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EFFECTS OF TWO COOPERATIVE LEARNING STRATEGIES ON ACADEMIC LEARNING TIME, STUDENT PERFORMANCE, AND SOCIAL BEHAVIOR OF SIXTH-GRADE PHYSICAL EDUCATION STUDENTS

By

Timothy Matthew Barrett

A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

Interdepartmental Area of
Major: Administration, Curriculum, and Instruction

(Physical Education Teacher Education)

Under the Supervision of Professor Phillip Ward

Lincoln, Nebraska

June, 2000

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DISSERTATION TITLE

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BY

Timothy Matthew Barrett

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Tim Barrett, Ph.D.

University of Nebraska, 2000

Adviser: Phillip Ward, Ph. D.

The purpose of this investigation was to assess the effects of two cooperative learning strategies in physical education on academic learning time in physical education (ALT-PE), the percentage of correct trials, the total number of trials and correct trials, and social behavior. Specifically, two cooperative learning strategies, Performer and Coach Earn Rewards (PACER) and Jigsaw II-PE, respectively, were implemented in two sixth-grade physical education classes. Eight participants (two males and two females in each study) participated. Data for each study were collected for 18 days. An A-B-A-B withdrawal design was used in each study to assess the effects of PACER and Jigsaw II-PE, respectively. Interobserver agreement mean in PACER for trials was 91.4% (90.2-92.9%), ALT-PE was 90.7% (85.0-100%), for social behavior 82.4% (74.7-96.1%), and 98.2% (95.0-100%) for social duration. Interobserver agreement mean in Jigsaw II-PE for trials was 92.6% (92.0-93.4%), ALT-PE was 93.4% (88.5-100%), for social behavior 90.0% (83.7-100%), and 97.5% (94-100%) for social duration. In each study, treatment integrity of the teacher was 100%. No functional relationship was found

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between the independent variable and ALT-PE, therefore neither PACER nor Jigsaw II-PE was more time consuming than traditional instruction. Thus time for student learning was not impeded. Functional relationships were demonstrated in both PACER and Jigsaw II-PE for the percentage of correct trials for all participants. PACER and Jigsaw II-PE each showed gender effects, in that low-skilled students performed as well as their average and high skilled counterparts. A functional relationship was found for the total number of trials and correct trials for Jigsaw II-PE, however not for PACER due to overlapping data points. A functional relationship was found for both PACER and Jigsaw II-PE with social duration, but not frequency of social interaction. This investigation provides the first functional assessment of two cooperative learning strategies designed for physical education.

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"Greatness is not in where we stand, but in what direction we are moving,

We must sail sometimes with the wind and sometimes against it—

But sail we must, and not drift, nor lie at anchor."

—Oliver Wendell Holmes

Dedicated to my loving sister,

Kelly-Ann Catherine Barrett

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ACKNOWLEDGMENTS

I would like to thank my advisor, Dr. Phillip Ward, for his commitment to my program of study throughout these past four years. Dr. Ward's guidance was instrumental in my professional growth and achievement. As a fellow behavior analyst, and a believer in what people do, Dr. Ward has been a significant exemplar of researcher, teacher, and scholar for me during my days at the University of Nebraska-Lincoln. Phillip you have been my "Fred" (a.k.a. B. F. Skinner).

Next, I would like to thank the members of my committee, Dr. Sharon Evans, Dr. John Maag, Dr. Michael Stewart, and Dr. Ellen Weissinger for their thoughtful contributions to the draft of the dissertation and their scholarly dialogue. A very special thanks goes out to Dr. Panayiotis Doutis, for without whom I may not have found my passion for cooperative learning. For the past four years, Panos has been there every step of the way with feedback, encouragement, and support. A sincere thank you to fellow graduate students and colleagues, Gary Neist, Judy Sloan, and Todd Spellman, for their time and effort during the intensive data collection period of this dissertation.

