

# The Handbook of Physical Education

*Edited by*

David Kirk, Doune Macdonald and  
Mary O'Sullivan

 **SAGE Publications**  
London • Thousand Oaks • New Delhi

## 4.5 Teaching styles and inclusive pedagogies

MARK BYRA

### Introduction

Teaching signifies action taken with the purpose of realizing learning in another (Dewey, 1933; Robertson, 1987; Smith, 1987). The aim of teaching is to engage students in meaningful goal-oriented activity with the intent of meeting instructional objectives specific to a given lesson or set of lessons (Mosston and Ashworth, 2002; Rink, 2002). Teaching styles, also referred to as teaching strategies in the literature (Metzler, 2000; Rink, 2002), are planned interactions between teacher and learners that result in the accomplishment of a set of specific outcomes. A given teaching style is distinguishable from another by particular teacher actions and decisions, particular student actions and decisions, and the objectives that the relationship satisfies (Mosston and Ashworth, 2002).

The need for a teacher to use a variety of teaching styles stems from the understanding that (a) student population is diverse, (b) physical education involves objectives from the psychomotor, cognitive, and social learning domains, and (c) subject matter and context at times dictate the employment of a specific approach to instruction (Mosston and Ashworth, 2002; Rink, 2002). Students learn in different ways, come from different cultural backgrounds, and enter physical education with different levels of movement experience. This precipitates different learner needs and aspirations, which in turn precipitates the need for a variety of teaching styles. Objectives from the psychomotor, cognitive, and social learning domains can be achieved in physical education and different teaching styles can help facilitate meeting outcomes across these learning domains. For example, in a peer teaching format students analyze their partner's performance and give feedback based on what they observed. In this teaching style, objectives from the social (peer interaction), cognitive (analysis of movement), and motor (skill performance) domains are met. Finally, subject matter and context at times suggests the employment of a more appropriate teaching style. For example, when teaching a beginning archery

unit, a teacher-centered instructional style is likely more effective than a student-centered style of teaching given the safety issues involved with the delivery of such content.

### Historical perspective on teaching styles

In the earliest physical education programs in North America teaching styles centered around the teacher (Van Dalen and Bennett, 1971). Teachers were the decision makers in the gymnasium. They demonstrated and selected the exercises and games to be performed. The students followed the lead of the teacher or student leader (who was trained by the teacher) from assigned spots on the floor. The goal for students was to imitate the teacher-demonstrated or student leader-demonstrated activities as precisely and accurately as possible. Terms used to describe this type of teaching include direct, formal, and teacher-centered instruction (Metzler, 2000; Rink, 2002). According to Mosston and Ashworth (2002), this kind of teaching would be comparable to the command or practice styles, two direct teaching styles found within the Spectrum of Teaching Styles as developed originally by Mosston (1966). Given the militaristic nature of the 1880s and early 1900s and the influence of the German gymnastics of Jahn, it is not surprising that the teaching style of this time period emphasized precision and uniformity in learner performance (Van Dalen and Bennett, 1971).

The emphasis of physical education subject matter changed from calisthenics and gymnastics to sports and games during the early and mid 1900s, but changes in teaching styles did not ensue. Teacher-centered instructional approaches that emphasized drill and repetition continued to be the norm up until the 1960s. In the mid 1960s, new teaching styles began to emerge in schools, ones that invited greater student decision making and interactions between teacher and students as well as among students. These included station teaching,

peer teaching, small group teaching, and teaching through questions. This change coincided with the demand for university-trained teachers in the field of physical education, the beginnings of research on effective teaching in education which served to generate new ideas about teacher–learner processes, and the general shifts in society that were occurring during this era, specifically the move from a state of conformity in the 1950s to the intense individuality of the younger generation of the 1960s and 1970s (Rice, et al., 1958; Van Dalen and Bennett, 1971).

A further impetus for change in teaching styles specific to physical education transpired with the introduction of Mosston's Spectrum of Teaching Styles. In his book Mosston (1966) introduced a framework of instructional approaches based on teacher and learner decision making. The *Spectrum* was presented as a unifying framework for delineating landmark teaching styles based on the shift of decisions from teacher to learner. According to Mosston's conceptual framework in his original text and in subsequent editions (Mosston, 1966, 1981; Mosston and Ashworth, 1986, 1994, 2002), the *Spectrum of Teaching Styles* proceeds from being highly teacher-centered to highly student-centered. Decision making is dominated by the teacher in the teacher-centered styles. In the student-centered styles, students play a significant role in the decision-making processes. The *Spectrum* is framed by two landmark styles: the command style, where the teacher is the primary decision maker, and the self-teaching style, where the learner is the primary decision maker. Between are nine additional landmark styles (plus alternative approaches that lie between these landmark styles), each defined according to "who makes which decisions about what and when" (Mosston and Ashworth, 2002: 4).

Although teacher-centered instructional styles continue to be the most commonly observed approaches to teaching in physical education classes in the 2000s, other instructional styles are finding a place in the teaching repertoires of physical educators. There are several reasons why this is happening today. In the United States, one relates to the development of national content standards in physical education (National Association for Sport and Exercise (NASPE), 1992, 1995, 2004) and the incorporation of these content standards into a teacher's day-to-day work. Learning outcomes associated with the psychomotor, cognitive, and social learning domains are reflected in the US national content standards in physical education. Physical educators are beginning to recognize that different teaching styles are required to meet the wide array of learning outcomes associated with the national content standards. For example, direct teaching styles (where the teacher models the skill and learners attempt to replicate the modeled skill) can be

effective in meeting learning outcomes associated with the psychomotor domain, whereas peer teaching styles (where the student analyzes a partner's performance and provides feedback about the performance) can be effective in meeting learning outcomes associated with the social, cognitive, and motor domains. We are still in the early stages of experiencing national content standards in the US and thus know little about the impact that these standards have on student learning and teachers' practices in physical education.

Teachers are also becoming more cognizant of alternative teaching styles through the research being conducted in physical education teacher education. Variables that have been shown to have a relationship to student learning include amount of time students engage in appropriate content, student motivation, student assessment, informed planning, teacher use of time, teacher management, teacher feedback, and teaching styles. Research findings about appropriate and effective teaching practices are being published in more and more of the journals aimed at practitioners (e.g. *Journal of Physical Education, Recreation, and Dance; Strategies; Teaching Elementary Physical Education*) and in publications (e.g. Assessment Series; Appropriate Practice Documents) produced by US national and state organizations in physical education (e.g. NASPE, AAHPERD, and State AHPERDs). For example, two articles published in the *Journal of Physical Education, Recreation, and Dance* have as a focus evidence-based practical implications specific to the inclusion teaching style (Byra and Jenkins, 2000; Chatoupis and Emmanuel, 2003b). Similarly, in several of the Assessment Series publications, *Authentic Assessment of Physical Activity for High School Students* (Doolittle and Fay, 2002), and *Assessing Motor Skills in Elementary Physical Education* (Holt/Hale, 1999), the authors present evidence-based practical information specific to the implementation of various instructional styles.

### Defining teaching styles and inclusive pedagogies

A teaching style in this chapter is defined as a plan that can be used to design and arrange teacher–learner transactions in the physical education class/gymnasium setting. Teaching styles have to do with the "how" and "why" of delivering content, not the "what" (Rink, 2002). Within the instructional setting, students must be provided with developmentally appropriate content, clear instructions for practice, opportunity to practice at an appropriate level of difficulty, opportunity to participate in appropriately designed task progressions, and accurate feedback and assessment about

subject matter and role performance (Rink, 2002). Interaction between teacher and learners in a given teaching style results in “a particular teaching behavior, particular learning behavior, and particular sets of objectives ... [being] reached” (Mosston and Ashworth, 2002: 13) during a lesson. The amount of time that the teacher and learners are engaged in a teaching style in a lesson will vary. In some cases the teacher and learners may engage in the same teaching strategy for an entire 30-minute lesson, whereas in other situations the teacher and learners may engage in two or three different teaching styles, one after another, in a 30-minute lesson. The terms “teaching style” and “teaching approaches” will be used interchangeably throughout this chapter.

Inclusive pedagogies are pedagogical practices that “include or tend to include” (*Webster’s New World College Dictionary*, 2000) learners in the interactive teaching environment. Inclusive pedagogies facilitate equal opportunities for success for all learners regardless of gender, socioeconomic status, race, ethnic background, or physical and/or cognitive ability. For example, a teacher who employs inclusive pedagogies provides students of lower motor ability the same opportunities to achieve as students of higher motor ability; provides girls with the same opportunities to achieve; and provides students from different ethnic backgrounds with similar opportunities to achieve. Inclusive pedagogies also promote the accomplishment of multiple learning outcomes, concurrently. Physical education is multifaceted. A teaching style that offers students possibilities for achieving multiple goals concurrently reflects the term “inclusion.” Inclusive pedagogies promote active learning among learners. Active learners share in the decision making that transpires in the instructional environment. Learners may be invited to make decisions about who they work with, where they work in the gymnasium, level of task difficulty, or the solutions to a problem or question. Inclusive pedagogies promote equal opportunity for success for all students. The ultimate goal of inclusive pedagogies is to ensure continued participation in physical education (Hastie, 2003; Siedentop and Tannehill, 2000).

