimulating ideas about the subject
14. (1) (2) (3) (4) (5) Involved students in "hands on" projects such as research, case studies, or "real life" activities
15. (1) (2) (3) (4) (5) Inspired students to set and achieve goals which really challenged them
16. (1) (2) (3) (4) (5) Asked students to share ideas and experiences with others whose backgrounds and viewpoints differ from their own
17. (1) (2) (3) (4) (5) Provided timely and frequent feedback on tests, reports, projects, etc. to help students improve
18. (1) (2) (3) (4) (5) Asked students to help each other understand ideas or concepts
19. (1) (2) (3) (4) (5) Gave projects, tests, or assignments that required original or creative thinking
20. (1) (2) (3) (4) (5) Encouraged student-faculty interaction outside of class (office visits, phone calls, e-mail, etc.)

Twelve possible learning objectives are listed below. For each, rate your progress in this course compared with your progress in other courses you have taken at this college or university. (Of course, ratings on objectives which were not addressed by the course will usually be low.)

In this course, my progress was:

- 1-Low (lowest 10 percent of courses I have taken here)
- 2-Low Average (next 20 percent of courses I have taken here)
- 3-Average (middle 40 percent of courses I have taken here)
- 4-High Average (next 20 percent of courses I have taken here)
- 5-High (highest 10 percent of courses I have taken here)

Progress on:

21. (1) (2) (3) (4) (5) Gaining factual knowledge (terminology, classifications, methods, trends)
22. (1) (2) (3) (4) (5) Learning fundamental principles, generalizations, or theories
23. (1) (2) (3) (4) (5) Learning to *apply* course material (to improve thinking, problem solving, and decisions)
24. (1) (2) (3) (4) (5) Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
25. (1) (2) (3) (4) (5) Acquiring skills in working with others as a member of a team
26. (1) (2) (3) (4) (5) Developing creative capacities (writing, inventing, designing, performing in art, music, drama, etc.)
27. (1) (2) (3) (4) (5) Gaining a broader understanding and appreciation of intellectual/cultural activity (music, science, literature, etc.)
28. (1) (2) (3) (4) (5) Developing skill in expressing myself orally or in writing
29. (1) (2) (3) (4) (5) Learning how to find and use resources for answering questions or solving problems
30. (1) (2) (3) (4) (5) Developing a clearer understanding of, and commitment to, personal values
31. (1) (2) (3) (4) (5) Learning to *analyze* and *critically evaluate* ideas, arguments, and points of view
32. (1) (2) (3) (4) (5) Acquiring an interest in learning more by asking my own questions and seeking answers

On the next three items, compare this course with others you have taken at this institution, using the following code:
 1=Much Less than Most Courses 2=Less than Most Courses 3=About Average 4=More than Most Courses 5=Much More than Most Courses

The Course:

33. ① ② ③ ④ ⑤ Amount of reading
 34. ① ② ③ ④ ⑤ Amount of work in other (non-reading) assignments
 35. ① ② ③ ④ ⑤ Difficulty of subject matter

Describe your attitudes and behavior in this course, using the following code:
 1=Definitely False 2=More False Than True 3=In Between 4=More True Than False 5=Definitely True

Self Rating:

36. ① ② ③ ④ ⑤ I had a strong desire to take this course.
 37. ① ② ③ ④ ⑤ I worked harder on this course than on most courses I have taken.
 38. ① ② ③ ④ ⑤ I really wanted to take a course from this instructor.
 39. ① ② ③ ④ ⑤ I really wanted to take this course regardless of who taught it.
 40. ① ② ③ ④ ⑤ As a result of taking this course, I have more positive feelings toward this field of study.
 41. ① ② ③ ④ ⑤ Overall, I rate this instructor an excellent teacher.
 42. ① ② ③ ④ ⑤ Overall, I rate this course as excellent.

For the following items, blacken the space which best corresponds to your judgment:
 1=Definitely False 2=More False Than True 3=In Between 4=More True Than False 5=Definitely True

43. ① ② ③ ④ ⑤ As a rule, I put forth more effort than other students on academic work.
 44. ① ② ③ ④ ⑤ The instructor used a variety of methods--not only tests--to evaluate student progress on course objectives.
 45. ① ② ③ ④ ⑤ The instructor expected students to take their share of responsibility for learning.
 46. ① ② ③ ④ ⑤ The instructor had high achievement standards in this class.
 47. ① ② ③ ④ ⑤ The instructor used educational technology (e.g., Internet, e-mail, computer exercises, multi-media presentations, etc.) to promote learning.

EXTRA QUESTIONS
 If your instructor has extra questions, answer them in the space designated below (questions 48-66):

- | | |
|---------------|---------------|
| 48. ① ② ③ ④ ⑤ | 58. ① ② ③ ④ ⑤ |
| 49. ① ② ③ ④ ⑤ | 59. ① ② ③ ④ ⑤ |
| 50. ① ② ③ ④ ⑤ | 60. ① ② ③ ④ ⑤ |
| 51. ① ② ③ ④ ⑤ | 61. ① ② ③ ④ ⑤ |
| 52. ① ② ③ ④ ⑤ | 62. ① ② ③ ④ ⑤ |
| 53. ① ② ③ ④ ⑤ | 63. ① ② ③ ④ ⑤ |
| 54. ① ② ③ ④ ⑤ | 64. ① ② ③ ④ ⑤ |
| 55. ① ② ③ ④ ⑤ | 65. ① ② ③ ④ ⑤ |
| 56. ① ② ③ ④ ⑤ | 66. ① ② ③ ④ ⑤ |
| 57. ① ② ③ ④ ⑤ | |

Your comments are invited on how the instructor might improve this course or teaching procedures. Use the space below for comments (unless otherwise directed).
 Note: Your written comments may be returned to the instructor. You may want to PRINT to protect your anonymity.

