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Spectrum of Teaching Styles Retrospective 2012

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The Spectrum of Teaching Styles was introduced by Dr. Muska Mosston in his 1966 book Teaching Physical Education. *In this essay the development of the Spectrum is briefly recounted and five refinements made since 1966 are reviewed. In closing, the authors reflect on the influence of critiques from scholars in the field on the development of the Spectrum and Spectrum research.*

Keywords Pedagogy, teaching, teaching styles, spectrum

The Spectrum of Teaching Styles was introduced over 45 years ago when the first edition of *Teaching Physical Education* (Mosston, 1966) was published. As we approach the 50th anniversary of its inception, and as a new generation of teachers is being introduced to the Spectrum of Teaching Styles, we thought a retrospective might be timely. In this essay we provide a brief history of the Spectrum's development, discuss its basic tenets, and review several key refinements since its inception. This retrospective will help inform those interested in using, researching, reviewing, and evaluating the underpinnings of the Spectrum.

Retrospective

What is the Spectrum of Teaching Styles? Over the years we have heard all the following references—a framework, a paradigm, a basic structure, a model, a schema, a system, a theory, and more. It could be, we suppose, all of those things, but for the many teachers we've worked with over the years the Spectrum is first and foremost a guiding tool that has become an integral part of their daily teaching routine. Just as a compendium of topical information guides the teacher in selecting content, the Spectrum provides a comprehensive array of alternative teaching approaches, or as we call them teaching styles, from which to select. No teaching style is inherently better or worse than another. Rather each, because of the unique learning conditions it fosters, is either more or less appropriate given the purposes, the context in which it is presented, and the learners involved.

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In describing the Spectrum we like to use the adjective 'elegant' because the Spectrum is, at the same time, deceptively simple, logical, and straightforward, and yet complex, elusive, and knotty. For us, the Spectrum has provided an entrée into and an anchorage within the fascinating world of teaching and learning. It provides this entrée by offering a common perspective, a number of undergirding concepts, and a functional language we can all use. For the sport pedagogy scholar, it serves both as an organized repository for knowledge about teaching as well as a catalyst for generating new pedagogic research questions. The Spectrum cannot solve all the problems of the teaching profession, but we believe it can help by providing a common perspective, language, and repository.

During the early 1960s a young physical education professor at Rutgers University in New Jersey was asking some pretty interesting questions about teaching. Is teaching an art, a science, or both? Can a teacher, regardless of her/his personality, learn to teach effectively using a variety of different teaching approaches? What is the relationship between teaching and one's educational philosophy? How many different teaching approaches are there? Is there a finite number? What is the relationship between teaching behavior and learning outcome? Is there a unified theory connecting all these ideas? Professor Muska Mosston was that Rutgers professor (note: Dr. Mosston passed away in 1994). He loved working with his university students as much as he loved working with children. Above all, he loved playing with ideas. In his beginning years as a professor, during the early 1960s, he was developing a national reputation as a non-conformist thinker and charismatic speaker regarding several topics relating to school physical education. During this time he had his own television program for children on WCBS-TV in New York City on Saturday mornings and explored many of these ideas extemporaneously.

One day on the Rutgers campus one of Mosston's university students, out of frustration in trying to replicate his mentor's teaching approach, said to him, "Professor Mosston, I can't be you!" After a pause the student continued. "Furthermore, I don't want to be like you." This encounter affected Mosston like a splash of cold water. He turned his attention away from honing and expanding his own teaching skills and became more intent on conceptualizing a vision of teaching that would include, but would go beyond, his personal teaching repertoire toward a universal vision of teaching. In our view Mosston's greatest contribution to teaching was providing the particular perspective from which the Spectrum evolved. That perspective was captured in the simple premise: Teaching behavior is a chain of decision making. All teaching-learning behavior is the result of decisions previously made. What emerged from this premise was a continuum or spectrum of teaching-learning configurations each defined by decision-making and ranging from command to discovery.

All Spectrum work, both theoretical and practical, emanates from and rests upon the premise that teaching behavior is a chain of decision making. This premise, this common perspective, provides teachers, teacher educators, teaching researchers, administrators, math and science specialists, art specialists, physical activity specialists, parents, and students with a common perspective about teaching and a common language which allows us to communicate objectively. Qualifiers such as "in my view" or "in my opinion" are typically not necessary within a Spectrum discussion. The Spectrum makes no judgment about any teaching approach but rather identifies its position along this decision making continuum within the elements of an instructional context. It provides reference points, a roadmap, so that the location of any teaching approach can be identified. Those who know the Spectrum can observe any teaching-learning encounter and, with a good degree of accuracy and reliability, agree on which decisions were made by the teacher and learner, and which decisions were not made by anyone, and thus can identify the approximate position of this particular teaching-learning encounter along the decision making continuum.