### Teaching styles continuum

When selecting a teaching style or approach, teachers must decide to what degree they want students involved in the decision making that takes place during a lesson. In teacher-centered styles, the

presented, demonstrates how the skill is to be performed, structures an appropriate progression of tasks to facilitate the learning of the skill, provides students time to engage in the tasks, gives specific feedback to the learners about their performance, and structures new tasks for future lessons according to what the students have learned (Mosston and Ashworth, 2002; Rink, 2002). Other names used in the literature to describe teacher-centered instructional strategies include direct, formal, interactive, command, and practice teaching. In student-centered teaching structures, decisions about what and how the students are learning is shared between the teacher and learner. Teachers invite the learners to make decisions about use of equipment, space, groupings, level of task difficulty, assessment of performance, and/or the discovery of solutions to movement problems. The degree of sharing in decision making between teacher and learners depends upon the style selected. The decision-making relationship that exists between the teacher and learner within a given teaching style will invariably impact who is at the center of the instructional environment, teacher or learner, and, in turn, impact the potential to reach different learner outcomes.

### Major findings from research

Teaching styles range from being highly teacher-centered to highly student-centered. The major findings from the teaching approaches researched in physical education will be organized according to the following titles: (a) direct teaching approaches; (b) peer teaching styles; (c) small-group cooperative learning formats; (d) self-check teaching styles; (e) inclusion teaching style; and (f) discovery teaching styles. In direct teaching styles the teacher is at the center of the instructional setting while in discovery teaching styles the learner is at the center of the instructional setting. In addition to presenting the findings from research, the relationship of these different teaching strategies to inclusive pedagogies will be discussed.

Approximately 50 data-based studies related to teaching styles and conducted in the setting of physical education are reviewed in this chapter. The majority of the articles reviewed are from journals written in English and published in the US (e.g. *Human Kinetics*, *AAHPERD*). More than three-quarters were published in *Journal of Teaching in Physical Education* or *Research Quarterly for Exercise and Sport*. Approximately 75% of the studies reviewed were published in the past decade (1993–2003). The other 25%

## Direct teaching approaches

### Scenario

After calling the 24 4th graders to their spots, Mr. Johnson instructs them to sit down and observe the demonstration. The new skill of the day is striking with a bat. The critical skill elements for batting a ball are first highlighted by Mr. Johnson and then demonstrated several times from an underhand toss. Following the demonstration, the students are instructed to select a partner, retrieve a bat and a medium-sized foam ball, and to perform the task as demonstrated within their designated area (previously identified). Once the students begin practicing, Mr. Johnson moves from one pair of learners to the next to give positive specific and/or corrective skill-related feedback specific to the critical skill elements presented during the demonstration.

Direct teaching implies a highly structured, teacher-centered and controlled instructional environment. Rink (1996) describes it as follows: "The teacher teaches in small steps; gives explicit directions or instructions on what the student is to do; maintains a task-oriented, teacher-monitored environment with high student engagement with the content; and provides immediate feedback to students" (p. 192).

Research on direct teaching approaches has its roots in classroom-based teaching, specifically in the areas of mathematics and reading (Brophy, 1979; Horwitz, 1979; Rosenshine, 1979; Soar and Soar, 1979). The findings from these many process-product studies in math and reading show that when teachers present the content in a structured, goal-oriented, hierarchical fashion, students learn. Strategies that encompass the described elements of direct teaching approaches have also been shown to facilitate student learning in the subject matter of physical education. When the general elements of direct teaching styles, as described by Rink (1996), are implemented in a movement environment, Harrison et al. (1995) and Gusthart and Sprigings (1989) found that college-aged and elementary-aged students improved their motor skill performance significantly when performing volleyball skills and a fundamental movement skill, respectively. The findings from two more recent studies conducted on college-aged students' volleyball skill performance (Harrison et al., 1999) and elementary-aged learners' fundamental motor skill performance (Sweeting and Rink, 1999) corroborate favorably with the results reported in the previous two process-product studies (Gusthart and Sprigings, 1989; Harrison et al., 1995).

In a study of task presentations and content development of four teachers differing in teaching experience, students taught by an experienced teacher were found to be more effective in performing

volleyball skills than those taught by teachers with little experience (Pellett and Blakemore, 1997). The more experienced teacher was able to present the tasks to the students more clearly and meaningfully and able to match the content to the individual needs of the students through the more appropriate use of task progressions than less-experienced teachers.

Results from three additional studies of content development specific to volleyball support the findings from Pellett and Blakemore (1997). Pellett and Harrison (1995) found that students who received refinement tasks during skills progressions were more effective at executing volleyball skills than students who practiced under conditions that included no refinement tasks in skill progressions. Refinement tasks are designed to help students improve quality of skill performance (Rink, 2002). Following is an example of a refining task: "On your next forearm pass, be sure to follow through (shift your weight) to the target." French et al. (1991) and Rink et al. (1992) found 9th graders' motor skill performance specific to the volleyball serve and set to be enhanced when they practiced the skills using task progressions. It was also shown that learning was evident only when the level of difficulty of the task progressions matched the skill level of the student (French et al., 1991).

Two teaching styles specific to Mosston and Ashworth's (2002) *Spectrum* can be categorized as direct teaching approaches. They are the command and practice styles of teaching. In the command style of teaching, students learn to perform a task accurately and quickly when and as described by the teacher (Mosston and Ashworth, 2002). In the practice style of teaching, students learn to perform a task individually, as demonstrated, while receiving individual feedback from the instructor (Mosston and Ashworth, 2002). As is the case in other direct approaches to teaching, the learner is provided a correct model to emulate, adequate time to practice the model, and congruent feedback related to the original model in both the command and practice styles.

The effects of the command and practice styles of teaching on student learning in physical education settings have been examined in a number of research studies. In one of the first *Spectrum* studies, Griffey (1983) found that when practicing the forearm volleyball pass higher-ability students benefited more from the task (practice) style of teaching than the command style of teaching, while lower-ability learners benefited more from the command style of teaching than the task style. All of the high-school students were found to benefit in the same manner when performing the serve during the 2-week unit of instruction. Griffey surmised that time allocated to skill performance was greater in the task style and that higher-ability learners were better equipped

(had the knowledge and skill) to engage more productively with assigned tasks.

Goldberger et al. (1982) and Goldberger and Gerney (1986) studied the effects of the practice style of teaching on middle-school children's performance of a hockey accuracy task. The conditions of the practice style of teaching resulted in student skill gains in both studies. The practice style of teaching has also been found to be effective in fostering skill changes in college-aged students as they performed soccer-ball-juggling (Beckett, 1991) and rifle shooting (Boyce, 1992), and in young children as they performed striking with a racquet (Jenkins and Byra, 1996).

Goldberger and Gerney (1990) examined the effect of two different organizational "formats" as presented within the instructional framework of the practice style. Under one format (teacher-rotate) the participants rotated from station to station, in a specific order every few minutes on the command of the teacher. Under the second format (learner-rotate) the fifth graders decided the order of rotation (from station to station), the amount of time to spend at each station, and when to rotate (from station to station). Both formats were found to be effective in fostering student learning. In addition the learner-rotate format was found to be more effective for the low-ability students than the high-ability students. The low-ability learners seemed to benefit from the opportunity to make decisions about amount of time spent practicing at a given station.

Dimensions of direct teaching styles include: goals that direct student learning; teacher decision making; similar activities across all students; use of large group instruction; basic skills; structured practice; and teacher feedback (Mosston and Ashworth, 2002; Rink, 2002; Rosenshine, 1979). Research indicates that students perform well on achievement tests under conditions afforded by direct teaching approaches, particularly when the subject matter is concrete (fixed) and contains mainly facts, rules, and basic skills and knowledge (Peterson, 1979; Rink, 2002). Direct teaching styles are commonly observed in physical education settings because there are benefits to performing motor skills according to precise models. One of the drawbacks of direct teaching styles is that they are unidimensional; that is, a direct teaching style "assumes that the only important educational goal is to increase measurable student achievement [motor skill achievement in physical education] and that all students learn in the same way and thus should be taught in the same way" (Peterson, 1979: 66). Physical education is not unidimensional; rather, it is multidimensional. Meeting the outcomes associated with the psychomotor, cognitive, and affective

educators to employ a variety of different teaching styles in their instructional practices.

## Peer teaching approaches

### Scenario

"Come on down to your spots," called Mr. Johnson. Once the 8th graders were sitting quietly, Mr. Johnson proceeded with his instructions. "In our second drill today, you will be organized in groups of four. There will be a tosser (places a student on one side of the net), a serve receiver (places another student on the other side of the net), a target (places a student at the net on the same side as the serve receiver), and a *coach* (Mr. Johnson locates himself to the side and in front of the passer). The tosser will toss the ball underhand to the serve receiver and the serve receiver will attempt to forearm pass the ball to the target who will catch the ball and roll it back to the tosser. The *coach* must first analyze the execution of the forearm pass and then give positive and/or correct specific feedback to the passer based on the skill cues we have learned and practiced. Make a record of your partner's task performance on the task sheet. Let's see what it looks like."

After observing Mary's first forearm pass, Mr. Johnson said, "Mary, I like how you kept your elbows locked and shifted your weight to the target – excellent." After the next pass, Mr. Johnson said, "be sure to maintain a wide-base of support."

"Let me remind you that I will only interact with the *coach* as I circulate from group to group. Oh, I almost forgot, rotate from tosser to passer to target to coach to tosser after each five tosses. Do you have any questions about the coach's role or the other roles?"

"Okay, you need to get into your groups. I should see the first toss within 30 seconds."

