

The Spectrum of Teaching Styles: A Perspective for Research on Teaching Physical Education

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Every area of scholarship should have a conceptual framework supporting it. Such a framework provides scholars with perspective. It provides definition and parameters to the discipline. It can provide a repository for systematically storing research results and helps to identify areas of the discipline yet to be explored. To be useful, such a framework must be inclusive, yet discriminating. With it, scholars can systematically explore the discipline. Without it, their efforts are often confusing, repetitious, fragmented, and unintelligible.

In 1973, teaching scholars Nixon and Locke described the Spectrum of Teaching Styles (Mosston, 1966) as "the most significant advance in the theory of physical education pedagogy in recent history..." (p. 1227). They called for a full program of testing but concluded, based on two completed studies (Dougherty, 1970; Mariani, 1970), that "early results have confirmed the power of the theory to predict both teaching events and consequences of student learning" (p. 1227).

This year marks the silver anniversary

of the Spectrum in physical education. It seems an appropriate time to reexamine Nixon and Locke's claim to determine how clear their vision was in the light of over 20 years of research and reflection. The Spectrum has evolved over the past 25 years (Mosston & Ashworth, 1986; 1990) and has been implemented, in varying degrees, around the world. Has research continued to support Spectrum theory? Has the Spectrum significantly advanced physical education pedagogy? These are the questions which guide this discussion.

A Review of Spectrum Research in Physical Education

In a series of Spectrum studies completed by graduate students during the 1970s, various styles of teaching, mainly from the "reproductive" cluster, were examined (Boschec, 1972; Bryant, 1974; Chamberlain, 1979; Dougherty, 1970; Gerney, 1979; Jacoby, 1975; McCleary, 1976; Virgilio, 1979). These studies, which generally failed to produce significant results, suffered from many methodological problems, including the following:

- Some researchers did not completely understand Spectrum theory nor did they know the style they were trying to use well enough to bring fidelity to their work.
- Some illogical conjectures were made about relationships between certain styles and disparate outcomes.
- The length and/or intensity of training was insufficient to produce the intended learning outcomes.

This early work was necessary for us to learn how to better conduct Spectrum research. We know now that to do research on the Spectrum one should understand the overall theory. A mechanism must be developed to check fidelity between theory and action (i.e., through systematic observation). We know also that the relationships between style and outcome are, for the most part, rational and logical. In other words, a particular teaching style produces specific kinds of learning conditions which should logically match the outcomes being sought. We also know more about the amount of training necessary for each style to produce meaningful results.

Over the past decade two colleagues and I have completed several Spectrum studies. In our research, we conducted episodes in selected "reproductive" styles to determine their effect on basic motor skill acquisition and other variables. From the start certain things were kept constant. The study was limited to styles from within the "reproductive" cluster; specifically the Practice, Reciprocal, and Inclusion styles. We tested the styles using fifth grade children from two local middle schools. Learning tasks were popular motor skills taken from local curricula. The same teachers were used, both trained in the Spectrum, and videotaped to assure fidelity between theory and practice.

The Command style (Style A) was not included in our work because, contrary to popular opinion, it is rarely used in physical education classes. The Command style requires the teacher to make all decisions and the learners to follow the teacher's commands exactly. For example, in activities such as karate, ballet, and synchronized swimming, all students follow the leader's directions precisely.

In two earlier studies, one a replication study, the effects of the Practice, Reciprocal, and Inclusion styles on motor skill acquisition were examined (Goldberger, Gerney, & Chamberlain, 1982; Goldberger & Gerney, 1986). All three of these styles were effective in promoting motor skill acquisition, but the Practice style (Style B) consistently produced the highest scores.

In the Practice style learners engage in teacher-designed tasks, usually at different stations around the gymnasium. While the learners practice, the teacher circulates and provides feedback. This has been traditionally one of the most popular teaching styles used in American physical education. The expectations are clear and learners are provided with the opportunity to maximize their time-on-task. The Practice style provides flexibility for learners to modify their practice conditions, including pace of performance and

order of tasks, so that practice is somewhat personalized. This approach was found to be consistently effective in promoting motor skill acquisition.

In a recent study (Goldberger & Gerney, 1990) the effects of two "formats" of the Practice style were examined. Under one popular format, often referred to as "station work" or "learning centers" in the literature, the teacher systematically rotated the children from station to station every few minutes. Under the other format, based on the landmark configuration of this style, each learner decided the order of station rotation, how much time to spend at each station, and when to rotate on his or her own. While both formats were effective, the second format was more effective for low-ability children. Under this format children could decide to allocate their practice time differentially and spend more time on tasks not yet mastered, an option not available

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under the teacher-rotated format.