Comments: _____

(Text Only)

**IDEA Center (1998) SURVEY FORM:
STUDENT REACTIONS TO INSTRUCTION AND COURSES**

Your thoughtful answers to these questions will provide helpful information to your instructor. Describe the frequency of your instructor's teaching procedures, using the following code:

1=Hardly Ever 2=Occasionally 3=Sometimes 4=Frequently 5=Almost Always

The Instructor:

1. Displayed a personal interest in students and their learning
2. Found ways to help students answer their own questions
3. Scheduled course work (class activities, tests, projects) in ways which encouraged students to stay up-to-date in their work
4. Demonstrated the importance and significance of the subject matter
5. Formed teams or "discussion groups" to facilitate learning
6. Made it clear how each topic fit into the course
7. Explained the reasons for criticisms of students academic performance
8. Stimulated students to intellectual effort beyond that required by most courses
9. Encouraged students to use multiple resources (e.g. data banks, library holdings, outside experts) to improve understanding
10. Explained course material clearly and concisely
11. Related course material to real life situations
12. Gave tests, projects, etc. that covered the most important points of the course
13. Introduced stimulating ideas about the subject
14. Involved students in "hands-on" projects such as research, case studies, or "real-life" activities
15. Inspired students to set and achieve goals which really challenged them
16. Asked students to share ideas and experiences with others whose backgrounds and viewpoints differ from their own
17. Provided timely and frequent feedback on tests, reports, projects, etc. to help students improve
18. Asked students to help each other understand ideas or concepts
19. Gave projects, tests, or assignments that required original or creative thinking
20. Encouraged student-faculty interaction outside of class (office visits, phone calls, e-mail, etc.)

Twelve possible learning objectives are listed below. For each, rate your progress in this course compared with your progress in other courses you have taken at this college or university. (Of course, ratings on objectives which were not addressed by the course will usually be below.)

In this course, my progress was:

1-Low (lowest 10 percent of courses I have taken here)

2-Low Average (next 20 percent of courses I have taken here)

3-Average (middle 40 percent of courses I have taken here)

4-High Average (next 20 percent of courses I have taken here)

5-High (highest 10 percent of courses I have taken here)

Progress on:

21. Gaining factual knowledge (terminology, classifications, methods, trends)
22. Learning fundamental principles, generalizations, or theories
23. Learning to apply course material (to improve thinking, problem solving, and decisions)
24. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
25. Acquiring skills in working with others as a member of a team
26. Developing creative capacities (writing, inventing, designing, performing in art, music, drama,

- etc.)
27. Gaining a broader understanding and appreciation of intellectual/cultural activity (music, science, literature, etc.)
 28. Developing skill in expressing myself orally or in writing
 29. Learning how to find and use resources for answering questions or solving problems
 30. Developing a clearer understanding of and commitment to personal values
 31. Learning to *analyze* and critically evaluate ideas, arguments, and points of view
 32. Acquiring an interest in learning more by asking my own questions and seeking answers

On the next three items, compare this course with others you have taken at this institution, using the following code:

1=Much Less than Most Courses	2=Less than Most Courses	3=About Average	4=More than Most Courses	5=Much More than Most Courses
----------------------------------	-----------------------------	-----------------	-----------------------------	-------------------------------------

The Course:

33. Amount of reading
34. Amount to work in other (non-reading) assignments
35. Difficulty of subject matter

Describe your attitudes and behavior in this course, using the following code:

1=Definitely False	2=More False Than True	3=In Between	4=More True Than False	5=Definitely True
-----------------------	---------------------------	--------------	---------------------------	----------------------

Self Rating:

36. I had a strong desire to take this course.
37. I worked harder on this course than on most courses I have taken.
38. I really wanted to take a course from this instructor.
39. I really wanted to take this course regardless of who taught it.
40. As a result of taking this course, I have more positive feelings toward this field of study.
41. Overall, I rate this instructor an excellent teacher.
42. Overall, I rate this course as excellent.

For the following items, blacken the space which best corresponds to your judgment:

1=Definitely False	2=More False Than True	3=In Between	4=More True Than False	5=Definitely True
-----------------------	---------------------------	--------------	---------------------------	----------------------

43. As a rule, I put forth more effort than other students on academic work.
44. The instructor used -a variety of methods--not only tests--to evaluate student progress on course objectives.
45. The instructor expected students to take their share of responsibility for learning.
46. The instructor had high achievement standards in this class.
47. The instructor used educational technology (e.g., Internet, e-mail, computer exercises, multi-media presentations, etc.) to promote learning.

EXTRA QUESTIONS

If your instructor has extra questions, answer them in the space designated below (questions 48-66):

Your comments are invited on how the instructor might improve this course or teaching procedures. Use the space below for comments (unless otherwise directed). *Note: Your written comments maybe returned to the instructor. You may want to PRINT to protect your anonymity.*

Institution:

Instructor:

Course Number:

Time and Days Class Meets:

Comments:

Appendix B

Operational Definition of Cooperative Learning

Group structure (Johnson, Johnson, & Smith, 1998a):

1. Students are assigned to groups of 2-5 by the instructor for the purpose of achieving an assigned academic task or social task.
 - a. Academic task is a course content-related assignment
 - b. Social task is an assignment to help students learn more about other students personally in order to work together more effectively
2. Students are assigned to groups heterogeneously based on student characteristics (academic level, learning styles, age, background, major)
3. Group tasks are structured so that the following five elements are prevalent:
 - a. Positive interdependence
 - b. Individual accountability
 - c. Promotive interaction
 - d. Team skills (leadership, communication, conflict resolution, building positive relationships)
 - e. Group processing—regular assessment of team functioning

The role of the student is to:

1. Participate in group assignments, complete the assigned group role, and to work collaboratively with other students to accomplish a shared goal through interaction and problem solving.
2. Focus attention on the assigned task to maximize his/her own learning and the learning of group members.
3. Interact with and communicate effectively with other students.
4. Equally share the work of the group.
5. Tutor and work with other students in the group to learn and complete the assigned task
6. Be responsible and accountable for learning the assigned task
7. Learn course content and team skills while working on assigned tasks.