Peer teaching structures have a rich history in education, particularly in the areas of math and language arts (Delquadri et al., 1986; Fuchs et al. 1994, 1997; Pumfrey, 1986). Within the scheme of peer tutoring, students work in pairs to support each other's learning. This teaching style has been shown to be effective in promoting student cognition and social interaction (Byrd, 1990; Katstra et al., 1987; Olson, 1990). Findings suggest that increases in learner achievement are related to the increase of individualized instruction, opportunity to respond, and provision of specific feedback (Fuchs et al., 1994; Maheady, 1998). Within certain conditions, researchers have found peer tutoring to

In physical education there is a growing body of literature that supports the use of peer teaching structures with normally developing students as well as students with motor and cognitive delays. In adapted physical education, researchers have studied the effects of pairing normally developing students with developmentally disabled students (DePaepe, 1985; Houston-Wilson et al., 1997; Webster, 1987). DePaepe (1985) found that students with moderate developmental disabilities who were paired with 5th-grade peer tutors from the regular student population spent more time in the subject-matter content (ALT-PE) of lessons than similarly disabled students who were practicing in self-contained and mainstreamed environments where instruction was provided by the teacher. The results of this study compare favorably to the work of Webster (1987) who found that peer tutors had a positive influence on the amount of time moderately to severely disabled students engaged in subject-matter content (ALT-PE), regardless of whether the peer tutors were trained or not. Houston-Wilson et al. (1997) support Webster's (1987) contention that trained peer tutors can influence the motor performance of students with developmental disabilities, but not the contention that untrained peer tutors can. This discrepancy may be attributed to the age differences in the developmentally disabled participants and/or the type of educational training provided to the peer tutors. The use of peer tutors in combination with physical education specialists and teacher assistants is endorsed as an educationally appropriate practice in adapted physical education (Block, 1994; Block et al., 1995; Kelly, 1995).

Peer teaching structures have also been studied in regular physical education classes. One group of researchers has systematically examined the number of trials and percentage of correct trials students perform when participating in class-wide peer tutoring. In the first of five studies Ward (1993) compared student opportunity to respond (as reflected in the number of trials performed in a 1-minute time period) in two peer tutoring conditions, dyads partnered to give feedback to each other, and dyads partnered to keep a written record of their partner's performance, to whole-group instruction. In both dyad conditions the students performed more than five times as many skill trials in 1 minute as the students participating in the traditional whole-group instruction setting. Increases in student responses in the dyad conditions were surmised to be the product of the structure of the task and students being placed in pairs. In a follow-up study, Ward and Johnson (1995) examined the percentage of student correct responses throwing a football within a fixed number of trials. The same three study conditions employed in the initial study (Ward, 1993) were used in this study with comparable results. Given that the task was not timed and required students to complete a

fixed number of trials, it is likely that the increases in student responses in the two dyad conditions can be attributed to the students being placed in pairs (Ward and Johnson, 1995).

In the third study, a variation of class-wide peer tutoring was incorporated as a condition (Crouch et al., 1997). This condition, termed peer-mediated accountability (PMA), was based upon the findings from the first two studies (Ward, 1993; Ward and Johnson, 1995) and the research on effective accountability practices (Jones, 1992; Lund, 1992). The elements of PMA include "teacher-established goals, peer recording of performance, public posting of student performance" (Crouch et al., 1997: 29), and the awarding of "fun activities" to represent consequences for improvement. The three conditions were: (a) whole-group instruction, where students moved through the sequence of four stations on their own; (b) peer dyads, where students completed the stations with a partner and the partner's responsibilities included recovering the ball and providing verbal encouragement; and (c) PMA (as previously described). The results revealed that the elementary students performed a greater number of trials (1-minute time period) while in the PMA condition than in the peer-dyads and whole-group instruction conditions. In addition, students generally performed a greater percentage of correct trials in the PMA condition than in the other two conditions. It is unknown whether the results would have been similar if the number of trials were fixed (e.g. ten) rather than those performed in a 1-minute time period.

The next step in this series of studies was to examine the effects of the PMA condition on average-skilled elementary-aged boys and girls and low-skilled girls (Ward et al., 1998). Similar to the previous studies, the PMA condition was found to be effective in promoting student opportunity to respond. In addition, the average-skilled students increased the number of correct trials they performed, but the low-skilled students did not. In a follow-up study of elementary students of differing skill levels, Johnson and Ward (2001) found that the students in the PMA condition performed fewer total trials but a greater percentage of correct trials compared to previous research. In addition, they found that the condition was equally effective for lower- and higher-skilled elementary students. These results do not corroborate with the finding from the previous study (Ward et al., 1998). The differences are likely attributable to one subtle, yet significant, change in the design of the intervention (PMA condition). For the first time, partners were responsible for providing verbal feedback about the correctness of performance. This changed the dynamics of the intervention from simply making a written record of a partner's correct and incorrect

skill performance to verbalizing the incorrect performance. Time was now being expended giving the verbal feedback statements and digesting the information provided (before attempting the next skill attempt).

In summary, it is clear that the PMA condition impacts student skill performance in a positive manner, even when giving and receiving specific corrective feedback is not a component of the peer-tutoring teaching strategy. When giving and receiving feedback is incorporated within this peer-tutoring model, it seems to be even more powerful in fostering change in student skill performance.

Other researchers have been studying the impact of a peer teaching style, called the reciprocal style, on student social, cognitive, and motor skill performance (Mosston and Ashworth, 2002). In this style, learners form partners, and, as one learner (doer) performs, the other (observer) gives specific feedback to the doer based on information provided by the teacher (criteria sheet). The extent of peer teaching in the reciprocal style is specifically the provision of feedback from one learner to another. The components of the reciprocal style of teaching are very similar to those espoused in the class-wide peer tutoring model (Delquadri et al., 1986). The only difference is that post-performance awards given for appropriate social and skill behavior are a part of the class-wide peer tutoring model, but not the reciprocal style of teaching.

Skill performance has been shown to improve in different-aged learners across various physical activities when practicing under the conditions of the reciprocal style of teaching (Ernst and Byra, 1998; Goldberger and Gerney, 1986; Goldberger et al., 1982). In addition, interactions between students have been found to be high in number and positive in nature (Byra and Marks, 1993; Ernst and Byra, 1998; Goldberger, 1992). Cox (1986) found that the number of exchanges between pairs in the reciprocal style of teaching is much greater and more positive than the interactions between learners within the command and practice styles of teaching. Byra and Marks (1993) reported that learners gave more specific feedback to partners who were identified as friends, and felt more comfortable receiving feedback from friends than non-acquaintances. These findings support Mosston and Ashworth's (2002) contentions that feedback is provided at a much higher rate when the teaching style requires learners to provide immediate task-related information to a partner, and that learners will interact more when partners are self-selected (i.e. friends). Ernst and Byra (1998) revealed that

given movement than learners practicing under conditions of direct instruction.

In the reciprocal style of teaching students are formally provided opportunity to engage in physical activity in a paired setting, one that promotes social development as elicited by the process of giving and receiving feedback, cognitive development as elicited by the thought processes required to analyze skill performance, and motor skill development as elicited by the "physical performance" and "observation and analysis" of the skill. If the desire is to emphasize the multidimensionality of physical education as reflected by the US national content standards (NASPE, 2004), it is fitting that teachers incorporate peer teaching approaches within their teaching repertoire.

## Cooperative learning

### Scenario

Ms. MacDonald began class by asking the high-school students to sit within their small, heterogeneous groups. Once settled, she said, "You are going to work on a strategy for defending your goal today. Take a minute to discuss, within your group, what you might do and how you will accomplish it. Be sure that you are working together and each member is contributing. Then practice the strategy selected in preparation for game play today. After incorporating the strategy discussed in today's scheduled game, you will regroup and determine how successful you were in completing the task. I will seek some explanation from your groups about the defensive strategies selected as I circulate during the first part of class. Be sure to remember the social skills needed to successfully participate in your groups. Do you have any questions about what you are required to do?"

Cooperative learning is a teaching structure where small groups of heterogeneous learners work together to complete an assigned task or project. Critical features used to qualify group work as cooperative learning include promotive interaction, positive interdependence, individual and small-group skills, group processing, and individual accountability (Johnson and Johnson, 1991; Kagan, 1990; Slavin, 1990). Leading proponents of cooperative learning indicate that the two most vital conditions needed to qualify group work as cooperative learning are positive interdependence and individual accountability (Johnson and Johnson, 1991; Kagan, 1990; Slavin, 1990). Johnson and Johnson (1991) believe that the three other components, promotive interaction, individual and small-group skills,

Cooperative learning structures, commonly observed in teachers' classrooms, are the focus of much research in education (Antil et al., 1998; Johnson and Johnson, 1992; Slavin, 1996). With a history of 30 years, cooperative learning remains one of the most fruitful areas of systematic inquiry in education today (Antil et al., 1998). Literally hundreds of studies have been conducted to examine the effects of cooperative learning structures on student learning in different school settings, with different aged students, and in different content areas (Johnson and Johnson, 1992). These studies indicate that both elementary- and middle-school teachers frequently employ cooperative learning structures in their classroom with positive effects on social and cognitive student learning (Antil et al., 1998; Puma et al., 1993).

There are several reasons why cooperative learning structures have gained such a high level of acceptance among scholars and practitioners alike. First, cooperative learning is designed to accommodate individual differences among students (Johnson and Johnson, 1991). Teachers are searching for teaching styles that will help them manage the challenges of teaching children and youth who enter schools with varied experiences and backgrounds (e.g. different race, ethnicity, cognitive ability, motor ability, social needs, etc.).

Another desirable asset of cooperative learning is its potential to contribute to both cognitive and social learning outcomes. Antil et al. (1998) suggest that with this dual emphasis, cooperative learning "appeals to teachers because it addresses and integrates seemingly diverse goals within a single approach" (p. 420).

Recent applications of constructivist approaches to learning is another reason why researchers and teachers are attracted to cooperative learning formats. Constructivists advocate that learning is "an active process in which the individual seeks out information in relation to the task at hand and the environmental conditions [e.g. social, cultural, grouping contexts] prevailing at any given time, and tests out her or his own capabilities within the context formed by the task and environment" (Kirk and Macdonald, 1998: 376). Teaching styles that foster increased dialogue among learners (i.e. emphasizes the social construction of knowledge), like cooperative learning, have received much attention recently from both researchers and teachers (Antil et al., 1998; Slavin, 1990).