In another recent study, Beckett (1990) found the Practice style to be an effective way to teach college students a soccer skill. Blakemore's work on mastery learning (1986) also falls under the canopy of the Practice style. She found that mastery conditions produced learner achievement, particularly benefited

low-ability learners, and helped equalize gender differences.

In our work, the Reciprocal style (Style C) was also investigated (Goldberger, Gerney & Chamberlain, 1982; Goldberger & Gerney, 1986). In this style, learners work as partners, helping each other to learn. As one partner performs the teacher-designed task, the other provides feedback based on teacher-designed criteria. After the first learner completes the task, they switch roles. Feedback is provided both during and following task practice. In a typical Reciprocal episode, where allocated time is predetermined, half the practice trials a learner completes are actual trials and half are observational trials. This style produced significant skill improvement, although the gains were not as great as in the Practice style.

In addition to improving motor skill, the Reciprocal experience is hypothesized to affect social development. In our work, we asked learners trained in the Reciprocal style to "help" their partners improve performance on a new motor task. Their social interaction was videotaped and compared to the interaction of a control group of students not trained in this style. Specifically, Reciprocal learners provided more feedback, expressed more empathy, offered more praise and encouragement to each other, and requested more feedback from each other when compared to the control group. In a study presently being completed, the ability of youngsters to analyze and assess motor performance was examined (Gerney, Dort, & Goldberger, 1991). We found that learners trained in the Reciprocal style were significantly better able to analyze and assess performance than their untrained counterparts.

In the Inclusion style (Style E), the last landmark style in the "reproductive" cluster and the last style we have studied thus far, learners individually select their level of task difficulty. The teacher provides multiple levels of difficulty within the same task, and each learner chooses the level he or she wants to complete. In

one study, for example, the task was shooting pucks into a target area using a hockey stick, and the difficulty factor was the distance from the target. Five levels in terms of distance from the target were provided. Each learner "plugged into" and practiced at the level of difficulty he or she felt was personally appropriate to be successful. If a learner perceived the level as being too difficult or too easy, he or she could change levels. Research relating success rate during practice to overall performance suggests that a high success rate during practice is desirable (Fisher et al., 1980; Silverman, 1990). This suggests that the conditions the Inclusion style provides would be productive, especially for exceptional learners (i.e., low- and high-ability learners).

In our research the Inclusion style did not produce the kinds of results predicted by Spectrum theory (Goldberger, Gerney, & Chamberlain, 1982; Goldberger & Gerney, 1986). While the Inclusion style was effective in terms of overall group improvement, it was not as productive as the Practice style and was not particularly effective for exceptional learners.

We often observed learners making inappropriate level of difficulty decisions. For example, an unskillful child selects a difficult level at which to start. This child is not successful but would not, even with mild teacher prompting, move to a less difficult level. Although this finding is troublesome, we are presently attempting to understand why learners are not able to make more appropriate level of difficulty decisions. We suspect that self-concept and peer pressure are factors in this phenomenon.

Moving to the "productive" cluster of styles, much less is known about the effects of styles on the right side of the Spectrum (figure 1) on learning outcomes. These styles require learners to use different behavioral tools, including invention, discovery, creativity and self-teaching, to go beyond content already known. While some studies have linked "open education" to

positive learning outcomes (e.g., Hennessey & Amabile, 1987), this literature is difficult to interpret because definitions and constructs are often unclear and inconsistent. These styles are, for the most part, virgin territory in terms of research on teaching. In this respect the Spectrum can help to identify areas of omission in the body of teaching literature.

Teacher Education Using the Spectrum

In several studies the Spectrum was the focus of teacher education research. Anderson and his associates reported on the effects of Spectrum training (Pichert, Anderson, et al., 1976). They studied groups of trained and untrained teachers and found that Spectrum teachers appeared to give more individual feedback, displayed less domination of academic discussions, and made better use of class time.

Ashworth (1983) studied videotapes of teachers trained in Spectrum and compared them, examining a number of variables, with tapes of teachers not trained in Spectrum.

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She found Spectrum-trained teachers engaged learners in more time-on-task activities; used more forms of feedback; conducted more private and individual interactions with children; gave fewer negative statements; circulated more among the children; and altered their teaching styles more frequently.

In a longitudinal study Ashworth (1990) compared two groups of student teachers, one trained in Spec-

trum and the other receiving 300 hours of nontheoretical training. Her results were very similar to her 1983 study.

Highlights of Teaching Research

A review of research on classroom teaching is beyond the scope of this article and is available elsewhere (e.g., Brophy & Good, 1986). But a few highlights from classroom research will help to illustrate how the Spectrum can provide a useful perspective for the study of all teaching and repository for research results.

During the 1970s and early 1980s, the federal government became interested in improving instruction and funded several large-scale investigations focusing on effective teaching in basic reading and mathematics (e.g., Brophy & Evertson, 1974; Fisher, et al., 1980; Stallings & Kaskowitz, 1974). In these studies effective teachers were defined as those able to consistently produce desired learner achievement, defined in terms of basic skill development in reading and mathematics.