The role of the group is to:

1. Share information and perspectives on the assigned task, and produce high quality work through member's joint efforts and contributions.
2. Learn and develop interpersonal skills, emphasizing both task and teamwork.
3. Effectively communicate to improve the effectiveness of the group.
4. Share leadership.
5. Hold each other accountable for high quality work.
6. Assess group effectiveness to continuously improve.
7. Develop a jointly derived answer within the assigned time frame.

The role of the instructor is to:

1. Develop key learning goals.
2. Establish academic and social tasks.
3. Facilitate the assignment of students to groups to maximize diversity, based on student characteristics.

4. Monitor, assess, and intervene group work and provide feedback on the effectiveness of social skills and completion of the assigned academic task as a group.
5. Evaluate students individually and as a group based on a criterion-referenced standard.
6. Provide instructional materials to complete the assigned tasks.
7. Arrange the facility to accommodate group work.
8. Direct classroom group processing at the end of group work.

Expected Outcomes

1. Increase the effort to achieve and produce high quality work.
2. Increase psychological adjustment and social competence—the ability to cooperatively work with other people to complete assigned tasks.
3. Build positive relationships and establish trust in a team environment.
4. Set and meet goals as an individual and as a group.
5. Improve higher-order thinking and reasoning skills.
6. Expand the potential learning of each team member through the synergy of the learning community and the experience, strengths and skills that each individual team member brings to the group.
7. Increase team skills by moving from “mechanically” working in team toward a level of teamwork that comes “natural.”
8. Develop problem-solving skills through collaborative discussion, reasoning, and completion of assigned tasks.
9. Understand course content at a deeper level through peer-tutoring and group work.
10. Develop student’s ability to find information from multiple resources (other students as well as the instructor)
11. Appreciate diversity—students of different ages, backgrounds, and academic levels.

Expected outcomes documented in studies (Johnson & Johnson, 1998b).

1. Knowledge acquisition, higher achievement than in competitive or individualistic environments
2. Increased retention
3. Accuracy, creativity in problem solving
4. Higher-level reasoning than the competitive or individualistic learning that is prevalent in classrooms at all levels.
5. Willingness to take on difficult tasks
6. Persistence in working toward goal accomplishment
7. Intrinsic motivation
8. Transfer of learning from one situation to another

Appendix C

Labels for Course Learning Environment Factors (CLEF)

Labels used in this study	Labels used by IDEA Center (Pallett, 2000)	Abbreviation Used in this Study	Item Number on ICSF--SRIC (IDEA Center, 1998b)
Implementation of techniques for learning engagement	Instructional methods	INSTMETH	1-20
Degree of course difficulty	Course difficulty	DIFF	33, 34, 35
Self-assessment of the level of student participation and motivation	Self-rating	SELFASMT	36-40, 43
Degree of student-faculty contact	Student-faculty contact	STUFAC	1, 2, 20
Level of interactive student involvement	Involving students	INVOLVE	5, 9, 14, 16, 18
Faculty emphasis on high expectations	Establishing expectations	HIGHEXP	3, 8, 15, 45, 46
Clarity of instructor's perspective on content	Clarity of Communication	COMM	6, 10, 11
Emphasis on assessment and feedback	Assessment and feedback	ASSESS	7, 12, 17, 19
Faculty emphasis on key elements of the course	Focusing student attention	STFOCUS	4, 6, 10, 12, 17
Promoting student interest in the course	Instilling interest	INTRST	11, 13
Faculty emphasis on group learning/team skills	Emphasizing collaborative learning	GRPSKLS	5, 16, 18, 19
The use of multiple instructional approaches	Employing multiple approaches	MULTIPLE	9, 14, 44, 47

Appendix D

Course Learning Environment Factors (CLEF)

Independent Variables
 IDEA Center (1998) Survey Form:
 Student Reactions to Instruction and Courses
 (IDEA Center, 1998b)

Permission was granted to copy these items from the form by the authors for dissertation purposes only. These items are copyrighted and may not be reprinted without the permission of the authors.

CLEF 1. INSTMETH: Implementation of techniques for learning engagement (items 1-20).

1. Displayed a personal interest in students and their learning.
2. Found ways to help students answer their own questions.
3. Scheduled course work (class activities, tests, projects) in ways which encouraged students to stay up-to-date in their work.
4. Demonstrated the importance and significance of the subject matter.
5. Formed teams or “discussion groups” to facilitate learning.
6. Made it clear how each topic fit into the course.
7. Explained the reasons for criticisms of students academic performance.
8. Stimulated students to intellectual effort beyond that required by most courses.
9. Encouraged students to use multiple resources (e.g. data banks, library holdings, outside experts) to improve understanding.
10. Explained course material clearly and concisely.
11. Related course material to real life situations.
12. Gave tests, projects, etc. that covered the most important points of the course.
13. Introduced stimulating ideas about the subject.
14. Involved students in “hands-on” projects such as research, case studies, or “real-life” activities.
15. Inspired students to set and achieve goals which really challenged them.
16. Asked students to share ideas and experiences with others whose backgrounds and viewpoints differ from their own.
17. Provided timely and frequent feedback on tests, reports, projects, etc. to help students improve.
18. Asked students to help each other understand ideas or concepts.
19. Gave projects, tests, or assignments that required original or creative thinking.
20. Encouraged student-faculty interaction outside of class (office visits, phone calls, e-mail, etc.).