Cooperative learning formats are appealing to physical educators because of their threefold convergence on social, cognitive, and motor outcomes. Although much research has been completed on cooperative learning in different classroom subject areas with different-aged learners, only a few studies have been conducted in physical education. In one of the earlier studies in physical education,

Grineski (1989) observed and systematically recorded kindergarten children's interactive behaviors as they participated in cooperatively and competitively structured group games. He found that the children exhibited a much greater number of prosocial interactions in a cooperatively structured group game setting than in the competitively structured group game setting. Interactions related to sharing, encouraging, protecting, and helping were displayed. Some of the children were interviewed following the games. Their perceptions of the cooperatively structured group games focused on the positive (e.g. help people, fun, play, etc.), whereas their perceptions of the competitively structured group games focused on the negative (e.g. sit down, out, lose, etc.). Other studies support the contention that cooperative learning formats contribute positively to student outcomes associated with the social, cognitive, and motor domains (Barrett, 2000; Johnson et al., 1984; Yoder, 1993).

Dyson, one of the leading researchers of cooperative learning in physical education, is beginning to explore the applicability of cooperative learning structures in different settings, with different participants, and different subject matter. Dyson's efforts represent the beginnings of a program of inquiry on cooperative learning in physical education using qualitative research techniques. Two of the studies were conducted with elementary learners (Dyson, 2001, 2002), while one was conducted with high-school students (Dyson and Strachan, 2000). The elementary teacher reported multiple successes with cooperative learning including achieving social, motor, and cognitive learning outcomes, understanding that working cooperatively in small groups requires much practice time and teacher guidance, and understanding that learning seems to be at its highest when students are actively involved in the process. She also reported her struggles, during this 2 year journey, with implementing a new instructional approach. The students reported that they learned from working together to complete assigned tasks in their small groups. The results from Dyson's (2001) study involving older elementary students reflect the findings associated with the 2002 study. Students perceived success when they "worked together, learned together, and helped each other learn" (Dyson, 2001: 279).

Dyson and Strachan (2000) researched the implementation of cooperative learning strategies in a secondary school physical education setting with 8th- and 11th-grade students. The secondary students and teacher reported that the cooperative learning format promoted the development of both motor (sports skills and strategies) and social skills (cooperation and communication), as was the case with elementary students (Dyson, 2001, 2002).

Dyson and colleagues continue to examine the impact of cooperative learning formats on elementary

and secondary-aged learners in physical education. The research indicates that cooperative learning formats facilitate student learning in the social, cognitive, and motor domains. It is critical that physical education teachers explore the use of teaching styles, like cooperative learning, given the development of the US national standards in physical education (NASPE, 1995, 2004) that are based on outcomes associated with the motor, social, and cognitive educational learning domains. Although the implementation of cooperative learning formats is complex and time consuming, the benefits of cooperative learning as reported by students and teachers in physical education are supportive of those described in the general education literature.

## Self-check teaching styles

### Scenario

Emily, a 3rd grader, is batting a ball from a tee. According to the criteria sheet she is instructed to bat the ball five times while following three skill cues: step, swing the bat in a horizontal plane, and rotate hips, trunk, and shoulders. Mr. Corbett, the teacher, observes three of Emily's trials, each of which results in missing the ball completely. "How are you doing Emily?" Mr. Corbett asks. Emily sadly states that she can't seem to hit the ball and she doesn't know why. Mr. Corbett asks her to read the three critical skill cues from the task sheet. She does. "Do you think you're performing the skill cues as described?" While doing the task again she says, "I'm stepping and rotating my hips, trunk, and shoulders, but, but, my swing isn't level – maybe that's why I'm missing the ball." Mr. Corbett says, "try one more time – think about the horizontal plane." Emily tries again and contacts the ball. "Sure, that must be it, I wasn't swinging level." "Emily, you're beginning to feel your performance and recognize what you are and are not doing. Excellent!" Mr. Corbett moves on to observe Josh.

Self-regulated learners view learning "as something they do for themselves rather than as something that is done to or for them" (Zimmerman, 1998: 1). According to Zimmerman (1998, 2000), self-regulatory learning processes are characterized by the three phases (forethought, performance, and self-reflection) of the academic learning cycle. During the forethought phase, students prepare for performance by using self-regulatory learning processes like goal setting and strategic planning. During the performance phase, students use self-regulatory processes like attention focusing and self-imagery, while during the

effectively improve academic performance in classroom settings (Newman, 1994; Pintrich and DeGroot, 1990; Zimmerman, 1986). In physical education, strategies like self-talk, imagery, and goal-setting have been used to encourage self-regulated learning (Anderson, 1999). In terms of teaching styles, the self-check strategy is a formal element of Mosston and Ashworth's (2002) self-check and inclusion styles of teaching.

Although little research has been conducted in the area of self-assessment and student learning in physical education, there are two styles within Mosston and Ashworth's (2002) instructional framework that necessitates students to check their own skill performance. The two teaching styles are self-check and inclusion. In both of these teaching styles the learner performs a task and checks his/her work against a criteria sheet. These two teaching styles are exceedingly student-centered in that the learners are given the added responsibility (decision making) of self-checking performance.

To self-check, students must analyze (compare and contrast) their performances against the task criteria (criteria sheet) and draw conclusions concerning what is correct and incorrect. They then apply this information to the execution of subsequent trials which ultimately should lead to improved motor skill performance. The cognitive processes in which students engage when self-checking include understanding, applying, analyzing, and evaluating, within the knowledge dimension of conceptual knowledge (Krathwohl, 2002).

The impact of self-checking has been examined in two studies in physical education (Beckett, 1991; Jenkins and Byra, 1996). Beckett (1991) compared gains in learner knowledge in college-aged students across two of Mosston and Ashworth's (2002) teaching styles, the inclusion style where learners assess their own skill performance, and the practice style where the teacher is responsible for assessing student skill performance and providing specific feedback. Learners who received instruction under the conditions of the inclusion style scored significantly higher on a written knowledge test than students engaged in instruction under the conditions of the practice style. These results are supported by Jenkins and Byra's (1996) findings with elementary-aged students. In their study, student knowledge gains were examined across three of Mosston and Ashworth's (2002) teaching styles, self-check, inclusion, and practice. As per Beckett's (1991) study, the students in the self-check and inclusion teaching styles reported a significantly greater number of critical skill elements during the post-test (knowledge test) than students in the practice style. The

Research supports the contention that self-assessment strategies facilitate cognitive learning (Beckett, 1991; Jenkins and Byra, 1996). This instructional style helps more students become independent learners, which is one of the goals espoused in the US National Standards for Physical Education (NASPE, 1995). However, within this instructional framework the teacher assumes a very different role as does the student. The teacher no longer provides skill-related feedback to the learners, which is a major shift from direct styles of teaching, and the students assume the responsibility of assessing their performance, which also represents a shift away from what they are accustomed to doing.

## Inclusion teaching style

### Scenario

Ms. Homer's classes in physical education are somewhat different than what is normally observed in a traditional physical education class. While working on the components of physical fitness, her 6th graders do the same exercises, at the same time, however, they choose a level of difficulty for each exercise from pre-set options. For example, her students can complete a set of 9, 12, or 15 push-ups while leaning against the wall (feet out), from a prone position (regular), or from a bench (feet raised on a bench). At another station the students can lift their bodyweight using a traditional chin-up bar (do regular chin-ups or the flexed arm hang) or they can lift their body weight while lying on their back on the floor and pulling-up on a bar located a distance of 2 feet above their shoulders. When it comes to practicing motor skills, the students can also choose a level of difficulty from pre-set options. For example, when practicing the basketball lay-up, the students can do so from two steps, no dribble, from the top of the basketball key (while dribbling), or from the top of the basketball key with an opponent in pursuit. They can work on dribbling while alternating hands and moving in general space, while moving in general space against an opponent who has their hands behind their back, or while moving in general space against an opponent who is guarding "full steam ahead." The students in Ms. Homer's classes make their initial choice of level of difficulty in a task based on their perception of what they can and can not do. When they make subsequent decisions about level of difficulty, choices are based on their initial level of success with the task. While her students are engaged in practice, Ms. Homer monitors their performance and decisions regarding level of difficulty. She also questions them about the critical skill elements to determine whether they are self-checking performance accurately.

The inclusion style of teaching (Mosston and Ashworth, 2002) facilitates the process of individualizing instruction across learners of varying skill ability. Students are provided with legitimate options for practicing a task, options based on factors that make the practice of the given task more or less difficult. As in the self-check teaching style (Mosston and Ashworth, 2002) learners use a teacher-designed criteria sheet to self-assess actual performance. The purpose of this style is to include all learners at their appropriate level of participation and skill. Unlike the direct, peer, cooperative, and self-check teaching structures reviewed in the previous sections, the inclusion style of teaching is specifically designed to accommodate individual learner performance differences. Student decision making is high in the inclusion style of teaching. The inclusion style of teaching is a student-centered instructional approach.

Goldberger et al. (1982) and Goldberger and Gerney (1986) found the inclusion style of teaching effective in producing improvement in learner skill performance, particularly for students of average skill level. These authors found that many of the low- and high-skilled middle-school students chose levels of difficulty in the hockey task that were too challenging or not challenging enough to facilitate learning. This may have been as a result of them being unfamiliar and inexperienced with the inclusion style of teaching or level of task difficulty not falling within the range of student ability.