As best as we can recall, the following describes Mosston's thinking as he developed the Spectrum during the early 1960s. Once he settled on the decision making premise, the next steps flowed smoothly. If teaching behavior is a chain of decision making, what then were the decisions that must be made in any teaching/learning transaction? As many decisions as possible were identified, including big decisions (e.g., the subject matter to be taught—a content decision) as well as small decisions (e.g., should a whistle be used—a signal decision). Mosston then organized these myriad decisions into a framework within three temporal sets: (a) pre-impact, decisions that define the intent (i.e., planning and preparation decisions); (b) impact, decisions that define the actions (i.e., face-to-face implementation of the pre-impact decisions); and (c) post-impact, decisions that define assessment (i.e., feedback about performance). He called this framework the anatomy of any style. The anatomy is not a teaching style itself but undergirds every teaching style.

Actual teaching styles emerged from the anatomy by identifying who, teacher or learner, makes which decisions. So, if the teacher makes all decisions, and the learner complies with the teacher's directions, a style of teaching emerges that Mosston labeled the "command style." In this style, the teacher provides specific directions, including pace/rhythm and posture, and the learner complies by performing as accurately as possible, striving to emulate precise performance. Did Mosston "invent" command style? No, but he clarified it and placed it within the broader context of the Spectrum.

Some people find the word "command" uncomfortable, conjuring up images of a domineering leader and exploited followers. Labels, although necessary, can be misleading. Mosston attempted to avoid this pitfall by identifying each style simply by a letter, so the command style was labeled style A, the next teaching style, the practice style, style B, and so forth. One must not take any label literally when considering the utility of any teaching style. In selecting a teaching style, it is a matter of deciding which approach would best provide the learning conditions most conducive to the objective(s) at hand. For example, if one was teaching dicing in food preparation, or how to pull onto a freeway in driver education, or how to shoot an archery arrow in physical education, an episode in the command style might be an effective approach to get things started.

A more graphic example of a situation suggesting the use of the command style can be observed when watching a marching band in action. Of course there is a lot of preparation the band goes through, but when the leader signals the start, and everyone in their uniforms responds in a manner decided upon by the director, command style is seen in action. Again, the command style, with the teacher directing the learners on what to do and the learners following directions implicitly, is not new to pedagogy. But, what Mosston did was to identify its position along the Spectrum of Teaching Styles.

Once the command style was identified, Mosston thoughtfully and deliberately shifted decisions from teacher and learner to form an array of different teaching styles and thus the Spectrum evolved. At one end of the Spectrum is the command style, defined by the teacher making all decisions and the learner responding in synchronization. At the other end of the Spectrum is a teaching style in which the learner makes all decisions and the teacher serves as more of a resource. This is the self-teaching style. This style, which is employed outside the confines of the regularly scheduled physical education class, is self-guided in all three sets of decision making, planning, implementation, and assessment. An example of this might be a high school student who chooses to go to the local community recreation center to participate in a self-developed (based on knowledge learned in his school physical education program) physical fitness program.

In our view these two end styles (where teacher makes all decisions [A] and learner makes all decisions [K]) are definitive and universal. Between these bookend styles

Mosston thoughtfully and deliberately shifted the sets of decisions between teacher and learner to form different teaching styles. A new teaching style was identified when a fundamentally different teacher-learner relationship emerged. The next style along the Spectrum, the practice style (style B), was revealed to Mosston when a particular set of decisions was shifted to the learner. This particular configuration of decisions that shifts to the learner does not change the objective of the episode, the learner continues in her/his attempt to replicate performance as provided by the teacher, but it does provide each learner with some personalized "wiggle room" or options about how this is accomplished (e.g., making the decision about pace/rhythm, starting time, posture, etc.).

Here is an example of a practice style episode to illustrate its contrast with the command style. Assume the golf grip has been taught step-by-step using the command style. The exact positioning of hands and fingers are starting to adhere in motor memory among the learners. To reinforce the skill, the teacher may follow this introductory command style episode with another command style episode where learners grasp and re-grasp their clubs 10 times, step by step, following the teacher's pace and rhythm. This second command style episode, brief and quickly paced, might then be followed by a practice style episode in which students are asked to grasp the golf club correctly another 20 times on their own. For this episode, students spread out around the space available, each with a golf club, and complete 20 practice trials at their own pace and rhythm. As a reminder, the criteria for correct performance might be prominently posted or each student might be given a description of the correct form with an illustration on a sheet of paper (a task card). This episode might begin with the teacher reviewing the criteria, demonstrating the task, and reminding them that s/he will be circulating from student to student providing personal feedback.

Which decisions have been shifted from the command style to the practice style? Using the current example, each learner made a "location" decision in deciding where s/he would practice the task. Each learner also made a set of time decisions including starting time and stopping time, pace, and time between each repetition of the grip task. The task was provided by the teacher, as were the criteria for correct performance, but each learner made several decisions about location and timing during task completion. The teacher does provide some parameters regarding time and space (e.g., stay in the gym, maximum of five minutes to complete the task). However, within those parameters, learners are making decisions providing a modicum accommodation for individual differences.