Philosophically in line with my beliefs about cooperative learning and interdependency, my heart goes out to my family, who truly represent a cooperative team. Skippered by my father, Michael Robert Jr., my mother Diane, brothers and crew members Michael III, Brian, and Matthew, and of course my sister, Kelly-Ann, for whom this dissertation is dedicated.

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CHAPTER I

INTRODUCTION

Education in the United States during the latter half of the 20th century witnessed great advances in knowledge about student learning. Despite the investment of time, effort, and money, as the world advances into the 21st century, schools still have far to travel toward the goal of increased learning for all students. In schools today, a typical classroom consists of a 1:30 teacher-student ratio. As a result, the dominant method of instruction has been the direct style. This has been true in classroom and in physical education settings over the last century. Group strategies such as Classwide Peer Tutoring (Greenwood, Delquadri, & Carta, 1988) and various cooperative learning methods (Grineski, 1996; Johnson & Johnson, 1975; Slavin, 1990, 1995) have been proposed as alternative approaches to the direct style of instruction. Many of these strategies are rooted in the recognition that "one size does not fit all" in complex learning environments found in educational settings.

The search for effective methods of instruction that allow students to have similar mastery of content has been a major feature of education in the 20th century. Carroll's (1963) time-based model of school learning posits that students ought to progress to similar levels of success, albeit it would take different amounts of time to reach similar levels. Carroll's (1963) model describes the relationship between opportunities to learn and time allowed for learning. Briefly, the model states that the degree of learning is a function of time spent learning and the time needed to learn. An individual will learn a

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task to the extent that they spend the amount of time that they need to learn the task. Carroll's (1963) model suggests that in most classrooms achievement varies and time remains constant. In Carroll's (1963) model, achievement remains constant, but time varies. In short, students use different amounts of time to master the same material.

Mastery learning (Bloom, 1984) another alternative instructional method, posits that most students can master what they are taught. Bloom (1984) argued that using master learning, 75 to 90% of students achieve to the same high level of time on task reached by the top 25% of students learning under typical group instructional methods. Moreover, mastery learning allows students to learn more material in less time (Bloom, 1984). Bloom (1984) reported the results of studies conducted by two doctoral students (Anania, 1982; Burke, 1984) who assessed the effects of three instructional conditions on math and reading skills: (a) conventional, (b) mastery learning, and (c) tutoring. Conventional instruction was characterized as typical group instruction, with a 1:30 teacher-student ratio, where formative assessments were taken periodically to measure student achievement. The instruction was the same in the mastery learning condition (i.e., 1:30 teacher-student ratio) but the formative assessments were followed by corrective procedures and parallel formative assessments to determine the level of mastery of subject matter by students. In the third condition, tutoring, significant differences were made in the instruction. First, students worked one-on-one or at most one-on-three with students using a sequential procedure consisting of instruction-test-feedback-corrective procedures and parallel (i.e., similar format and content) formative

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assessments (Bloom, 1984). Instructional time was similar in all three conditions with the exception of the corrective work in the mastery learning and tutoring conditions.

The standard deviation or sigma of the conventional instruction class was used to measure the achievement differences between the conventional class and the mastery learning and tutoring classes. The results showed that typically the average student under tutoring was about two standard deviations above the average of the conventional class. Thus, the average tutored student was above 98% of the students in the conventional class. In the mastery condition, the average student was about one standard deviation above the average of the conventional class and the average student was above 84% of the students in the conventional class.

In addition, both mastery learning and tutoring classes reported lower variances compared to the normal distribution of conventional instruction. In fact, 70% of the students in the mastery learning condition and 90% of the tutored students achieved the level of summative achievement reached by only the top 20% of the students taught under the conventional instructional conditions (Bloom, 1984). Finally, there were corresponding changes in students' time on task for each instructional condition. While students' mean time on task in the conventional condition was 65%, students in the mastery learning condition were on task 10% longer (i.e., 75%) and 25% longer during tutoring (i.e., 90%).