In a study of college-aged students, Beckett (1991) found the inclusion style to be as effective as the practice style for learner skill improvement, and as suitable for learners of average and exceptional aptitude for learning motor skills. Beckett suggests that differences in students' ages (college students versus 5th-graders), the motor tasks learned (soccer juggling versus floor hockey accuracy task), and the settings in which the research studies were conducted (natural versus laboratory) may help to explain why the findings from his study do not support the findings from Goldberger et al. (1982) and Goldberger and Gerney (1986).

Goudas et al. (1995) examined the motivational effects of the inclusion style on a group of upper elementary-aged learners in track and field. The girls reported a preference for the inclusion style for reasons associated with intrinsic motivation. Specifically, the girls perceived that they had greater control over what they did and the amount of effort they put forth, and less anxiety, as a result of being able to select level of task difficulty. Chatoupis and Emmanuel's (2003a) study of students' perception of athletic competence in the inclusion style of teaching supports the findings of Goudas et al. (1995), particularly those findings specific to females, as self-perception of athletic competence (Harter, 1981) may be influenced by both teaching style and gender.

Byrne and Jennings (1998) examined teacher decision making in the inclusion style of teaching with fifth-grade students in a striking (bat) task. They suggest that 5th-graders can select different levels of task difficulty when provided the opportunity, and make task decisions regarding level of difficulty according to their perceptions of success, challenge, and curiosity.

The primary goal of the inclusion style of teaching is to provide students opportunity to engage in activity at an appropriate skill level. Individualizing instruction to permit greater student success is the underlying premise of the inclusion style of teaching (Mosston and Ashworth, 2002). Lee (1997) suggests that an instructional approach like the inclusion style, one that influences learner interest, enjoyment, and personal meaning, likely has a positive impact on learner task engagement that, in turn, mediates achievement. Research on the inclusion style of teaching provides some evidence to support Lee's (1997) instructional approach/model.

## Discovery teaching styles

### Scenario

After having observed the 6th graders working on the basic skills of basketball in two-on-two games, Mr. Bushner calls them to their spots and says, "I have a problem for you to solve when you go back out in your two-on-two games. Here is the problem: Your partner passes the ball to you. What can you do with it now? Go back to your mini-games and solve this problem – try to find as many solutions to it as possible. I will come around and help you make connections to what you already know about shooting, passing, and dribbling in basketball; this may include me presenting to you a sequence of tasks (scaffolding). Once I observe various solutions to the question, I will call you all in and we will discuss them. Do you have any questions? No, then let's begin."

Akin to discovery teaching styles is the development of critical thinking skills in learners. Beyer (1987) proposes that critical thinking involves evaluation and objective analysis of any "claim, source, or belief to judge its accuracy, validity, or worth" (p. 33). According to Ennis (1987), critical thinking is defined as "reasonable and reflective thinking that is focused on deciding what to believe or do" (p. 10). Lipman (1988) argues that critical thinking involves "skillful, responsible thinking that facilitates good judgment because it (1) relies upon criteria, (2) is self-correcting, and (3) is sensitive to context" (p. 39). All of these definitions propose that to engage in critical thinking, students must be actively involved within the context of a subject area and the teacher must create conditions for participation that allow students to "elaborate, defend, and extend

their positions, opinions, and beliefs" (Garside, 1996: 215). Students must take major responsibility for their own thinking and learning within this student-centered instructional style.

Research indicates that teachers can help facilitate the development of critical thinking skills for students in classroom settings. Hudgins and Edelman (1986) reported that elementary-aged learners were able to offer "supporting evidence"-type statements at a greater frequency after receiving instruction in a teacher-led small-group discussion discovery teaching style. Garside (1996) found small-group discussion better than lecture for facilitating the use of higher-level critical thinking skills, such as analyzing, synthesizing, and evaluating, in college-aged students. Green and Klug (1990) reported that students who worked collaboratively within small groups learned more effectively than students working alone. These students demonstrated thinking aloud, working together to extend their opinions, and defending positions, all of which are elements that characterize critical thinking (Beyer, 1987; Ennis, 1987; Garside, 1996).

The concept of critical thinking was introduced into physical education via the movement education curriculum (Kirchner et al., 1970; Logsdon et al., 1977; Ludwig, 1968) and the *Spectrum of Teaching Styles* (Mosston, 1966). Movement education emphasizes moving, thinking, and feeling through movement exploration and discovery and Buschner (1990) points out that "skillful movement requires skillful thought" (p. 59). The *Spectrum* is a series of teaching options that "foster reproduction of past knowledge" and "invite production of new knowledge" (Mosston and Ashworth, 2002: 10–11). When producing new knowledge, students engage in cognitive operations like applying, analyzing, evaluating, and creating, which leads to the discovery of information new to the learner.

It is only in the past decade that the acquisition of critical thinking skills has become an area of study in physical education. McBride (1988, 1992) presents a theoretical framework for critical thinking while others have described the importance and researched the benefits of critical thinking (Blitzer, 1995; Buschner, 1990; Cleland, 1990; Greenockle and Purvis, 1995; McBride, 1995; Schwagger and Labate, 1993; Tishman and Perkins, 1995; Woods and Book, 1995). McBride (1992) defines critical thinking in physical education as "reflective thinking that is used to make reasonable and defensible decisions about movement tasks or challenges" (p. 115).

Cleland, one of the leading US researchers in this area in physical education, has studied the effects of different discovery teaching styles on the acquisition of critical thinking skills in children in several studies. McBride's (1992) work on critical thinking seems to have been as much of a stimulus for Cleland's research as has Mosston and Ashworth's

(2002) *Spectrum of Teaching Styles*. Cleland and her colleagues have examined the effects of the divergent discovery, convergent discovery, and guided discovery *Spectrum* teaching styles on learners' critical thinking. In her first study Cleland studied the divergent movement patterns of young children to establish baseline information about children's divergent movement patterns, and to examine different factors that might contribute to a child's production of divergent movement (Cleland and Gallahue, 1993). When asked to engage in the discovery process, the youngsters demonstrated that they could modify, adapt, or combine fundamental movement patterns to produce divergent movement. Experience and age were found to be factors that contributed to a child's ability to produce divergent movement patterns.

In a second study of children's divergent movement ability, Cleland (1994) randomly assigned second and third graders to one of three instructional groups (divergent discovery, command/practice, or control, no instruction) to examine the effect of content and specific teaching styles on learner ability to produce divergent movement. The students in the divergent discovery group generated a significantly greater number of divergent movement patterns than those who received treatment under conditions of direct instruction or no instruction.

In a year long study of 5th-grader's critical thinking in physical education, Cleland and Pearse (1995) examined how physical education specialists structured their learning environments to promote critical thinking. Based on systematic analysis of videotapes, the investigators concluded that a student's ability to think critically (to produce divergent movement) "depends on the movement task and the teacher's ability to effectively use indirect [divergent discovery and convergent discovery] teaching styles" (Cleland and Pearse, 1995: 36). According to student interviews, the learners reported that they enjoyed the critical thinking activities employed in the lessons, preferred to engage in tasks that involved small groups, while written movement problems were more difficult to solve. The research of Cleland and her colleagues (Cleland, 1994; Cleland and Gallahue, 1993; Cleland and Pearse, 1995) serves to affirm that critical thinking in children, specifically as it applies to the production of divergent movement, can be fostered through discovery teaching styles (Mosston and Ashworth, 2002).

Discovery styles of teaching reflect a constructivist view of learning. Constructivists postulate that knowledge is actively created in an environment where "learners can experiment, that is, manipulate objects to see what happens, question what is already known, compare findings and assumptions with those of others, and search for their own answers" (Alkove and McCarty, 1992: 21). According to advocates of the constructivist approach, critical thinking skills are best

developed in students when they actively participate in the construction of their own knowledge during a lesson, as is the case with discovery teaching styles. Chen (2001) examined how an expert teacher employed a constructivist-oriented teaching approach to promote the learning of critical thinking skills in children during creative dance lessons. Three themes emerged from the video-audio-taped lessons and transcriptions of the teacher and student interviews. Firstly, the inquiry activities employed during constructivist-oriented teaching strategies triggered the children's interest and motivation to create new dance movements. The teacher did this by blending the student's "prior knowledge and experience [using children's literature] with learning the content of creative dance" (Chen, 2001: 373). Secondly, the teacher provided the students with opportunities to actively engage in the processes of discovery and exploration. This was accomplished by "encouraging the students to explore different ways to express ideas through body movement, having them choose their ideas for creating a dance, and encouraging them to create their own dance movement" (p. 374). Thirdly, the students were directed to self-assess and refine their thoughts and actions throughout the process of discovery. Constructivists suggest that the process of discovery fosters a deeper understanding of the content and improves the quality of learning (Prawat, 1992). The results of this study indicate that students do use critical thinking skills to create and discover in a movement setting when the teacher guides them to actively engage in discovery processes (i.e. by sparking their interest in the subject matter, drawing on prior knowledge, integrating new knowledge, and self-assessing performance).

The video-audio-taped lessons and written anecdotal descriptions of the lessons from Chen's study (2001) were re-analyzed to further investigate the teaching strategies used to evoke critical thinking in children during creative dance lessons (Chen and Cone, 2003). Two types of teaching strategies were found to generate divergent and undiscovered movement patterns in the children: teacher scaffolded sequential learning tasks, and teacher presentation of open-ended tasks with questions, demonstrations, and/or verbal cues. Chen (2001) and Chen and Cone's (2003) work confirms that a constructivist-oriented teaching style facilitates the learning of critical thinking skills in children in physical education as reflected by their movement actions and reactions.

