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ABSTRACT

The dual purposes of this study were to examine teachers' experiences with and perceptions of Mosston's Spectrum of Teaching Styles and to compare and contrast teachers' and students' perceptions of and experiences with the spectrum. A teaching styles survey instrument was also validated in this study. Participants were 212 physical education teachers from two states who completed a teaching styles instrument. Teacher data also were combined with student data from a companion study in order to compare teachers' and students' experiences and perceptions. Teachers had significantly different experiences using the spectrum of teaching styles as well as perceptions of the styles. Their perceptions also differed according to self-rated teaching ability related to using the styles. The most preferred teaching styles included practice, reciprocal, inclusion, divergent production, and guided discovery. Teachers and students also had significantly different experiences with the teaching styles and perceptions of the educational characteristics of the styles. (Contains 35 references.) (Author/SM)

# TEACHERS' EXPERIENCES WITH AND PERCEPTIONS OF MOSSTON'S SPECTRUM: HOW DO THEY COMPARE WITH STUDENTS?

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Abstract

The dual purposes of the study were to examine teachers' experiences with and perceptions of Mosston's Spectrum of Teaching Styles and to compare and contrast teachers' and students' perceptions and experiences with the spectrum. A teaching styles survey instrument also was validated in this study. Participants were 212 physical education teachers from two states who completed a teaching styles instrument. Teacher data also were combined with student data from a companion study (N=438) in order to compare teachers' and students' experiences and perceptions. Teachers had significantly different experiences using the spectrum of teaching styles as well as perceptions of the styles. Their perceptions also differed according to self-rated teaching ability related to using the styles. The most preferred teaching styles included practice, reciprocal, inclusion, divergent production and guided discovery. Teachers and students also had significantly different experiences with the teaching styles and perceptions of the educational characteristics of the styles.

# TEACHERS' EXPERIENCES WITH AND PERCEPTIONS OF MOSSTON'S SPECTRUM: HOW DO THEY COMPARE WITH STUDENTS?

It has been suggested that the teaching style used in physical education should match the content being taught and the cognitive style of the students (Goldberger, 1984; Mawer, 1993; Siendentop, 1991). Using a variety of teaching styles to match the various cognitive styles of students in classes may help teachers meet the intellectual strengths and needs of the many students they teach. The content being taught also often lends itself to particular teaching styles, for example aerobic dance taught with a traditional teacher directed style, such as Mosston's Command Style (Mosston & Ashworth, 1994).

Teachers' are becoming increasingly more aware of the cognitive diversity of students. This increased knowledge about how students' learn includes differences in learning style, self-regulation, and intelligences (Curry, 1999; Gardner, 1983; Zimmerman, 1990). This increased knowledge does not necessarily translate, however, into knowledge about how to teach different types of learners or how to apply the information to change curricular and instructional practices.

Matching the teaching style to the content being taught and learners' needs is consistent with the design of the Spectrum of Teaching Styles (Mosston & Ashworth, 1994). The authors suggest that different teaching styles are appropriate for achieving different learning outcomes in a variety of domain areas (i.e., physical, social, emotional, and cognitive development). Joyce and Weil (1986) have suggested that effective teachers master a repertoire of teaching styles. Teachers then use the style that is best suited for particular situations based on the needs of the students and lesson objectives. They need to use an array of styles that will foster learning and meet the developmental needs of students.

The spectrum is a unified theory of teaching transcending the cultural boundaries and individual characteristics of many other teaching models due to its basis in the human capacity to make decisions. Many of the other myriad of teaching models are fragmented, dealing with only part of the teaching phenomenon (e.g., thinking skills) without demonstrating the relationship to other aspects (Mosston & Ashworth, 1985). It is important to study and understand this unified theory of teaching in comprehensive ways encompassing all of the styles.

Mosston's Spectrum of Teaching Styles represents a continuum of decision making that runs the gamut from teacher centered to student centered. The spectrum has been in use and refined for over 25 years and continues to play a major role in the conceptualization of teaching in physical education. The current version of the spectrum (Mosston & Ashworth, 1994) is comprised of 11 different teaching styles including: (a) command, (b) practice, (c) reciprocal, (d) self check, (e) inclusion, (f) guided discovery, (g) convergent discovery, (h) divergent production, (i) learner's individual designed program, (j) learner initiated, and (k) self teaching. The purpose of the styles is varied (from reproducing knowledge to producing new knowledge).