These studies, for the most part, used elementary school children as subjects and basic skills in reading and mathematics as outcome measures. From the studies the following generalizations about effective teaching can be made (Brophy & Good, 1986; Medley, 1979; Rosenshine, 1977):

1. Achievement is maximized when roles are clear, when the teacher emphasizes instruction, and when the teacher takes a personal responsibility for student learning.
2. "Setting the scene" before an episode serves as an advance organizer for learners, in terms of both content and role, which helps to clarify expectations and reduce off-task behavior (Ausubel, 1978).
3. Key indicators of effective class management include good preparation; installation of rules and procedures at the beginning of the year; consistent accountability procedures; and smooth, brief, and orderly transitions.
4. Students must engage in activities appropriate to their ability to en-

- sure a high rate of success.
5. Instruction generally should be briskly paced, in small steps, until mastery is attained. A certain amount of redundancy is useful. Introductions should not be too long and should be interspersed with practice opportunities.
 6. Students achieve more in classes where the teacher is actively involved in teaching and is "with-it" (aware of what is going on at all times), a term devised by Kounin (1970).
 7. Clarity of the teacher's presentation is associated with student achievement.
 8. Teacher enthusiasm appears to be related to achievement, particularly for affective outcomes.
 9. When a student is called on in class, the teacher should provide sufficient time to allow the student to think and respond. If the student responds incorrectly, he or she should be corrected without personal criticism.
 10. Children from low socioeconomic backgrounds need more drill, practice, and nurturing.
 11. The most appropriate teaching style will vary from objective to objective.

Most of these ideas are intuitively appealing. Rosenshine (1977) used them to conceptualize a paradigm he refers to as Direct Instruction. While the Direct Instruction paradigm is a useful and powerful concept, it only reveals part of the picture about effective teaching; its associated learning behaviors represent only a sampling of possible learning behaviors. It is interesting, although not surprising, that an analysis of the learning behavior associated with direct instruction placed it mainly under the canopy of the Practice style, certainly within the "reproductive" cluster.

These limitations are often overlooked in discussing teaching effectiveness, and results are often too broadly generalized. It is possible that teaching research focusing on other learning outcomes, with different types of children, in varying contexts, would uncover different

lists of effective teaching behaviors. At this time, most teaching researchers do little to place their findings into any kind of conceptual context, thus research on teaching can be accurately characterized as being fragmented and disorganized.

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teaching information which places specific concepts into a more comprehensive context. Its universal nature provides a niche for everything uncovered thus far, while at the same time helping to reveal areas of omission. Spectrum theory complements the findings mentioned in this article and enhances their significance and applicability by placing them into a meaningful context.

There is much work yet to be done. Little work has been done with styles in the "productive" cluster. Before setting forth in this area we must first more clearly define terms such as discovery, divergent production, and self-teaching, and devise instruments to measure these constructs. The whole area of teacher education is ripe for analytic study. As was suggested in the Muellers' article in this feature, we need to explore linkages between specific goals, teaching styles, and tasks. Much still needs to be done, and the Spectrum can provide a useful perspective within which to do it.

The Spectrum as a Framework

Research on teaching has uncovered many persistent linkages between teaching and learning found across differing content area and contexts. Almost all of these linkages are within the "reproductive" cluster. So much more remains to be explored about effective teaching, and the Spectrum provides us with the perspective to see this larger picture. Almost all we have learned about effective teaching through research makes sense. As Ebel has (1967) suggested, teaching research will reveal nothing revolutionary about teaching. Teaching and learning appear to be rational acts that follow common sense logic. Teachers have been using most of these ideas throughout recorded history. That the Spectrum is logical and predictable does not diminish its importance. It is helping to build a science of teaching which elevates teaching from a hit or miss endeavor to a more purposeful and professional activity. That teaching through the Spectrum is prescriptive does not diminish or devalue the creativity of the individual teacher. Teaching will always remain an art as well as a science. The idea of employing the Spectrum of Teaching Styles as a framework through which to view the panorama of research on teaching—to see where things fit, to see the linkages among styles and outcomes, and to see the holes in this body of knowledge—should be seriously considered.

Finally, returning to Nixon and Locke's 1973 statement about the significance of the Spectrum, we can conclude, based on 25 years of research and reflection, that Spectrum theory has retained its power and significance. Although the theory has not yet completed the full program of testing Nixon and Locke called for, results to date confirm the theory's power to both describe teaching events and predict learning outcomes. Those of us who have worked with the Spectrum consider it simple and logical, yet at the same time, complex and encompassing. We believe the Spectrum can bring

a missing perspective to the analytic study of teaching.

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