In a similar thoughtful and deliberate manner, the next Spectrum teaching style identified was the reciprocal style. In the shift between the practice and reciprocal styles the decision transfer occurs in the post-impact set of decisions. A learner assesses the performance of another learner, a partner, based on criteria provided by the teacher. In the example we have been using (learning the golf grip), the task card on which correct performance is depicted is given a partner. The partner observes the performance and provides formative assessment based on criteria provided by the teacher on the task card. Perhaps a slightly more apropos example, rather than the golf grip, might be the golf swing. A student can see the golf grip but can't see the golf swing, unless a mirror or television replay are provided. The partner can be taught to look for specific criteria (e.g., shoulder turn, arm straight, weight shifted) and to provide immediate and constructive feedback to the partner performing the task. After one learner completes the task they change roles. The reciprocal style not only provides a means of giving immediate feedback, it also offers an opportunity for social development as the partners systematically "help" each other within a constructive relationship to learn the task at hand. Giving and accepting feedback are important social skills that can be learned and practiced.

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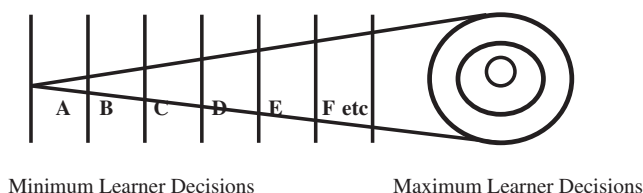
Figure 1. Spectrum schema 1966.

Continuing on, in this same deliberate manner, Mosston revealed five more teaching styles along the Spectrum. Each style had its unique anatomy and teacher-learner behaviors, and each produced a different set of learning conditions. In the other bookend style, the last style on the right side of the Spectrum, style K, the self-teaching style, the roles of the teacher and learner have been reversed in terms of decision making.

In summary, as the Spectrum evolved from a premise, to the anatomy, and then to the landmark styles, it is important, we believe, to understand the evolution of the Spectrum. It did not originate "from a collection of commonly observed teaching approaches or styles" (p. 87) as suggested by Sicilia-Camacho and Brown (2008). Rather, it was revealed in a systematic process of logical uncovering.

In 1966, Mosston wrote the first edition of *Teaching Physical Education,* and this book introduced the Spectrum to the world. In the first edition, he identified eight teaching styles (now there are 11) and he provided examples about how each might be used in teaching physical education. Mosston presented a schema (visual) of the entire Spectrum which attempted to represent the overview of the framework (see Figure 1). We believe the diverging lines in the schema were meant to indicate that, in Mosston's view, education should proceed from a dependent learner toward the ultimate target of an independent learner. This schema and its implications are examined within our discussion of five major refinements that have evolved in the Spectrum.

Five Refinements

While the Spectrum's premise has remained intact and the idea of shifting decisions between teacher and learner to form different teaching styles is unchanged, there have been a number of refinements to the framework over the years. Let us highlight and discuss five of them. These refinements emerged as Mosston, and later his colleague Sara Ashworth, and others, studied and implemented the Spectrum over the past almost half-century.

Non-versus

When the second edition of *Teaching Physical Education* was published in 1981, one change was made to the schema/diagram representing the Spectrum. In the revised Spectrum schema, each individual style appears to be of equal dimension (see Figure 2). The size of the square representing command style is the same as for the practice style, reciprocal style, and so forth. In contrast, in the original Spectrum schema (Mosston, 1966) it appears that the styles on the left side are smaller, and by implication, of less value than the styles to the right. This is not what Mosston believed. He always believed each style to contribute in its unique ways. He never envisioned individual styles in opposition with each other. Rather, he viewed the styles as complimentary to one another. In the preface

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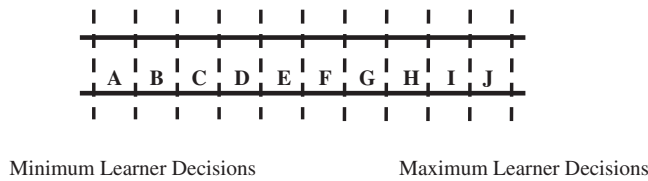
Figure 2. Spectrum schema 1981.

to the second edition he wrote, "The conceptual basis of the Spectrum rests on the NON-VERSUS notion. That is, each style has its place in reaching a specific set of objectives; hence, no style, by itself, is better or best" (Mosston, 1981, p. viii).

In the first edition (1966) Mosston included the diverging lines to show that the schema implied directionality, suggesting that teaching should go from "command to discovery." Even though this represented his personal philosophy about education, in his Spectrum work he was committed to a standard of universality. He understood the command style, both its assets and liabilities, and for which learning objectives its use was necessary. For example, a marching band could not do what it does without the command style. He believed a competent teacher could easily move up and down the Spectrum seamlessly depending on intent.

Those of us who knew Mosston know how much he would have enjoyed the opening ceremonies of the London Olympics, with the meticulous attention to detail. He would have been in awe of the precision of the performers and would have said something like, "Wow, the power of the command style is incredible." He would, however, never advocate for an educational system dominated by the command style (or any other style). He would indicate that limiting the number of teaching styles is constricting. There is a lot any society must teach its younger generation and making the entire Spectrum available to teachers to make appropriate teaching style decisions is likely the best we can do. In our view each style, because of the unique combination of teacher and learner behaviors it fosters, creates a particular set of learning conditions. These particular learning conditions are either more or less appropriate for supporting the learning objective(s) at hand. So, Mosston defined and valued the command style exactly the same way in both schemas. However, the first cone-shaped schema didn't represent this view. It seemed to project a biased hierarchical view of the relationship among the styles and so it needed to be changed.