- CLEF 2. DIFF: Degree of course difficulty (items 33, 34, 35).
1. Amount of reading (item 33).
 2. Amount to work in other (non-reading) assignments (item 34).
 3. Difficulty of subject matter (item 35).
- CLEF 3. SELFASMT: Self-assessment of the level of student participation and motivation (items 36-40, 43).
1. I had a strong desire to take this course (item 36).
 2. I worked harder on this course than on most courses I have taken (item 37).
 3. I really wanted to take a course from this instructor (item 38).
 4. I really wanted to take this course regardless of who taught it (item 39).
 5. As a result of taking this course, I have more positive feelings toward this field of study (item 40).
 6. As a rule, I put forth more effort than other students on academic work (item 43).
- CLEF 4. STUFAC: Degree of student-faculty contact (items 1, 2, 20).
1. Displayed a personal interest in students and their learning (item 1).
 2. Found ways to help students answer their own questions (item 2).
 3. Encouraged student-faculty interaction outside of class (office visits, phone calls, e-mail, etc.) (item 20).
- CLEF 5. INVOLVE: Level of interactive student involvement (items 5, 9, 14, 16, 18).
1. Formed teams or “discussion groups” to facilitate learning (item 5).
 2. Encouraged students to use multiple resources (e.g. data banks, library holdings, outside experts) to improve understanding (item 9).
 3. Involved students in “hands-on” projects such as research, case studies, or “real-life” activities (item 14).
 4. Asked students to share ideas and experiences with others whose backgrounds and viewpoints differ from their own (item 16).
 5. Asked students to help each other understand ideas or concepts (item 18).
- CLEF 6. HIGHEXP: Faculty emphasis on high expectations (items 3, 8, 15, 45, 46).
1. Scheduled course work (class activities, tests, projects) in ways which encouraged students to stay up-to-date in their work (item 3).
 2. Stimulated students to intellectual effort beyond that required by most courses (item 8).
 3. Inspired students to set and achieve goals which really challenged them (item 15).
 4. The instructor expected students to take their share of responsibility for learning (item 45).
 5. The instructor had high achievement standards in this class (item 46).
- CLEF 7. COMM: Clarity of instructor’s perspective on content (items 6, 10, 11).
1. Made it clear how each topic fit into the course (item 6).
 2. Explained course material clearly and concisely (item 10).
 3. Related course material to real life situations (item 11).

CLEF 8. ASSESS: Emphasis on assessment and feedback (items 7, 12, 17, 19).

1. Explained the reasons for criticisms of students academic performance (item 7).
2. Gave tests, projects, etc. that covered the most important points of the course (item 12).
3. Provided timely and frequent feedback on tests, reports, projects, etc. to help students improve (item 17).
4. Gave projects, tests, or assignments that required original or creative thinking (item 19).

CLEF 9. STFOCUS: Faculty emphasis on key elements of the course (items 4, 6, 10, 12, 17).

1. Demonstrated the importance and significance of the subject matter (item 4).
2. Made it clear how each topic fit into the course (item 6).
3. Explained course material clearly and concisely (item 10).
4. Gave tests, projects, etc. that covered the most important points of the course (item 12).
5. Provided timely and frequent feedback on tests, reports, projects, etc. to help students improve (item 17).

CLEF 10. INTRST: Promoting student interest in the course (items 11, 13).

1. Related course material to real life situations (item 11).
2. Introduced stimulating ideas about the subject (item 13).

CLEF 11. GRPSKLS: Faculty emphasis on group learning/team skills (items 5, 16, 18, 19).

1. Formed teams or “discussion groups” to facilitate learning (item 5).
2. Asked students to share ideas and experiences with others whose backgrounds and viewpoints differ from their own (item 16).
3. Asked students to help each other understand ideas or concepts (item 18).
4. Gave projects, tests, or assignments that required original or creative thinking (item 19).

CLEF 12. MULTIPLE: The use of multiple instructional approaches (items 9, 14, 44, 47).

1. Encouraged students to use multiple resources (e.g. data banks, library holdings, outside experts) to improve understanding (item 9).
2. Involved students in “hands-on” projects such as research, case studies, or “real-life” activities (item 14).
3. The instructor used -a variety of methods--not only tests--to evaluate student progress on course objectives (item 44).
4. The instructor used educational technology (e.g., Internet, e-mail, computer exercises, multi-media presentations, etc.) to promote learning (item 47).

Appendix E

Dependent Variables
IDEA Center (1998) Survey Form:
Student Reactions to Instruction and Courses
(IDEA Center, 1998b)

Permission was granted to copy the items from this form by the authors for the publication of this dissertation only. These items are copyrighted and may not be reprinted without the permission of the authors.

Learning Outcomes (items 21-32)

1. Gaining factual knowledge (terminology, classifications, methods, trends) (item 21).
2. Learning fundamental principles, generalizations, or theories (item 22).
3. Learning to apply course material (to improve thinking, problem solving, and decisions) (item 23).
4. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course (item 24).
5. Acquiring skills in working with others as a member of a team (item 25).
6. Developing creative capacities (writing, inventing, designing, performing in art, music, drama, etc.) (item 26).
7. Gaining a broader understanding and appreciation of intellectual/cultural activity (music, science, literature, etc.) (item 27).
8. Developing skill in expressing myself orally or in writing (item 28).
9. Learning how to find and use resources for answering questions or solving problems (item 29).
10. Developing a clearer understanding of and commitment to personal values (item 30).
11. Learning to analyze and critically evaluate ideas, arguments, and points of view (item 31).
12. Acquiring an interest in learning more by asking my own questions and seeking answers (item 32).

Overall excellence of courses and instruction (items 41-42)

1. Overall, I rate this instructor an excellent teacher (item 41).
2. Overall, I rate this course as excellent (item 42).

Appendix F

Research Questions, Variables, and Statistical Procedures

Research Question	Dependent Variable (s)	Independent Variable (s)	Statistical Procedure
<u>Research Question One</u>			
What is the impact of the instructional method (CL and NCL courses) on student ratings of CLEF (course learning environment factors) in the community college classroom?	CLEF: INSTMETH DIFF SELFASMET STUFAC INVOLVE HIGHEXP COMM ASSESS STUFOC INTRST GRPSKLS MULTIPLE	Instructional Method: CL and NCL	Correlation & Multiple Regression
<u>Research Question Two</u>			
What is the impact of the instructional method (CL and NCL) on student ratings of LRNOUT (learning outcomes) and OVRALL (overall excellence of courses and instruction) in the community college classroom?	LRNOUT OVRALL	Instructional Method: CL and NCL	Correlation & Multiple Regression
<u>Research Question Three</u>			
What is the impact of CLEF (course learning environment factors) on student ratings of LRNOUT (learning outcomes) and OVRALL (overall excellence of courses and instruction) in the community college classroom?	LRNOUT OVRALL	CLEF: INSTMETH DIFF SELFASMET STUFAC INVOLVE HIGHEXP COMM ASSESS STUFOC INTRST GRPSKLS MULTIPLE	Correlation & Multiple Regression
<u>Research Question Four</u>			
What is the impact of the instructional method (CL and NCL) and CLEF (course learning environment factors) on student ratings of LRNOUT (learning outcomes) and OVRALL (overall excellence of courses and instruction) in the community college?	LRNOUT OVRALL	CLNCL & CLEF: INSTMETH DIFF SELFASMET STUFAC INVOLVE HIGHEXP COMM ASSESS STUFOC INTRST GRPSKLS MULTIPLE	Correlation & Multiple Regression