Styles also vary in terms of who makes particular decisions related to the lesson (teacher or students), including decisions made prior to class, during class, and after class (e.g., evaluation).

Teachers' actions are not the only influence on students' engagement and learning. The cognitive mediation paradigm recognizes that students are active participants in their own learning. The perceptions students hold about teachers and their reactions to teachers' actions determine their engagement and learning (Doyle, 1977). Students' perceptions provide them with a framework for selecting strategies for learning or cognitive processes to use (Lee & Solmon, 1992). Influencing the perceptions of students are their attitudes, previous experiences, and knowledge giving each student a unique view of instructional events (Solmon & Carter, 1995).

Due to the different attitudes, experiences, and needs each brings to class, students and teachers may not always perceive instructional events in the same way. Discrepancies between the meaning assigned to the same class event by teachers and students have been shown at all levels of teaching, in classrooms (Cullingford, 1991; Farrell, Peguero, Lindsey, & White, 1988; Lunenberg & Volman, 1999; Kaufman & Holmes, 1996), as well as in physical education (Cothran & Ennis, 1997; Solmon et al., 1998). Students also may react differently to teaching styles than how they were intended by teachers (Wittrock, 1986). The reaction of students related to a particular education method may be negative if it is inconsistent with previous educational experiences (Cothran & Ennis, in press).

The majority of studies related to Mosston's spectrum compare the effectiveness of 2-3 teaching styles. They also tend to involve the investigation of different combinations of styles making it difficult to compare findings across studies. For example, Goldberg and Gerney (1986) found in a study of fifth grade students (N=328) practicing a hockey accuracy tasks with style B, C, or E, that students in the styles B and E groups showed significantly greater motor skill improvement than students in the style C group. Wilson (1997), on the other hand, did not find significant differences in motor skill improvement between third grade students (N=79) taught the overhand throw with styles B or C.

While the comparative studies provide meaningful, useful information for the field of physical education, little attention has been focused on teachers' overall perceptions of Mosston's Spectrum or their experiences with the 11 teaching styles that comprise the spectrum. Without comparing all of the styles across the same teachers, it is difficult to provide support for the spectrum or to make generalizations about it. As Metzler noted in 1983 there is a lack of sufficient research on the spectrum "...many of the concepts, implications, and assumptions set forth in the Spectrum have never been validated as appropriate instructional approaches." This situation still applies, to some degree, today. In addition, there also is a paucity of research investigating the student perspective and comparing teachers' and students' perceptions of the spectrum.

There were no studies located that investigated teachers' perceptions of the teaching styles as a primary focus for the study. One recent study investigated the perceptions of physical education teacher education (PETE) majors and faculty regarding the extent Mosston's spectrum is used and the exposure to it in teacher education programs. Significant differences were found among faculty members (N=153) regarding the extent to which they perceived they had adequately prepared PETE students to use the spectrum. Similarly, PETE students (N=1,415)

also differed in their perceptions that they were effectively prepared to use the spectrum (White, 1998).

Very few studies have investigated the student perspective as the primary focus. Cai (1997) found that college students' (N=121) preferences for teaching styles (i.e., command, reciprocal or inclusion) were influenced by the content of the course, with karate students preferring the command style and racquetball students favoring the reciprocal style. Similar attitude influence has been alluded to in other research papers. Boyce (1992), for example, reported that over 50% of college students (N=135) did not like the command style learning environment, even though it enabled superior skill acquisition.

In a previous study, students' perceptions and experiences with Mosston's Spectrum of Teaching Styles (N=438 students) were investigated. The results suggested that students' had more experience with the reproductive styles and that they differed in their perceptions of the value of the 11 teaching styles. Differing perceptions were related to gender, type of learner and course enrollment (Cothran, Kulinna, & Ward, 1999). The dual purposes of the present study were to examine physical education teachers' experiences with and perceptions of Mosston's spectrum of teaching styles and to compare and contrast teachers' and students' perceptions and experiences with Mosston's spectrum. Specifically, the following questions were investigated: (a) Does the Teachers' Perceptions of Teaching Styles instrument produce reliable and valid scores in a population of teachers? (b) Have teachers used the full spectrum of teaching styles with their classes? (c) Do teachers differentiate among educational characteristics (e.g., fun, learning, and motivation) of the teaching styles? (d) Are there teacher characteristics that influence their perception of different teaching styles? (e) How do teachers' experiences using the spectrum of teaching styles differ from students' experiences with the teaching styles? and (f) How do teachers' and students' differ in their ratings of overall perceptions and the educational characteristics of the teaching styles?