Landmark Styles

As was mentioned above, the teaching styles on either end of the Spectrum are definitive. Mosston identified the other teaching styles along this decision-making continuum by gradually shifting decisions between teacher and learner until new styles emerged. A style's emergence occurred when a significantly different teacher-learner relationship and set of learning conditions emerged. As was mentioned above, Mosston identified a cluster of nine teacher decisions in the command style that, if shifted from teacher to learner, made enough of a change in learning conditions to be considered a different teaching style. As it turns out, the individual teaching styles Mosston identified are not anomalous or capricious. Most have been identified elsewhere in similar iterations. For example, Mosston's command and practice styles are similar to direct instruction (Metzler, 2000) and interactive teaching (Rink, 2010) while the reciprocal and, when working in small groups, the divergent discovery styles have some similarities to cooperative learning (Dyson, 2002).

In the first edition of Mosston's book (1966), eight teaching styles were identified in this systematic and logical manner and thus made up the Spectrum of Teaching Styles. Over the years, through natural refinement, the number of teaching styles increased to 11 (Mosston & Ashworth, 2002). These 11 teaching styles are now referred to as "landmark" styles. Each landmark style has its own specific decision-making configuration, its own anatomy.

One might wonder what it is when you have a configuration of decision-making that doesn't replicate one of Mosston's landmark styles exactly. These "non-landmark" styles are referred to as "being under the canopy" of the nearest landmark style. In the revised schema, the vertical lines between styles were replaced with segmented lines (see Figure 2). This was meant to illustrate that decisions flow between styles and the separation is permeable. Specifically, it shows that the styles are not discrete. Are landmark styles better than non-landmark styles? If, for a particular episode, a non-landmark style is selected thoughtfully to meet a particular set of learning conditions, it might be very appropriate. Safety, equipment, facilities, and logistics are reasons for not shifting certain decisions.

The insistence on being clear with regard to whether or not an episode is landmark or under the canopy of a style has to do with accountability. As with any quasi-scientific endeavor, clarity and precision are critical in understanding the Spectrum and its implications. Employing a teaching style under the canopy of a landmark style is perfectly fine, if the rationale is clear. The Spectrum, rather than depersonalizing the teacher (Sicilia-Camacho & Brown, 2008), can serve to provide more congruency and fidelity between a teacher's intent and her/his in-class behavior. Mosston's push toward identifying "universal" structures in pedagogy was not motivated in the least by a desire to diminish the creativity or individualization of teachers. The Spectrum provides teachers with a versatile tool through which they can express their pedagogical creativity and individuality.

In her book *Teaching Middle School Physical Education* (2010) Bonnie Mohnsen wrote:

> My own teacher training in the 1970s primarily taught me simply to explain and demonstrate motor skills to students. I learned to follow this with having everyone practice the same skill simultaneously in the same way and to give students feedback afterward. As I visit classes across the United States today, this is the same strategy I still observe in the majority of classes. (p. 129)

Like Mohnsen, the vast majority of physical education classes we've observed over the years fall "under the canopy" of the practice style. Research clearly supports this observation (Cothran et al., 2005; Kulinna & Cothran, 2003). We are not critical of this because we feel if the practice style were the only style used, and if it were used well, certain goals of physical education would be achieved more consistently. The practice style with its various formats has been found to be a superb approach for basic motor skill acquisition, particularly in classes with large groups of learners (Goldberger & Gerney, 1990). If learning motor skills was the only goal of physical education, using formats of the practice style almost exclusively could make sense. However, given the variety of important goals in American education and the differing circumstances teachers find themselves facing, we believe the more comfortable and competent a teacher is in using a variety of pedagogical approaches available (including different teaching styles) the more effective s/he could potentially be. "Mobility ability," the skill of easily moving from one teaching style to another as circumstances suggest, is one we wholeheartedly endorse. Interestingly, we have a couple of colleagues (now retired) who studied and implemented Spectrum teaching

styles for over 30 years and both only used three styles. These were terrific and successful teachers, well-respected for their teaching abilities. How can this be true? As we noted above, this has to do more with the curriculum they were following than their philosophy. In both cases, the major goal of their programs was limited to performing a specific set of sport/movement skills. To do this, they used mainly the practice style, with some episodes in command and reciprocal used on occasion. In our experience, and it is also our belief, teaching styles are not necessarily employed evenly across the typical physical education curriculum.

The Spectrum was developed to provide a comprehensive view of teaching behavior and was not meant to be a prescriptive tool regarding curriculum development. You can have an excellent curriculum and only use a limited number of teaching styles. You can also be an excellent teacher and only use a limited number of teaching styles.

Episodic Teaching

We have defined and discussed the term "episode" previously. For us this has become an important and useful concept. In planning a lesson, a teacher usually thinks in terms of a class period. A class period is a unit of time, usually designated by the school, agency, or program, during which instruction occurs. So, for example, a school might divide its day into 50 minute periods. In preparing for a class period the teacher would plan for certain things to happen. The teacher may decide, given this time, s/he might be able to accomplish three things. Each of these three things might have different objectives, different learning experiences, and different anticipated outcomes. In our terms, we would describe this class period as having three episodes. In Spectrum terms, an episode is a unit of time within which the teacher and learner are working on the same objective or set of objectives and are engaged in the same teaching style. An episode might last a few minutes, an entire period, or more.