Appendix G

Letter of Permission from Haywood Community College



185 FREEDLANDER DRIVE
 CLYDE, NORTH CAROLINA 28721-9454
 (828) 627-2821

A Member of the North Carolina Community College System

March 15, 2001

Ms. Janice Gilliam
 Interim Dean of Student Services
 Haywood Community College
 185 Freedlander Drive
 Clyde, NC 28721

Dear Ms. Gilliam,

I am writing in regards to your request to administer surveys to students and faculty as part of your study in partial fulfillment of the requirements for the Doctorate of Education from North Carolina State University, in Adult and Community College Education.

You have my permission to administer the IDEA Center Long Form Student Reactions to Instruction and Courses to all students enrolled in academic courses Spring Semester 2001 at Haywood Community College. This survey will serve in lieu of the current student evaluation of instruction system. All students present on the day of the administration of the surveys in all courses will be asked to complete the survey, administered by faculty and selected staff members as part of our regular evaluation process each semester. In addition, you have permission to administer the IDEA Center Faculty Information Form to each faculty member for each course to provide data about the course and students enrolled in the course. Faculty will be informed that this survey is a required step in the IDEA Center Assessment Process for each course and that as a result, each individual faculty member will receive a summary report for each course from the IDEA Processing Center. You have permission to administer a second instrument to faculty, the Questionnaire on the Use of Cooperative Groups, from the Cooperative Learning Center. Faculty will be informed also that this is a required process in your study to select courses taught cooperatively for comparison with courses not taught cooperatively and that all information will benefit not only your study, but the Entrepreneurial Learning Initiative of the Haywood Community College.

You have permission to direct the administration of the surveys and to ask for assistance from academic support personnel in this process. I would like to request a projected time line for the administration of the surveys to be shared with faculty.

In granting access to college classrooms and faculty information for the administration of the surveys, I would require that all measures to ensure confidentiality of the data for individual courses and faculty be taken. I would also like to request an electronic copy of the data for Academic Services archives and the Research and Development Office archives, a copy of the analyses, any reports generated in relation to our Entrepreneurial Learning Initiative, and a copy of your dissertation upon the successful defense of your dissertation.

I wish you well in your research efforts and look forward to receiving the results of your study.

Sincerely,

Michael Germano, Ed. D.
 Dean of Academic Services

Appendix H

Permission Statement from

North Carolina State University

Institutional Review Board for the Use of Human Subjects in Research

North Carolina State University is a land-grant university and a constituent institution of The University of North Carolina

**Office of Research
and Graduate Studies**

NC STATE UNIVERSITY

Sponsored Programs and
Regulatory Compliance
Campus Box 7514
1 Leazar Hall
Raleigh, NC 27695-7514

919.515.7200
919.515.7721 (fax)

Matthew Zingraff, Ph.D., Chair
Institutional Review Board
on Research Involving Human Subjects

Date: March 28, 2001

Project Title: Doctoral Thesis: Cooperative Learning in the Community College
Classroom

IRB#: 1591

Dear Janice H. Gilliam:

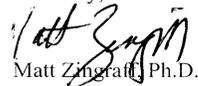
Based on the information provided, this project is exempt from the policy as outlined in Code of Federal Regulations (Exemption: 46.101.b.2).

Provided that the only participation of the subjects is as described in the proposal narrative, this project is exempt from further review.

NOTE:

1. This committee complies with requirements found in Title 45 part 46 of The Code of Federal Regulations. For NCSU projects the Assurance Number is: M1263; the IRB Number is: 01XM.
2. Review de novo of this proposal is necessary if any significant alterations/additions are made.

Sincerely,


Matt Zingraff, Ph.D.

cc: Dr. Carol E. Kasworm

Appendix I

Letters of Permission from IDEA Center to use and copy the IDEA Center Survey

Forms for the purpose and publication of this dissertation only.



**Individual Development and
Educational Assessment Center**

211 South Seth Child Road
Manhattan, Kansas 66502-3089
1.800.255.2757
785.532.5970
Fax: 785.532.5725
E-mail: idea@ksu.edu
www.idea.ksu.edu

March 12, 2001

Ms. Janice Gilliam
Interim Dean of Student Services
Haywood Community College
185 Freedlander Drive
Clyde, NC 28721

Dear Ms. Gilliam:

Please let this letter serve as permission from the IDEA Center to use the *IDEA Student Ratings of Instruction* student survey and faculty information forms in your dissertation research. Our only requirements are that you identify the IDEA Center as the source of the instrument and that you provide one copy of your dissertation to the Center upon the successful defense of your dissertation.

Enclosed you will find the five copies of the forms that you requested in your recent email.

We wish you success in your research efforts.

Sincerely,

A handwritten signature in cursive script that reads "Bill Pallett".

William H. Pallett, Ph.D.
Director



**Individual Development and
Educational Assessment Center**

211 South Seth Child Road
Manhattan, Kansas 66502-3089
1.800.255.2757
785.532.5970
Fax: 785.532.5725
E-mail: idea@ksu.edu
www.idea.ksu.edu

December 21, 2001

Ms. Janice Gilliam
Route 2 Box 364
Flat Rock, NC 28731

Dear Ms. Gilliam:

Please let this letter serve as permission from The IDEA Center to reproduce in any format you choose all, or any part, of the contents of *the IDEA Survey Form – Student Reactions to Instruction and Courses*, and *the IDEA Faculty Information Form* in your dissertation. With this permission it is understood that you will note that all materials are copyrighted by The IDEA Center.