These differences in achievement between tutoring and conventional instruction led Bloom (1984) to pose what he called the "two sigma problem." The two sigma problem, according to Bloom (1984) challenges researchers to search for methods of

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group instruction as effective as one-to-one tutoring. One potential solution to this problem is cooperative learning. Cooperative learning is a set of alternative teaching methods in which students work in small groups to help one another learn academic content (Slavin, 1991). Cooperative learning has been studied and implemented in practical applications in classrooms for over the last 30 years (Slavin, 1995).

One reason cooperative learning is a potential solution to the two sigma problem is in part, a function of the changes in the instructional environment that occur during cooperative learning. Specifically, tasks completed by students in a cooperative learning environment are characteristically different from tasks completed in conventional instruction. Typically in a conventional instructional environment students work on tasks individually (e.g., seatwork), whereas in a cooperative learning environment students work under a high level of task interdependence. For instance, in order to complete a task a group of students are dependent upon each other.

According to Doyle (1983, 1986) tasks represent the central organizing framework for the curriculum. Tasks exist within systems whose function is to direct an individual's behavior in routinized or structured patterns for accomplishing particular kinds of educational acts. For example, in a cooperative learning environment, group tasks explicitly state each group members' responsibility in accomplishing the task. The three major task systems in educational settings are the instructional, managerial, and social (Siedentop, 1990). Each task system does not operate as a discrete entity. Task systems function as a behavioral ecology in the classroom, in that changes in one system will affect the other systems. In a cooperative learning environment, one can observe how

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an instructional task affects the social task system. For instance, the teacher typically assigns a group task. In order for the group to accomplish the task, each member must put forth an effort. The contingent relationship between each individual's effort and accomplishing the group task will evoke particular student social behaviors (e.g., praise or reprimands) in order to finish the task.

In physical education, the development of task systems occurs in predictable ways: teacher states a task, students respond to the task, and then teachers may or may not respond to student efforts (Siedentop, 1990). The actual task performed may differ dramatically from the stated task. The degree to which students actually perform the stated task by the teacher is determined by the extent of accountability. Doyle (1983) suggests if there is no accountability, there is no task. Accountability measures can be formal (e.g., grade-exchange) or informal (e.g., mediated through teacher verbal and nonverbal interactions with students). When accountability is lacking, or when it is ineffective, task accomplishment is typically incomplete or modified by students in such a manner as to change the intended outcome (Doyle, 1983). Therefore, the extent to which the teacher holds students accountable determines the degree of task accomplishment by students (Doyle, 1983). In a cooperative learning environment, accountability is strengthened when each individual is held accountable for task accomplishment (Slavin, 1983b, 1995).

In cooperative learning, tasks are usually highly structured. In fact, most cooperative learning methods require specialized curricular materials. As a result, explicit

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task statements are easily delivered, while task ambiguity is reduced, thus limiting student modification of tasks.

Statement of the Problem

Research in physical education has generally taken its lead from general education. Cooperative learning has been studied in general education and special education with positive results; however, the question has not been studied extensively in physical education. In physical education, most of the evidence in support of cooperative learning is anecdotal. The few studies that have been conducted have shown positive results (Johnson & Ward, in review; Konukman, 1998; Ward & Ward 1996). These earl studies used CWPT as a cooperative learning strategy. More recently, Barrett (in review) conducted a component analysis of a modified version of PACER with undergraduate physical education majors during a badminton unit. The results showed that cooperative learning was effective in increasing both total trials and the percentage of correct trials that students performed.

In general education and special education settings cooperative learning has demonstrated both academic gains such as increased student achievement and social gains such as improved inter-group relations, acceptance of academically handicapped classmates, and increased self-esteem (Slavin, 1995). In physical education, studies have shown some evidence of psychomotor gains and social development (e.g., Johnson & Ward, in review; Konukman, 1998). Despite the lack of empirical evidence in support of cooperative learning in physical education, academic and social development through cooperative activities are strongly promoted as outcomes of cooperative learning

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