In Spectrum classes, a lesson or class period typically includes one, two, or more episodes. Each episode has its own learning intent and corresponding pre-impact, impact, and post-impact decisions. This combination of episodes would appear seamless to the learners during the flow of the lesson. In our experience, Spectrum teachers rarely, if ever, use the same teaching style all day. Differing objectives trigger the use of different teaching styles. We have conducted and observed many lessons where episodes, utilizing disparate teaching styles, were used seamlessly and effectively during the same period. For example, when teaching a new motor skill to a class of second graders, the teacher may introduce the critical skill elements of the movement in a short command style episode, next have the children practice the motor skill at their own pace using a practice style episode, follow skill practice with a reciprocal style episode where the children practice the motor skill while simultaneously engaged in giving and receiving feedback (social development) and analyzing a partner's motor skill performance (cognitive development), and finally end the 30 minute lesson with a short command style episode where the children review the critical skill elements that were introduced during the initial episode of the lesson. In this example, three different teaching styles were used in a carefully selected sequence to help the children accomplish a series of similar and different learning outcomes. The style used in one episode was purposely selected to compliment the style used in the subsequent episode.

We have found using the episode as the "unit of measure" to be useful for Spectrum teachers and researchers. Spectrum teachers and learners can change episodes easily. Spectrum scholars focus at the episode level in trying to establish linkages between teaching behavior and learning outcome.

Clusters

In his 1966 book, Mosston did attempt to include a discussion of learner outcomes in relation to each teaching style. He did this within the context of what he called "developmental channels." He identified five developmental channels: physical, social, cognitive, emotional, and moral/ethical. Each channel ranged from minimum to maximum (see Figure 3). So, for example, in discussing the efficacy of the command style, given the learning conditions the command style produces, he described the potential for physical (psycho-motor) development as high but for cognitive development as low (limited to cognitive memory). During the Spectrum's early years (1965–1975) most of Mosston's claims regarding the efficacy of teaching styles to produce results came from anecdotal experiences, case studies, and logical analysis. Starting in the 1970s, a number of researchers attempted to provide empirical evidence. The results were mixed. In some studies the connections predicted by the theory were confirmed. In others, the proverbial no significant differences were found.

After developing the Spectrum, Mosston came to realize that a natural break was apparent within the cognitive developmental channel separating the landmark styles into two clusters. Just as landmark styles identify where teaching styles lie along the Spectrum (like mile markers), clusters separate teaching styles into two groups based on the type of learner cognitive involvement. From a cognitive/thinking perspective, the teaching styles on the left side of the Spectrum required the learner to engage in convergent thought whereas the teaching styles on the right side of the Spectrum required the learner to engage in divergent thought. The break that separates the clusters occurs between the inclusion style and the guided discovery style and involves decisions about how the learner acquires the content (see Figure 3). The line demarking the two clusters is called the "discovery threshold" (Mosston & Ashworth, 2002, p. 11). If the content is provided to the learner and the learner is asked to reproduce the content as closely as possible to the teacher's presentation, styles A through E on the left side of the Spectrum would be proficient for this purpose. Learner evaluation in these styles would compare learner results against content criteria provided by the teacher. The focus is on reproducing content. Thus, this cluster is labeled the reproduction cluster. However, if the learner isn't provided with the content directly but is involved
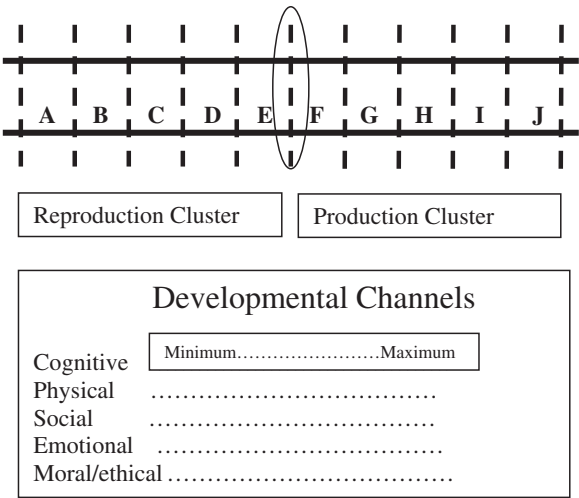
Figure 3. The Spectrum clusters and developmental channels.

in acquiring or discovering the information for him/herself, this would provide a significantly different learning experience, one involving a teaching style within the production cluster (styles F through K).

For example, a teacher might be working with a group of elementary children on the concept of balance. The teacher could say to the students, "you have balance when your center of gravity falls within your base of support." Then the teacher might show them and lead them through a series of tasks that highlight this concept. This reflects the use of a teaching style from the reproduction cluster. Alternatively, the teacher might develop an episode in which, after defining base of support and center of gravity, the students perform a series of balance activities some of which produce stability and others which do not. The teacher might then ask them to write down in their notebooks their answer to the following question: "From your experiences, when you are stable, in balance, what is the relationship between your base of support and your center of gravity?" Through their experience most of them would come to understand that as long as the center of gravity stayed within the base of support they could maintain stability. But they would come to this understanding experientially, not as a result of the teacher telling them directly. We define this as "discovering" the idea or concept, and it would be achieved by using a teaching style from the production cluster. In general this type of teaching has been referred to as indirect or heuristic instruction (Flanders, 1970; Metzler, 2000; Rink, 2010).