I wish you well in your research and professional endeavors.

Sincerely,

A handwritten signature in cursive script that reads "William H. Pallett".

William H. Pallett
Director

Appendix J

IDEA Center: Faculty Information Form (IDEA Center, 1998a)
Permission was granted to use and copy this form by the authors for the publication of
this dissertation only.

This form is copyrighted and may not be reprinted without the permission of the
authors.

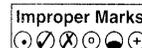
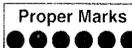
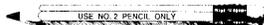


Faculty Information Form

Institution: _____ Instructor: _____

Course Number: _____ Time and Days Class Meets: _____

IMPORTANT!



Last Name (Up to 11 letters)											Init.
A	A	A	A	A	A	A	A	A	A	A	A
B	B	B	B	B	B	B	B	B	B	B	B
C	C	C	C	C	C	C	C	C	C	C	C
D	D	D	D	D	D	D	D	D	D	D	D
E	E	E	E	E	E	E	E	E	E	E	E
F	F	F	F	F	F	F	F	F	F	F	F
G	G	G	G	G	G	G	G	G	G	G	G
H	H	H	H	H	H	H	H	H	H	H	H
I	I	I	I	I	I	I	I	I	I	I	I
J	J	J	J	J	J	J	J	J	J	J	J
K	K	K	K	K	K	K	K	K	K	K	K
L	L	L	L	L	L	L	L	L	L	L	L
M	M	M	M	M	M	M	M	M	M	M	M
N	N	N	N	N	N	N	N	N	N	N	N
O	O	O	O	O	O	O	O	O	O	O	O
P	P	P	P	P	P	P	P	P	P	P	P
Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
R	R	R	R	R	R	R	R	R	R	R	R
S	S	S	S	S	S	S	S	S	S	S	S
T	T	T	T	T	T	T	T	T	T	T	T
U	U	U	U	U	U	U	U	U	U	U	U
V	V	V	V	V	V	V	V	V	V	V	V
W	W	W	W	W	W	W	W	W	W	W	W
X	X	X	X	X	X	X	X	X	X	X	X
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z

Objectives: (Scale - M = Minor or No Importance, I = Important, E = Essential)

M I E

- Gaining factual knowledge (terminology, classifications, methods, trends)
- Learning fundamental principles, generalizations, or theories
- Learning to *apply* course material (to improve thinking, problem solving, and decisions)
- Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
- Acquiring skills in working with others as a member of a team
- Developing creative capacities (writing, inventing, designing, performing in art, music, drama, etc.)
- Gaining a broader understanding and appreciation of intellectual/cultural activity (music, science, literature, etc.)
- Developing skill in expressing oneself orally or in writing
- Learning how to find and use resources for answering questions or solving problems
- Developing a clearer understanding of, and commitment to, personal values
- Learning to *analyze* and *critically evaluate* ideas, arguments, and points of view
- Acquiring an interest in learning more by asking questions and seeking answers

Days Class Meets	Department Code	Time Class Begins	Course Number	Number Enrolled	Local Code
<input type="radio"/> Mon <input type="radio"/> Tues <input type="radio"/> Wed <input type="radio"/> Thu <input type="radio"/> Fri <input type="radio"/> Sat <input type="radio"/> Sun	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

Contextual Questions (Research Purposes):

The IDEA Center will conduct research on these optional questions in order to improve the interpretation of student ratings.

1. Which of the following represents the primary approach to this course? (Mark only one)

- = Lecture
- = Discussion/recitation
- = Seminar
- = Skill/activity
- = Laboratory
- = Field Experience
- = Studio
- = Multi-Media
- = Practicum/clinic
- = Other

2. If multiple approaches are used, which one represents the secondary approach?

- = Lecture
- = Discussion/recitation
- = Seminar
- = Skill/activity
- = Laboratory
- = Field Experience
- = Studio
- = Multi-Media
- = Practicum/clinic
- = Other

3. Describe this course in terms of its requirements with respect to the features listed below. Use the following code to make your responses:

N = None (or little) required
S = Some required
M = Much required

N S M

- A. Writing
- B. Oral communication
- C. Computer applications
- D. Group work
- E. Mathematical/quantitative work
- F. Critical thinking
- G. Creative/artistic/design endeavor

Contextual Questions Continued:

4. Rate each of the circumstances listed below, using the following code to respond:

P = Had a positive impact on learning
 I = Neither a positive nor a negative impact
 N = Had a negative impact on learning
 ? = Can't judge

- P I N ?
- A. Physical facilities and/or equipment
- B. Your previous experience in teaching this course
- C. Substantial changes in teaching approach, course assignments, content, etc.
- D. Your desire to teach this course
- E. Your control over course management decisions (objectives, texts, exams, etc.)
- F. Adequacy of students' background and preparation for the course
- G. Student enthusiasm for the course
- H. Student effort to learn
- I. Technical/instructional support

5. Please identify the principal type of student enrolling in this course

- ① = Freshmen/sophomores seeking to meet a "general education" or "distribution" requirement
- ② = Freshmen/sophomores seeking to develop background needed for their intended specialization
- ③ = Upperclassmen non-majors taking the course as a "general education" or "distribution" requirement
- ④ = Upperclassmen majors (in this or a related field of study) seeking competence or expertise in their academic/professional specialty
- ⑤ = Graduate or professional school students
- ⑥ = Combination of two or more of the above types

6. Is this class:

- a. Team taught? Yes No
- b. Taught through distance learning? Yes No

(Text Only)
IDEA Center (1998) Faculty Information Form

Institution _____ Instructor:

Course Number/Section: _____ Time and Days Class Meets:

Objectives: (Scale: M = Minor or No Importance; I = Important, E = Essential)