Research shows that the strategies associated with discovery teaching styles (Cleland, 1994; Cleland and Gallahue, 1993; Cleland and Pearse, 1995) and constructivist-oriented teaching (Chen, 2001; Chen and Cone, 2003) help to facilitate critical thinking skills in students in physical education as reflected in their movement actions. Within this genre of teaching structures, the teacher's role shifts from one of

controlling student decision making to one of inviting students to be problem solvers. Discovery teaching styles are highly student-centered.

## Major trends and future directions

The history of research on teaching styles in physical education specific to student learning in the psychomotor domain dates back approximately 20 years. Research specific to student learning in the social and cognitive domains has an even shorter history of approximately 10 years.

It is not surprising that teacher centered teaching structures have the richest and longest research history in physical education. This makes perfect sense given that we in physical education have "followed the lead of educational research" (Rink, 2002: 50), research conducted during the late 1960s and throughout the 1970s and early 1980s that was directed at studying teaching variables related to direct instruction and student learning, and that psychomotor performance is at the core of physical education and is what differentiates it from the other subjects in schools.

Research in physical education indicates that teacher-centered (direct) teaching styles are effective in promoting student motor skill learning. The findings from multiple studies in physical education verify that, when teachers employ the elements of direct instruction in their teaching, significant student achievement gains are made in skill performance. There is a need to conduct research that extends the conditions under which direct teaching styles have been studied. In addition, there is a need to conduct "replication" studies to verify what we already know.

Many physical educators and researchers contend that learning in physical education should not be limited to the psychomotor domain. These individuals believe that cognitive and social learning outcomes contribute as much, if not more, to student learning in physical education as psychomotor outcomes. Teaching approaches that have a dual- or tri-emphasis (e.g. cooperative learning, peer teaching, discovery teaching styles, etc.) are appealing to teachers because they integrate "seemingly diverse goals within a single approach" (Antil et al., 1998; 420). The multidimensionality of physical education necessitates physical educators to employ a variety of student-centered teaching styles in their instructional practices.

In 1995 the National Association for Sport and Physical Education (NASPE) published a document titled *Moving into the future: National standards for physical education*. This has been followed by a second edition (NASPE, 2004). The six US national standards for physical education frame what

students should learn from a quality physical education program. This document speaks to the multidimensionality of physical education, and is one of the few, perhaps only, subjects in schools where teachers have the opportunity to enhance student learning in the psychomotor, cognitive, and affective educational domains.

Other nations have committed to multiple goals in physical education as well. For example, in Australia, New Zealand, and the UK, national goals and curricular frameworks reflect the multidimensionality of physical education (Qualifications and Curriculum Authority Physical Education, 1999; Queensland School Curriculum Council, 1999). In an attempt to develop lifelong learners for a changing society, teachers are incorporating socio-cultural aspects and cognitive theories of learning into the curriculum aims and goals, and ways of teaching in physical education (Kirk, 2004; Macdonald, 2004; Tinning and Fitzclarence, 1992; Wright, 2004).

If the goal is to teach interaction skills, positive interdependence skills, skills related to giving and receiving feedback or analyzing motor skill performance, and/or inquiry skills while engaged in motor activities, then it behooves physical education teachers to employ student-centered teaching styles. Decision making and critical thinking skills, and the subsequent responsibilities that are coupled with making decisions, are shared between the student and teacher in student-centered teaching styles. Peer teaching, cooperative learning, the self-check and inclusion teaching styles, and discovery teaching styles are student-centered teaching approaches that emphasize social and/or cognitive development within a movement setting. Each of these student-centered teaching styles is dual- or tri-istic in nature; that is, outcomes from two or more of the three learning domains are integrated in one approach. Student-centered teaching styles exemplify the characteristics of inclusive pedagogies.

Research indicates that student learning is not limited to the motor domain in student-centered instructional approaches. Findings from research on peer teaching approaches, cooperative learning formats, self-check and inclusion teaching styles, and discovery teaching styles in the physical education setting are supportive of student social and/or cognitive learning. Researchers, however, have just begun to expose the "tip of the iceberg" on student-centered teaching approaches. Further research is required to explore how these student-centered teaching styles contribute to social and cognitive learning outcomes with different students at different grade levels performing different physical activities. For example, how do changes in task structure or changes in the accountability/incentive systems used in the peer teaching or cooperative learning approaches affect social and cognitive learning in students engaged in physical activity?

In student-centered teaching styles students are afforded the opportunity to learn and practice cognitive and/or social skills while engaged in motor tasks. Given this common characteristic, it seems that researchers of student-centered teaching styles could learn much from one another's investigations. For example, those studying the reciprocal style of teaching (one of several peer teaching instructional approaches) could benefit from reviewing the literature on peer-mediated accountability tutoring schemes (another of several peer teaching instructional approaches). Incorporating the dependent measures used by Ward and colleagues (i.e. number of trials, correct trials, and percent correct trials) when studying the reciprocal teaching style might serve to help us better understand how giving and receiving feedback impacts motor skill performance. Including a dyad intervention that reflects the conditions of the reciprocal style of teaching in a study of the peer-mediated accountability tutoring model might help us better understand feedback within this model. Or, those studying cooperative learning formats might profit from reviewing the research on discovery styles. Both teaching approaches have been found to promote cognitive and social learning in students in physical education settings. Elements of both of these teaching structures lead students to actively participate in the construction of their own learning. It seems that much could be gained from this integration of knowledge across teaching styles research.

## Summary

In this chapter research on teaching styles used in physical education has been reviewed. How has this research informed us? Three basic conclusions can be made. Firstly, direct teaching styles remain prominent in the teaching of and research in physical education. Secondly, researchers in physical education are now more interested in studying the effects of inclusive pedagogies (teaching styles in which outcomes from two or three educational learning domains are emphasized). It seems that this change is akin to the US efforts to improve schools (Holmes Group, 1985; National Commission on Teaching and America's Future, 1996; National Education Goals Panel, 1991) and more specifically to the recent development of the US national standards in physical education (NASPE, 1992, 1995, 2004). Finally, this review of research on teaching styles highlights the need for us to broaden our understanding of teaching styles beyond "one". For example, those studying a cooperative learning format can learn from research on discovery teaching styles given the similarities between these two teaching styles. This will help to

further develop research methods employed in teaching styles studies.

## References

- Alkove, L.D. and McCarty, B.J. (1992). Plain talk: Recognizing positivism and constructivism in practice. *Action in Teacher Education*, 14(2): 16–21.
- Anania, J. (1983). The influence of instructional conditions on student learning and achievement. *Review of Educational Research*, 46: 355–385.
- Anderson, A. (1999). The case for learning strategies in physical education. *Journal of Physical Education, Recreation, and Dance*, 70(1): 45–49.
- Antil, L.R., Jenkins, J.R., Wayne, S.K. and Vadasy, P.F. (1998). Cooperative learning: Prevalence, conceptualization, and the relation between research and practice. *American Educational Research Journal*, 35: 419–454.
- Barrett, T. (2000). *Effects of two cooperative learning strategies on academic learning time, student performance, and social behavior of sixth grade physical education students*. Unpublished doctoral dissertation, University of Nebraska, Lincoln.
- Beckett, K. (1991). The effects of two teaching styles on college students' achievement of selected physical education outcomes. *Journal of Teaching in Physical Education*, 10: 153–169.
- Beyer, B. (1987). *Practical strategies for the teaching of thinking*. Boston, DC: Allyn and Bacon.
- Blitzer, L. (1995). It's a gym class ... What's there to think about? *Journal of Physical Education, Recreation, and Dance*, 66(6): 44–48.
- Block, M.E. (1994). Why all students with disabilities should be included in regular physical education. *Palaestra*, 10(3): 17–24.
- Block, M.E., Oberweiser, B. and Bain, M. (1995). Using classwide peer tutoring to facilitate inclusion of students with disabilities in regular physical education. *The Physical Educator*, 52: 47–56.
- Boyce, B.A. (1992). The effects of three styles of teaching on university student's motor performance. *Journal of Teaching in Physical Education*, 11: 389–401.
- Brophy, J. (1979). Teacher behavior and student learning. *Educational Leadership*, 37(1): 33–38.
- Buschner, C.A. (1990). Can we help children move and think critically? In W.J. Stinson (Ed.), *Moving and learning for the young child* (pp. 51–66). Reston, VA: AAHPERD.
- Byra, M. and Jenkins, J. (1998). The thoughts and behaviors of learners in the inclusion style of teaching. *Journal of Teaching in Physical Education*, 18: 26–42.
- Byra, M. and Jenkins, J. (2000). Matching instructional tasks with learner ability: Inclusion style of teaching. *Journal of Physical Education, Recreation, and Dance*, 71(3): 26–30.