Again, as is the case for the landmark teaching styles, the identification of clusters of teaching styles was not presented to provide claim that one cluster of teaching styles was better or the best. One of Mosston's motivations in devising the Spectrum was to show the positive connections among the elements of the framework such that the individual styles and clusters could be discussed in terms of both their commonalities and their differences. Mosston never viewed the teaching styles or clusters of styles to be "oppositional" as Sicilia-Camacho and Brown (2008, p.88) contend.

O-T-L-O

In describing a teaching style episode we said that each one, in Spectrum terms, has its own objectives, teaching and learning behavior, and outcomes. In short, we call this entity the O-T-L-O (objectives, teaching behavior, learning behavior, and outcomes). What is the relationship among these components of the teaching-learning process? We believe it is a logical, causative, and organic relationship. The objectives (O-) present the intent of the episode in terms of content mastery. The teaching-learning behavior (T-L) describes the interaction between teacher and learner during content mastery. The outcome (-O) answers the question, to what degree were the objectives reached? Mosston and Ashworth (2002) referred to these components taken together as the "pedagogical unit" (p. 15). The proposition undergirding the Spectrum is that a particular teaching style will produce predictable learning conditions that, in turn, will produce expected learning outcomes. Will there be times when a particular episode doesn't work in producing expected outcomes? Of course, as is true in most human endeavors. But, there are reasons why it didn't work and those, in most cases, can be determined, and with persistence, rectified.

The key component in the O-T-L-O is the teacher-learner interaction. Teaching is a purposive activity. There is a purpose undergirding and driving the activity. But, regardless of the purpose, it is the teacher's behavior that the learner experiences and to which the learner responds. The Spectrum helps to bridge the gap between teacher intent and teacher behavior. Sicilia-Camacho and Brown (2008) expressed their concern about teachers losing their individuality and creativity when using the Spectrum. They contend that "any

pedagogical model that attempts to universalize and objectify will necessarily have to separate personhood from pedagogy, and thereby once again devalue and neglect the important issue of subjectivity" (p. 87). In our experience, just the opposite is the case. Because a Spectrum prepared teacher has an expanded repertoire of alternative teaching styles, s/he can select the style that best matches intent to reach a given objective. Using these styles with comfort and authenticity is critically important. Once again, Mosston's push towards identifying "universal" structures in pedagogy was not motivated by a desire to diminish the creativity or individualization of teachers.

The O-T-L-O identifies the critical elements of the teaching-learning process at the episode level. For any given episode, the O-T-L-O should be seamless. Teacher intent and behavior should be congruent, learning activities should clearly support intent, and outcomes should match objectives. If there is incongruity or discord among these elements, outcomes will not match objectives.

It is also important to appreciate that any teaching episode exists within a larger context. Most episodes are segments of a whole, a larger instructional enterprise. When we think about the O-T-L-O, we typically think in terms of an episode (within a lesson). Each episode has objectives, learning activities, and assessment. However, used more broadly, these same elements can serve when thinking about a unit of instruction or an annual instructional plan. At these levels, the language is more comprehensive and general, whereas at the episode level the language is very specific, but the elements and the relationship among the elements are the same. Furthermore, these same elements can be used even more broadly in discussing a system (e.g., a K–12 system, a college major, or a training program in industry). The organic and causative relationships among the elements of the O-T-L-O remain intact. What changes at these various levels are not the elements or their relationships, but the degree of specificity.

Perhaps a simple way to look at this dimension is in terms of a three level model (see Figure 4). The "micro" level would focus on a particular episode/lesson, the "meso" level focuses more at the unit or the year-long perspective, and the "macro" level offers the broadest perspective about the overall system. Each element of the O-T-L-O can be examined at each level. For the most part, teachers live at the micro level. Nevertheless, we must all be aware of this broader context and be cognizant of any incongruities between intent and action.
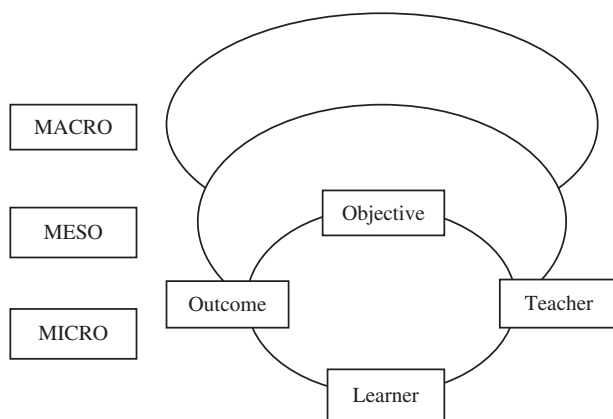
Figure 4. O-T-L-O three level schema (revised 2008).