1. Gaining factual knowledge (terminology, classifications, methods, trends)
2. Learning fundamental principles, generalizations, or theories
3. Learning to apply course material (to improve thinking, problem solving, and decisions)
4. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
5. Acquiring skills in working with others as a member of a team
6. Developing creative capacities (writing, inventing, designing, performing in art, music, drama, etc.)
7. Gaining a broader understanding and appreciation of intellectual/cultural activity (music, science, literature, etc.)
8. Developing skill in expressing myself orally or in writing
9. Learning how to find and use resources for answering questions or solving problems
10. Developing a clearer understanding of and commitment to personal values
11. Learning to *analyze* and critically evaluate ideas, arguments, and points of view
12. Acquiring an interest in learning more by asking my own questions and seeking answers

Days Class Meets

Department Code

Time Class Begins

Course Number

Number Enrolled

Local Code

Contextual Questions (Research Purposes):

I. Which of the following represents the primary approach to this course? (Mark only one)

1. Lecture
2. Discussion/recitation
3. Seminar
4. Skill/activity
5. Laboratory
6. Field Experience
7. Studio
8. Multi-Media
9. Practicum/clinic

10. Other

- II. If multiple approaches are used, which one represents the secondary approach (from list in question I.) ?
- III. Describe this course in terms of its requirements with respect to the features listed below. Use the following code to make your responses:
 N = None (or little) required
 S = Some required
 M = Much required
- A. Writing
 - B. Oral communications
 - C. Computer applications
 - D. Group work
 - E. Mathematical/quantitative work
 - F. Critical Thinking
 - G. Creative/artistic/design endeavor
- IV. Rate each of the circumstances listed below, using the following code to respond:
 P = Had a positive impact on learning
 I = Neither a positive nor a negative impact
 N = Had a negative impact on learning
 ? = Can't judge
- A. Physical facilities and/or equipment
 - B. Your previous experience in teaching this course
 - C. Substantial changes in teaching approach, course assignments, content, etc.
 - D. Your desire to teach this course
 - E. Your control over course management decisions (objectives, texts, exams, etc.)
 - F. Adequacy of students' background and preparation for the course
 - G. Student enthusiasm for the course
 - H. Student effort to learn
 - I. Technical/instructional support
- V. Please identify the principal type of student enrolling in this course
1. Freshmen/sophomores seeking to meet a "general education" or "distribution" requirement
 2. Freshmen/sophomores seeking to develop background needed for their intended specialization
 3. Upperclassmen non-majors taking the course as a "general education" or "distribution" requirement
 4. Upperclassmen majors (in this or a related field of study) seeking competence or expertise in their academic/professional specialty
 5. Graduate or professional school students
 6. Combination of two or more of the above types
- VI. Is this class:
- | | | | |
|--------------------------------------|-----|----|--|
| A. Team taught? | Yes | No | |
| B. Taught through distance learning? | Yes | No | |

Appendix K

Questionnaire on the Use of Cooperative Learning (QUCL)

(Cooperative Learning Center, 1991)

Permission was granted to use and copy this form by the authors for the publication of this dissertation only.

This form is copyrighted and may not be reprinted without the permission of the authors.

QUESTIONNAIRE ON THE USE OF COOPERATIVE LEARNING

The purpose of this questionnaire is to find out how teachers implement cooperative learning into their classroom. Data collected from this questionnaire will be summarized as group data, keeping all individual responses anonymous.

Demographic Information

1. College:
2. Position:
3. Division:
4. Years of teaching:
5. Please list course and section numbers of courses you teach:

Cooperative Learning Basic Training

6. Training date
7. Training site
8. Hours spent in training
 - a. less than 20
 - b. 20-39
 - c. 40-59
 - d. 60-79
 - e. more than 80
9. Name of trainer
10. Is collegial support established within the college or between teachers to implement cooperative learning?
 - a. Yes
 - b. No
- 11a. What percentage of the total class time do you spend in cooperative learning groups?
 - a. No Class time
 - b. Less than 10% of the time
 - c. 10-25% of the time
 - d. 26-50% of the time
 - e. 51-75% of the time
 - f. More than 76% of the time
 - g. Not currently in a classroom

11b. Please check ALL of the following elements that you implement in your classroom when using cooperative group learning:

- a. Individual accountability (student work is graded individually)
- b. Positive interdependence (students are dependent on each other for learning in small groups)
- c. Promotive interaction (students work face to face in small groups to encourage learning)
- d. Social/team skills are purposefully taught
- e. Group processing is used after active learning experiences to enhance learning

If you currently do not use cooperative learning (response a or g on item 15) in your classroom, DO NOT answer the remaining questions. Thank you for completing this questionnaire. Please return to your Division Support Staff.

If you use cooperative learning groups in your classroom (responses b – f on item 15), please CONTINUE with the questionnaire by turning to the next page.

QUESTIONNAIRE ON THE USE OF COOPERATIVE LEARNING

Please complete the following information on your use of cooperative learning.

1. Subject area (s) you teach:
2. Percentage of time in cooperative groups (e.g. 20%) for the class?
3. Of the time spent in groups, what percentage of that time is spent on task?
4. How long do students stay in the same group (e.g. 1 session, 2 days, 3 weeks)?
5. List the course and section number of courses in which you have implemented cooperative learning this semester:

Answer the following questions on the answer sheet provided using the following scale:

Almost Always	Sometimes	Almost Never
5	3	1
4	2	1

**The following questions were developed by the Cooperative Learning Center,
University of Minnesota ©Cooperative Learning Center**

Please indicate the response(s) which best represent (s) your use of cooperative learning.

What group sizes do you currently use in your classroom?

6. Two (2) students per group.
7. Three (3) students per group.
8. Four (4) students per group.
9. Five (5) students per group.
10. Six (6) or more students per group.

How do you assign students to cooperative learning groups?

11. Students choose who they want to work with.
12. I assign students of the same ability to a group.
13. I assign students of different abilities to a group.
14. Students are randomly assigned to groups.

When students work in groups, how are the groups physically arranged?

15. Students can see and hear group members.
16. Groups are physically separated so that they do not interfere with each others' learning
17. I can easily move from group to group.
18. Groups sit where and in whatever arrangement they want to.

What materials are distributed to group members?

19. Each student within the group has a set of materials.
20. Group members share one set of materials.
21. Each group member has a different piece of the materials set.