- Byra, M. and Marks, M. (1993). The effect of two pairing techniques on specific feedback and comfort levels of learners in the reciprocal style of teaching. *Journal of Teaching in Physical Education*, 12: 286–300.
- Byrd, D. (1990). Peer tutoring with the learning disabled: A critical review. *Journal of Educational Research*, 84(2): 115–118.
- Chatoupis, C. and Emmanuel, C. (2003a). The effects of two disparate instructional approaches on student self-perceptions in elementary physical education. *European Journal of Sport Science*, 3(1): 1–16.
- Chatoupis, C. and Emmanuel, C. (2003b). Teaching physical education with the Inclusion style: The case of a Greek elementary school. *Journal of Physical Education, Recreation, and Dance*, 74(8): 33–38, 53.
- Chen, W. (2001). Description of an expert teacher's constructivist-oriented teaching: Engaging students' critical thinking in learning creative dance. *Research Quarterly for Exercise and Sport*, 72: 366–375.
- Chen, W. and Cone, T. (2003). Links between children's use of critical thinking and expert teacher's teaching in creative dance. *Journal of Teaching in Physical Education*, 22: 169–185.
- Cleland, F. (1990). How many ways can I? Problem solving through movement. In W.J. Stinson (Ed.), *Moving and learning for the young child* (pp. 73–75). Reston, VA: AAHPERD.
- Cleland, F.E. (1994). Young children's divergent movement ability: Study II. *Journal of Teaching in Physical Education*, 13: 228–241.
- Cleland, F.E. and Gallahue, D.L. (1993). Young children's divergent movement ability. *Perceptual and Motor Skills*, 77: 535–544.
- Cleland, F. and Pearse, C. (1995). Critical thinking in elementary physical education: Reflections on a yearlong study. *Journal of Physical Education, Recreation, and Dance*, 66(6): 31–38.
- Cox, R.L. (1986). A systematic approach to teaching sport. In M. Pieron and G. Graham (Eds.), *Sport pedagogy* (pp. 109–116). Champaign, IL: Human Kinetics.
- Crouch, D.W., Ward, P. and Patrick, C.A. (1997). The effects of peer-mediated accountability on task accomplishment during volleyball drills in elementary physical education. *Journal of Teaching in Physical Education*, 17: 26–39.
- Delquadri, J., Greenwood, C., Whorton, D., Carta, J. and Hall, R. (1986). Class-wide peer tutoring. *Exceptional Children*, 52: 535–542.
- DePaepe, J.L. (1985). The influence of three least restrictive environments on the content motor-ALT and performance of moderately mentally retarded students. *Journal of Teaching in Physical Education*, 5: 34–41.
- Dewey, J. (1933). *How we think: A statement of the relation of reflective thinking to the educative process*. Boston, DC: Health and Company.
- Doolittle, S. and Fay, T. (2002). *Authentic assessment of physical activity for high school students*. Reston, VA: NASPE Publications.
- Dyson, B. (2001). Cooperative learning in an elementary physical education program. *Journal of Teaching in Physical Education*, 20: 264–281.
- Dyson, B. (2002). The implementation of cooperative learning in an elementary physical education program. *Journal of Teaching in Physical Education*, 22: 69–85.
- Dyson, B. and Strachan, K. (2000). Cooperative learning in a high school physical education program. *Waikato Journal of Education*, 6: 19–37.
- Ennis, R. (1987). A taxonomy of critical thinking dispositions and abilities. In J. Baron and R. Sternberg (Eds.), *Teaching thinking skills: Theory and practice* (pp. 9–26). New York: W.H. Freeman.
- Ernst, M. and Byra, M. (1998). What does the reciprocal style of teaching hold for junior high school learners? *The Physical Educator*, 55: 24–37.
- French, K.E., Rink, J.E., Rikard, L., Mays, A., Lynn, S. and Werner, P. (1991). The effects of practice progressions on learning two volleyball skills. *Journal of Teaching in Physical Education*, 10: 261–274.
- Fuchs, L., Fuchs, D., Bentz, J., Phillips, N. and Hamlett, C. (1994). The nature of student interactions during peer tutoring with and without prior training and experience. *American Educational Research Journal*, 31: 75–103.
- Fuchs, D., Fuchs, L.S., Mathes, P.G. and Simmons, D.C. (1997). Peer-assisted learning strategies: Making classrooms more responsive to diversity. *American Educational Research Journal*, 34: 174–206.
- Garside, C. (1996). Look who's talking: A comparison of lecture and group discussion teaching strategies in developing critical thinking skills. *Communication Education*, 45: 212–227.
- Goldberger, M. (1992). The spectrum of teaching styles: A perspective for research on teaching physical education. *Journal of Physical Education, Recreation, and Dance*, 63(1): 42–46.
- Goldberger, M. and Gerney, P. (1986). The effects of direct teaching styles on motor skill acquisition of fifth grade children. *Research Quarterly for Exercise and Sport*, 57: 215–219.
- Goldberger, M. and Gerney, P. (1990). Effects of learner use of practice time on skill acquisition of fifth grade children. *Journal of Teaching in Physical Education*, 10: 84–95.
- Goldberger, M., Gerney, P. and Chamberlain, J. (1982). The effects of three styles of teaching on the psychomotor performance of fifth grade children. *Research Quarterly for Exercise and Sport*, 53: 116–124.
- Goudas, M., Biddle, S., Fox, K. and Underwood, M. (1995). It ain't what you do, it's the way that you do it! Teaching style affects children's motivation in track and field. *The Sport Psychologist*, 9: 254–264.
- Green, C.S. and Klug, H.G. (1990). Teaching critical thinking and writing through debates: An experimental evaluation. *Teaching Sociology*, 18: 462–471.
- Greenockle, K.M. and Purvis, G.J. (1995). Redesigning a secondary school wellness unit using the critical thinking model. *Journal of Physical Education, Recreation, and Dance*, 66(6): 49–52.

- Griffey, D.C. (1983). Aptitude X treatment interactions associated with student decision making. *Journal of Teaching in Physical Education*, 3: 15–32.
- Grineski, S. (1989). Children, games, and prosocial behavior – insights and connections. *Journal of Physical Education, Recreation, and Dance*, 60(3): 20–25.
- Gusthart, J.L. and Sprigings, E.J. (1989). Student learning as a measure of teacher effectiveness in physical education. *Journal of Teaching in Physical Education*, 8: 298–311.
- Harrison, J.M., Fellingham, G.W., Buck, M.M. and Pellett, T.L. (1995). Effects of practice and command styles on rate of change in volleyball performance and self-efficacy of high-, medium-, and low-skilled learners. *Journal of Teaching in Physical Education*, 14: 328–339.
- Harrison, J.M., Preece, L.A., Blakemore, C.L., Richards, R.P., Wilkinson, C. and Fellingham, G.W. (1999). Effects of two instructional models-skill teaching and mastery learning-on skill development, knowledge, self-efficacy, and game play in volleyball. *Journal of Teaching in Physical Education*, 19: 34–57.
- Harter, S. (1981). The development of competence motivation in the mastery of cognitive and physical skills: Is there a place for joy? In G.C. Roberts and D.M. Landers (Eds.), *Psychology of motor behavior and sport-1980* (pp. 3–29). Champaign, IL: Human Kinetics.
- Hastie, P. (2003). *Teaching for lifetime physical activity through quality high school physical education*. San Francisco, CA: Benjamin Cummings.
- Holmes Group. (1995). *Tomorrow's schools of education*. East Lansing, MI: Author.
- Holt/Hale, S.A. (1999). *Assessing motor skills in elementary physical education*. Reston, VA: NASPE Publications.
- Horwitz, R.A. (1979). Psychological effects of the open classroom. *Review of Educational Research*, 49(1): 71–85.
- Houston-Wilson, C., Dunn, J.M., van der Mars, H. and McCubbin, J. (1997). The effect of peer tutors on motor performance in integrated physical education classes. *Adapted Physical Activity Quarterly*, 14: 298–313.
- Hudgins, B.B. and Edelman, S. (1986). Teaching critical thinking skills to fourth and fifth graders through teacher-led small-group discussions. *Journal of Educational Research*, 79: 333–342.
- Jenkins, J. and Byra, M. (1996). An exploration of theoretical constructs associated with the Spectrum of Teaching Styles. In F. Carreiro da Costa (Ed.), *Research on teaching and research on teacher education: What do we know about the past and what kind of future do we expect?* (pp. 103–108). Lisbon, Portugal: AIESEP.
- Johnson, D.W. and Johnson, R.T. (1991). *Learning together and alone: Cooperative, competitive, and individualistic learning* (3rd ed.). Boston, DC: Allyn & Bacon.
- Johnson, D.W. and Johnson, R.T. (1992). Positive interdependence: Key to effective cooperation. In R. Hertz-Lazarowitz and N. Miller (Eds.), *Interaction in cooperative groups: The theoretical anatomy of group learning* (pp. 174–199). New York: Cambridge University Press.
- Johnson, M. and Ward, P. (2001). Effects of class-wide peer-tutoring on correct performance of striking skills in 3rd grade physical education. *Journal of Teaching in Physical Education*, 20: 247–263.
- Johnson, R.T., Bjorkland, R. and Krotee, M. (1984). The effects of cooperative, competitive, and individualistic student interaction patterns on the achievement and attitudes of students learning the golf skill of putting. *Research Quarterly for Exercise and Sport*, 55: 129–134.
- Jones, D.L. (1992). Analysis of task structures in elementary physical education classes. *Journal of Teaching in Physical Education*, 11: 411–425.
- Kagan, S. (1990). The structural approach to cooperative learning. *Educational Leadership*, 47(4): 12–15.
- Katstra, J., Tollefson, N. and Gilbert, E. (1987). The effects of peer evaluation on attitude toward writing and writing fluency of ninth grade students. *Journal of Educational Research*, 80(3): 168–172.
- Kelly, L. (1995). *Adapted physical education national standards*. National Consortium for Physical Education and Recreation for Individuals with Disabilities. Champaign, IL: Human Kinetics.
- Kirchner, G., Cunningham, J. and Warrell, E. (1970). *Introduction to movement education*. Dubuque, IA: Wm. C. Browne.
- Kirk, D. (2004). New practices, new subjects, and critical inquiry: Possibility and progress. In J. Wright, D. Macdonald and L. Burrows (Eds.), *Critical inquiry and problem-solving in physical education* (pp. 199–208). London: Routledge.
- Kirk, D. and Macdonald, D. (1998). Situated learning in physical education. *Journal of Teaching in Physical Education*, 17: 376–387.
- Krathwohl, D.R. (2002). A revision of Bloom's taxonomy: An overview. *Theory Into Practice*, 41: 212–218.
- Lee, A.M. (1997). Contributions of research on student thinking in physical education. *Journal of Teaching in Physical Education*, 16: 262–277.
- Lipman, M. (1988). Critical thinking-What can it be? *Educational Leadership*, 46(1): 38–43.
- Locke, L.F., Silverman, S.J. and Spirduso, W.W. (2004). *Reading and understanding research* (2nd ed.). Thousand Oaks, CA: Sage.
- Logsdon, B., Barrett, K., Broer, M., McKee, R. and Ammons, M. (1977). *Physical education for children: A focus on the teaching process*. Philadelphia, PA: Lea & Febiger.
- Ludwig, E.A. (1968). Towards an understanding of basic movement education in the elementary schools. *Journal of Health, Physical Education, and Recreation*, 39(3): 26–28, 77.
- Lund, J. (1992). Assessment and accountability in secondary physical education. *Quest*, 44: 352–360.
- Macdonald, D. (2004). Understanding learning in physical education. In J. Wright, D. Macdonald and L. Burrows (Eds.), *Critical inquiry and problem-solving in physical education* (pp. 16–29). London: Routledge.
- Maheady, L. (1998). Advantages and disadvantages of peer-assisted learning strategies. In K. Topping and S. Ehly (Eds.), *Peer-assisted learning* (pp. 45–65). Mahwah, NJ: Erlbaum.