Closing Remarks

For almost a half century, the Spectrum has remained a prominent force in teaching and research in physical education around the world. Today, it continues to be presented as a viable framework for the delivery of instruction in physical education by some (Harrison, Blakemore, & Buck, 2007; Mohnsen, 2010; Pangrazi & Beighle, 2010; Siedentop & Tannehill, 2000) and, by others, as instructional approaches useful for eliciting student learning (Graham, Holt/Hale, & Parker, 2010; Metzler, 2000; Rink, 2010; Tjeerdsma Blankenship, 2008). In the early 1970s, the Spectrum was espoused as "the most significant advance in the theory of physical education pedagogy even though it lacked having been the object of extensive research" (Nixon & Locke, 1973, p. 1227). In 1985 Metzler wrote, "the Spectrum . . . is one of the most, if not most, widespread conceptualizations of teaching in physical education today.. . . So many use it that the inherent concepts, assumptions, and implications are accepted as dogma" (p. 145). In 2000 he wrote that the Spectrum has "become one of the most influential books ever written on teaching in physical education" (Metzler, p. 12). Most recently, it has been suggested that the "logics embedded within teaching styles, and the Spectrum, have taken a central place in PE pedagogy to a point where they have become an almost taken-for-granted core logic for [methods of educational] knowledge transmission" (Sicilia-Camacho & Brown, 2008, p. 86).

Even though Mosston's (and Ashworth's) work has been highly touted over the years, there have been critics of the Spectrum. In their recent article, Sicilia-Camacho and Brown (2008) scrutinize the "versus" to the "non-versus" paradigm shift in the Spectrum between the first (Mosston, 1966) and second editions (Mosston, 1981) of *Teaching Physical Education*. These authors view this shift "in epistemological terms as an advance towards a positivism in physical education" (p. 85). They are concerned that the logics embedded in the "non-versus" issue will serve as an invitation to outside groups or agencies to place their own agendas upon physical education. A number of the critical arguments posed by these authors have been addressed in the *Retrospective* and *Refinements* sections of the present article.

In his 1985 publication, *On Styles*, Metzler criticized the Spectrum on several accounts including the overemphasis on teacher behavior, the lack of student process descriptions used, and the verification of styles. In addition, Locke (1977), Griffey (1983), Metzler (1985), and later Goldberger (1992), raised issues about the scarcity of Spectrum research conducted in the 1970s and the employment of inadequate research methodologies used in these early Spectrum studies. The Spectrum refinements described in this article address some of the problems Metzler identified in 1985. In terms of the quality of Spectrum studies conducted since the mid 1980s, researchers have paid close attention to the comments made by Locke, Griffey, Metzler, and Goldberger. Spectrum researchers have consistently verified style implementation, examined the styles according to the objectives related to each, studied the effects of the various styles on student learning, and proceeded to do research only after gaining a solid understanding of the Spectrum since the 1980s.

The influence of Spectrum teaching styles on variables associated with teaching and learning including student skill learning (Cleland, 1994; Goldberger & Gerney, 1986; Goldberger & Gerney, 1990; Goldberger, Gerney, & Chamberlain, 1982), student knowledge gains (Beckett, 1991; Cox, 1986; Jenkins & Byra, 1996), student behaviors (Byra & Jenkins, 1998; Byra & Marks, 1993; Griffey, 1983), and class climate, students' motivation, and student involvement (Chatoupis & Emmanuel, 2003; Digelidis, Papaioannou, &

Laparidis, 2003; Sanchez, Byra, & Wallhead, 2012) have been studied quite extensively during these years. So what have Spectrum researchers found? Teaching styles from both the reproduction and production clusters are effective in promoting motor skill acquisition in school-age and college-age students. Learners who formally engage in processes associated with assessing a partner's skill performance (reciprocal style) or their own skill performance (self-check and inclusion styles) have shown higher gains of knowledge compared to learners who receive instruction that does not require them to formally assess performance (command and practice styles). Students who are provided opportunity to make decisions about the level of task difficulty (inclusion style) report higher levels of autonomy and perceived control as well as higher levels of physical and cognitive involvement. These represent some of the general findings that support the theoretical assumptions associated with Spectrum teaching styles.

A comprehensive review of Spectrum research conducted between 1970 and 2000 is presented in an article published in *Quest* in 2000 (Byra, 2000). This article describes two eras of Spectrum research, an early era (1970s) and a more recent era (1980–2000), and how the research conducted during the 1970s influenced the quality of research conducted during the 1980s and 1990s. In 1992 Goldberger stated that Spectrum research conducted during the 1970s "was necessary for us to learn how to better conduct Spectrum research" (p. 42) in the 1980s and 1990s. A more recent review of Spectrum research has been published in *Studies in Physical Culture and Tourism* (Chatoupis, 2009).

To fully develop the theory surrounding an educational concept, critical analysis from scholars in the field is requisite. The critique and arguments presented by Locke (1977), Griffey (1983), Metzler (1985), and Goldberger (1992) about the Spectrum of teaching styles and Spectrum research certainly influenced the revisions made to the Spectrum in the third, fourth, and fifth editions of *Teaching Physical Education* (Mosston & Ashworth, 1986, 1994, 2002). The research questions asked and the methodologies employed to study these questions has also changed as a result of the analysis of the Spectrum research presented by these same four authors. The writing of this article in which the Spectrum is reviewed and five major Spectrum refinements made discussed in terms of the development of the Spectrum over the last 25 years was arguably at least partially stimulated by the critique put forth by Sicilia-Camacho and Brown (2008). Critique is needed to expand our understanding of theories and models, the Spectrum not withholding.