What methods do you use to establish interdependence in groups?

22. Each member in the group must reach their goal in order for the group to reach their goal (e.g. one paper from the group).
23. Bonus points are added or some other reward is given to all group members when everyone in the group achieves the established criteria.
24. Group members are assigned complimentary roles to complete a task (e. g. experimenter, record-keeper).
25. Groups are placed in competition with other groups.
26. Students establish a mutual identity through a name, identity, flag or motto.
27. Groups are placed in a fantasy situation in order to complete the task.

28. Before students begin working on an assignment, do you tell them how their work will be evaluated (e.g. criteria or comparison to peers?)

How do students interact with other students in their cooperative group?

29. Students in groups work individually and turn in their work together.
30. Students compete within the group to do the most work.
31. Students share ideas and materials making sure that all group members are actively involved.

When solving problems or answering questions, how do students reach consensus in cooperative groups?

32. Students make little attempt to reach consensus and turn in separate answers.
33. A few leaders dominate the group and their point of view is accepted without challenge.
34. Students argue their point of view and change their minds only on the basis of the data.
35. All students share information and agree on one answer quickly.
36. Do students share ideas or seek information (in appropriate ways) from other groups?

How do you promote the mastery of interpersonal and group skills by students?

37. Students are told the social skills they need to use in cooperative groups, but little feedback is given to them on their use.
38. The social skill is defined and practiced. Groups are observed and feedback given to them.
39. The social skill is defined, practiced, and monitored.

How are group activities monitored in your classroom?

40. Formal observation of group functioning by teacher (e.g., by classroom or special

- education teacher or aide.)
41. Feedback by teacher or group observations
 42. Students observe their own groups and provide feedback for each other.
 43. Other:

What do you do while students are working in groups?

44. I do not interfere with group work and work quietly at my desk.
45. I move from group to group and tell students how they can better complete the task
46. I move from group to group and occasionally consult with students on ways to complete the task and work effectively with each other.

How is group processing conducted in your classroom?

47. My schedule does not allow for time for groups to process.
48. My students discuss how well they worked with each other
49. I have several structured ways for students to process in groups (e.g. rating scale continuum).
50. I structure the processing as part of the lesson and have students turn in processing assignments with their other work.

How do you evaluate students' work?

51. Norm-referenced evaluation system where individual students' performance is compared to the performance of other students.
52. Criteria-referenced evaluation system where students' individual work is compared against a preset criteria
53. Criteria-referenced evaluation system where a single groups' product is compared against a preset criteria
54. Criteria-referenced evaluation system where students are evaluated on the basis of individual work and the combined efforts of the members of their group, using a preset criteria (i.e. bonus points).

Thank you for completing this questionnaire. Please return to the Division Support Staff.

Appendix L

Letter of Permission from the Cooperative Learning Center to use and copy the
Questionnaire on the Use of Cooperative Learning for this dissertation only.

Cooperative Learning Center

University of Minnesota 60 Peik Hall, 159 Pillsbury Drive South East, Minneapolis, MN 55455

612 624 7031

FAX 612 626 1395

February 15, 2001

Ms. Janice Gilliam
Route 2 Box 364
Flat Rock, NC 28731

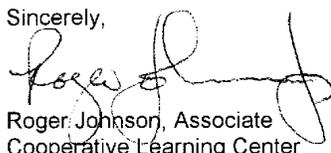
Dear Ms. Gilliam,

I grant you permission to use the Questionnaire on the Use of Cooperative Groups developed and copyrighted by David Johnson and Roger Johnson of the Cooperative Learning Center, University of Minnesota, in your study of cooperative learning for your thesis as a doctoral student in the School of Adult and Community College Education at North Carolina State University.

Reference to the questionnaire in your thesis should be appropriately made to David and Roger Johnson, Cooperative Learning Center. You may copy and distribute the questionnaire for the purpose of your study.

We would like to request a completed copy of your thesis upon completion of your study for our file.

Sincerely,

A handwritten signature in black ink, appearing to read "Roger Johnson", is written over the typed name and title.

Roger Johnson, Associate
Cooperative Learning Center

Appendix M

Summary of CL and NCL Respondents by Program

Distribution of CL Respondents by Program

Respondents in CL Courses by Program Type	Number of Students Enrolled	Number of Respondents	Percent Completed
Agricultural Sciences	54	44	81.48
Biological Science/Life Sciences	119	91	76.47
Business Administration & Management	7	6	85.71
Computer & Information Science	29	20	68.97
Conservation & Renewal Natural Resources	24	20	83.33
Education	59	59	100.00
Engineering	56	42	75.00
Fine and Applied Arts	11	9	81.82
Liberal Arts & Sciences/Humanities	39	24	61.54
Mathematics & Statistics	31	25	80.65
Nursing	73	65	89.04
Vocational-Technical	118	103	87.29
Totals	620	508	81.94

Distribution of Respondents in NCL Group by Program

Respondents in NCL Courses by Program Type	Number of Students Enrolled	Number Completing Survey	Percent Completed
Agricultural Sciences	166	118	71.08
Biological Science/ Life Science	133	111	83.46
Business—Accounting	6	6	100.00
Business—Marketing	7	7	100.00
Business Administration & Management	89	75	84.27
Business, General	174	142	81.61
Chemistry	7	6	85.71
Communications	106	56	52.83
Computer & Information Science	94	70	74.29
Conservation & Renewal Natural Resources	119	98	82.35
Economics	29	21	72.41
Education	70	52	74.29
English Language & Literature General	267	206	77.15
Engineering	17	11	64.71
Fine & Applied Arts	208	146	70.19
Health Professional/Related Science	52	48	92.30
Law	11	10	90.91
Liberal Arts & Sciences/Humanities	429	279	65.03
Mathematics & Statistics	48	43	89.58
Music	56	47	83.93
Nursing	72	66	91.67
Physical Education/Health & Safety Education	11	8	72.73
Social Sciences	94	76	80.85
Vocational-Technical	112	80	71.43
Totals	2377	1782	74.97