- McBride, R.E. (1988). Teaching critical thinking in the psycho-motor learning environment – A possibility or a passing phase? *The Physical Educator*, 46: 170–173.
- McBride, R.E. (1992). Critical thinking – An overview with implications for physical education. *Journal of Teaching in Physical Education*, 11: 112–125.
- McBride, R.E. (1995). Critical thinking in physical education ... An idea whose time has come. *Journal of Physical Education, Recreation, and Dance*, 66 (6): 21–23.
- Metzler, M.W. (2000). *Instructional models for physical education*. Boston, DC : Allyn & Bacon.
- Mosston, M. (1966). *Teaching physical education*. Columbus, OH: Merrill.
- Mosston, M. (1981). *Teaching physical education* (2nd ed.). Columbus, OH: Merrill.
- Mosston, M. and Ashworth, S. (1986). *Teaching physical education* (3rd ed.). Columbus, OH: Merrill.
- Mosston, M. and Ashworth, S. (1994). *Teaching physical education* (4th ed.). New York: Macmillan.
- Mosston, M. and Ashworth, S. (2002). *Teaching physical education* (5th ed.). San Francisco, CA: Benjamin Cummings.
- National Association for Sport and Physical Education. (1992). *Outcomes of quality physical education programs*. Reston, VA: Author.
- National Association for Sport and Physical Education. (1995). *Moving into the future: National physical education standards – A guide to content and assessment*. Reston, VA: Author.
- National Association for Sport and Physical Education. (2004). *Moving into the future: National standards for physical education* (2nd ed.). Reston, VA: Author.
- National Commission on Teaching and America's Future. (1996). *What matters most: Teaching for America's future*. New York: Author.
- National Education Goals Panel. (1991). *The national education goals report: Building a nation of learners*. Washington, DC: Author.
- Newman, R.S. (1994). Academic help-seeking: A strategy for self-regulated learning. In D.H. Schunk and B.J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 283–301). Hillsdale, NJ: Erlbaum.
- Olson, V. (1990). The revising processes of sixth-grade writers with and without peer feedback. *Journal of Educational Research*, 84(1): 22–29.
- Pellett, T.L. and Blakemore, C.L. (1997). Comparisons of teaching presentation and development of content: Implications for effective teaching. *Perceptual and Motor Skills*, 85: 963–972.
- Pellett, T.L. and Harrison, J.M. (1995). The influence of refinement on female junior high school students' volleyball practice success and achievement. *Journal of Teaching in Physical Education*, 15: 41–52.
- Peterson, P.L. (1979). Direct instruction reconsidered. Pintrich, P.R. and DeGroot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82: 33–40.
- Prawat, R.S. (1992). Teacher's beliefs about teaching and learning: A constructivist perspective. *American Journal of Education*, 100: 354–395.
- Puma, M.J., Jones, C.C., Rock, D. and Fernandez, R. (1993). *Prospects: The congressionally mandated study of educational growth and opportunity*. Interim Report. Bethesda, MD: Abt Associates.
- Pumfrey, P. (1986). Paired reading: Promise and pitfalls. *Educational Research*, 28(2): 89–94.
- Qualifications and Curriculum Authority (QCA). (1999). *Physical education: The national curriculum for England*. London: QCA.
- Queensland School Curriculum Council. (1999). *Health and physical education: Years 1 to 10 syllabus*. Brisbane: Queensland Publishing Services.
- Rice, E.A., Hutchinson, J.L. and Lee, M. (1958). *A brief history of physical education* (4th ed.). New York: The Ronald Press Company.
- Rink, J.E. (1996). Effective instruction in physical education. In S.J. Silverman and C.D. Ennis (Eds.), *Student learning in physical education* (pp. 171–198). Champaign, IL: Human Kinetics.
- Rink, J.E. (2002). *Teaching physical education for learning* (4th ed.). Boston, DC : McGraw Hill.
- Rink, J.E., French, K.E., Werner, P.H., Lynn, S. and Mays, A. (1992). The influence of content development on the effectiveness of instruction. *Journal of Teaching in Physical Education*, 11: 139–149.
- Robertson, E. (1987). Teaching and related activities. In M.J. Dunkin (Ed.), *International encyclopedia of teaching and teacher education* (pp. 15–18). Oxford: Pergamon Press.
- Rosenshine, B. (1979). Content, time, and direct instruction. In P.L. Peterson and H.J. Walberg (Eds.), *Research on teaching: Concepts, findings, and implications* (pp. 28–56). Berkeley, CA: McCutchan.
- Russell, T. and Ford, D. (1983). Effectiveness of peer tutors vs resource teachers. *Psychology in the Schools*, 20: 436–441.
- Schwagger, S. and Labate, C. (1993). Teaching for critical thinking in physical education. *Journal of Physical Education, Recreation, and Dance*, 64(5): 24–26.
- Sharon, S. (1980). Cooperative learning in small groups: Recent methods and effects on achievement, attitudes, and ethnic relations. *Review of Educational Research*, 50: 241–271.
- Siedentop, D. and Tannelhill, D. (2000). *Developing teaching skills in physical education*. Mountain View, CA: Mayfield.
- Slavin, R.E. (1990). *Cooperative learning: Theory, research, and practice*. Boston, DC : Allyn & Bacon.

- Smith, B.O. (1987). Definitions of teaching. In M.J. Dunkin (Ed.), *International encyclopedia of teaching and teacher education* (pp. 11–14). Oxford: Pergamon Press.
- Soar, R. and Soar, R.M. (1979). Emotional climate and management. In P.L. Peterson and H.J. Walberg (Eds.), *Research on teaching: Concepts, findings, and implications* (pp. 97–119). Berkeley, CA: McCutchan.
- Sweeting, T. and Rink, J.E. (1999). Effects of direct instruction and environmentally designed instruction on the process and product characteristics of fundamental skill. *Journal of Teaching in Physical Education*, 18: 216–233.
- Tinning, R. and Fitzclarence, L. (1992). Postmodern youth culture and the crisis in Australian high school physical education. *Quest*, 44: 287–303.
- Tishman, S. and Perkins, D.N. (1995). Critical thinking and physical education. *Journal of Physical Education, Recreation, and Dance*, 66(6): 24–30.
- Van Dalen, D.B. and Bennett, B.L. (1971). *A world history of physical education: Cultural, philosophical, comparative* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.
- Ward, P. (1993). An experimental analysis of skill responding in physical education high school accountability (Doctoral dissertation, Ohio State University, 1993). *Dissertation Abstracts International*, 54, 2950A.
- Ward, P. and Johnson, L.A. (1995, July). *Effects of peer-mediated accountability during peer tutoring on skill development in physical education*. Paper presented at the World Congress of the International Council for Health, Physical Education, Recreation, Sport, and Dance, Gainesville, FL.
- Ward, P., Smith, S.L., Makasci, K. and Crouch, D.W. (1998). Differential effects of peer-mediated accountability on task accomplishment in elementary physical education. *Journal of Teaching in Physical Education*, 17: 442–452.
- Webster, G.E. (1987). Influence of peer tutors upon academic learning time-physical education of mentally retarded students. *Journal of Teaching in Physical Education*, 6: 393–403.
- Webster's new world college dictionary* (4th ed.). (2000). Foster City, CA: IDG Books Worldwide.
- Woods, A.M. and Book, C. (1995). Critical thinking in middle school physical education. *Journal of Physical Education, Recreation, and Dance*, 66(6): 39–43.
- Wright, J. (2004). Critical inquiry and problem-solving in physical education. In J. Wright, D. Macdonald and L. Burrows (Eds.), *Critical inquiry and problem-solving in physical education* (pp. 3–15). London: Routledge.
- Yoder, L.J. (1993). Cooperative learning and dance education. *Journal of Physical Education, Recreation, and Dance*, 64(5): 47–51, 56.
- Zimmerman, B.J. (1986). Development of self-regulated learning: Which are the key sub-processes? *Contemporary Educational Psychology*, 11: 307–313.
- Zimmerman, B.J. (1998). Developing self-fulfilling cycles of academic regulation: An analysis of exemplary instructional models. In D.H. Schuck and B.J. Zimmerman (Eds.), *Self-regulated learning: From teaching to self-reflective practice* (pp. 1–19). New York: Guilford Press.
- Zimmerman, B.J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P.R. Pintrich and M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). San Diego, CA: Academic Press.