References

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.

Byra, M. (2000). A review of Spectrum research: The contribution of two eras. *Quest*, *52*, 229–245.

Byra, M., & 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., & Marks, M. C. (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.

Chatoupis, C. (2009). Contributions of the Spectrum of teaching styles to research on teaching. *Studies in Physical Culture and Tourism*, *16*, 193–205.

Chatoupis, C., & Emmanuel, C. (2003). The effects of two disparate instructional approaches on student self-perceptions in elementary physical education. *European Journal of Sport Science*, *3*(1), 1–16.

Cleland, F. E. (1994). Young children's divergent movement ability: Study II. *Journal of Teaching in Physical Education*, *13*, 228–241.

Cothran, D. J., Kulinna, P. H., Banville, D., Choi, E., Amade-Escot, C., MacPhail, A., . . . Sarmento, P., & Kirk, D. (2005). A cross-cultural investigation of the use of teaching styles. *Research Quarterly for Exercise and Sport*, *76*, 193–201.

Cox, R. L. (1986). A systematic approach to teaching sport. In M. Pieron & G. Graham (Eds.), *Sport pedagogy* (pp. 109–116). Champaign, IL: Human Kinetics.

Digelidis, N., Papaioannou, A., & Laparidis, K. (2003). A one-year intervention in 7th grade physical education classes aiming to change motivational climate and attitudes towards exercise. *Psychology of Sport and Exercise*, *4*, 195–210.

Dyson, B. (2002). The implementation of cooperative learning in an elementary physical education program. *Journal of Teaching in Physical Education*, *6*, 19–37.

Flanders, N. (1970). *Analyzing teaching behavior*. Reading, MA: Addison-Wesley Publishing.

Goldberger, M. (1992). The Spectrum of teaching styles: A perspective for research on teaching physical education. *Journal of Physical Education, Recreation, and Dance*, *63*, 42–46.

Goldberger, M., & 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., & 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., & 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.

Graham, G., Holt/Hale, S. A., & Parker, M. (2010). *Children moving: A reflective approach to teaching physical education* (8th ed.). Boston: McGraw Hill.

Griffey, D. C. (1983). Aptitude X treatment interactions associated with student decision making. *Journal of Teaching in Physical Education*, *3*, 15–32.

Harrison, J. M., Blakemore, C. L., & Buck, M. M. (2007). *Instructional strategies for secondary physical education* (6th ed.). Boston, MA: McGraw-Hill.

Jenkins, J., & 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.

Kulinna, P. H., & Cothran, D. (2003). Physical education teachers' self-reported use and perceptions of various teaching styles. *Learning and Instruction*, *13*, 597–609.

Locke, L. (1977). Research on teaching physical education: New hope for a dismal science. *Quest*, *28*, 2–16.

Metzler, M. W. (1985). On styles. *Quest*, *35*, 145–154.

Metzler, M. W. (2000). *Instructional models for physical education*. Boston, MA: Allyn and Bacon.

Mohnson, B. (Ed.). (2010). *Concepts and principles of physical education: What every student needs to know*. Reston, VA: AAHPERD.

Mosston, M. (1966). *Teaching physical education*. Columbus, OH: Merrill.

Mosston, M. (1981). *Teaching physical education* (2nd ed.). Columbus, OH: Merrill.

Mosston, M., & Ashworth, S. (1986). *Teaching physical education* (3rd ed.). Columbus, OH: Merrill.

Mosston, M., & Ashworth, S. (1994). *Teaching physical education* (4th ed.). New York, NY: Macmillan.

Mosston, M., & Ashworth, S. (2002). *Teaching physical education* (5th ed.). San Francisco, CA: Benjamin Cummings.

Nixon, J., & Locke, L. (1973). Research on teaching physical education. In R. Travers (Ed.), *Handbook of research on teaching* (2nd ed., pp. 1210–1242). Chicago, IL: Rand McNally.

Pangrazi, R. P., & Beighle, A. (2010). *Dynamic physical education for elementary school children* (16th ed.). San Francisco, CA: Benjamin Cummings.

Rink, J. E. (2010). *Teaching physical education for learning* (6th ed.). Boston, MA: McGraw Hill.

Sanchez, E., Byra, M., & Wallhead, T. (2012). Students' perceptions of the command, practice, and inclusion styles of teaching. *Physical Education and Sport Psychology*, *17*, 317–330.

Sicilia-Camacho, A., & Brown, D. (2008). Revisiting the paradigm shift from the *versus* to the *non-versus* notion of Mosston's Spectrum of teaching styles in physical education pedagogy: A critical pedagogical perspective. *Physical Education and Sport Pedagogy*, *13*, 85–108.

Siedentop, D., & Tannehill, D. (2000). *Developing teaching skills in physical education* (4th ed.). Mountain View, CA: Mayfield Publishing.

Tjeerdsma Blankenship, B. (2008). *The psychology of teaching physical education: From theory to practice*. Scottsdale, AZ: Holcomb Hathaway.