Understanding teachers' experiences with and perceptions of teaching styles is significant for a number of reasons. First, it is important to learn about teachers' perceptions and experiences with the spectrum due to its central role in the physical education literature and the paucity of available research investigating the entire spectrum. This information can be used to compare styles and make general inferences regarding the entire spectrum. Comprehending more about teachers experiences and perceptions related to the spectrum also can be used in the design of teacher in-service programs to promote the effective use of styles that are commonly used and to help teachers add new styles to their teaching repertoire as well as to inform teacher education programs. Comparing and contrasting teachers' and students' perceptions will lead to an increased understanding of how teaching styles affect the teaching-learning process and may lead to information that can be used to decrease the incongruities between teachers' and students' perspectives.

## Method

### Instrument Development

An existing instrument was modified in order to assess teachers' experiences with and perceptions of teaching styles. The original instrument was designed to assess students' experiences and perceptions of Mosston's Spectrum of teaching styles during their K-12 physical education experiences (Cothran, et al., 1999). The student instrument includes a scenario for each

teaching style followed by one question related to their experience with the style and three questions addressing their perceptions of the style. The instrument produced reliable and valid scores for the student participants in the validation study. The validation process included a pilot study, experts reviewing the content validity, and a reliability and validity study with 438 college students (Cothran, et al., 1999).

For the current study, the wording on the original instrument was slightly modified to reflect teachers' experiences and perceptions of Mosston's spectrum, rather than student experiences and perceptions. For example, question #2 was changed from "I think this way of teaching would make class fun" to " I think this way of teaching would make class fun for my students." The revised instrument includes a scenario for each of the 11 teaching styles followed by the four statements: (a) I have used this way to teach physical education, (b) I think this way of teaching would make class fun for my students, (c) I think this way of teaching would help students learn skills and concepts, and (d) I think this way of teaching would motivate students to learn. An example scenario and the related four items from the "Teachers' Perceptions of Teaching Styles" instrument is available in Table 1.

Participants

Participants for the current study were 212 physical education teachers from Indiana (n=58) and Michigan (n=154). Participants did not complete all of the demographic information questions or items on the instrument, thus, the total number of participants varies slightly for different aspects of this study. All of the participants were employed as physical education teachers, including 71 elementary, 36 middle/junior high, 31 high school teachers, and 74 individuals teaching at more than one level. Both genders were well represented (112 female and 96 males) in the sample. There also was a balance among years of teaching experience with teachers reporting 0-3 years (n=40), 4-10 years (n=66), 11-20 years (n=46) or over 20 years (n=58) of experience. The majority of participants reported their ethnicity as European American (90%), with a small number of participants indicating African-American, Hispanic, Multiracial or other.

Data Collection

The "Teachers' Perceptions of Teaching Styles" instrument was completed by participants in order to examine teachers' experience with and perceptions (i.e., fun, effectiveness, motivation) of the 11 teaching styles. Participants were recruited through inservice meetings, state level conventions, and mailings to teachers involved in state organizations. Teachers who agreed to participate in the study were given the following materials: (a) letter explaining the study, (b) informed consent form, (c) teaching styles instrument and (e) stamped return envelope. At the inservice meetings and conferences, teachers gave completed research materials directly to one of the first two authors. Teachers recruited through mailings sent completed research materials to the first author.

Teacher data is also being combined with student data from a companion study in order to compare and contrast teachers' and students' experiences with and perceptions of the spectrum of teaching styles. The wording of the items for students reflected their own K-12 physical education experiences rather than teaching. Parallel construction of the items on the teacher and student instruments allowed for aggregation of data from this study and the previous study (student data) for analyses comparing teachers and students experiences and perceptions of the 11 teaching

styles. The participants for the earlier phase of the study were 438 college students who reflected on their K-12 physical education experiences to complete the survey (Cothran, et al., 1999).

Data Analysis

Instrument. Tests were performed to determine if the "Teachers' Perceptions of Teaching Styles" instrument could produce reliable and valid scores in this population of teachers. The reliability of the scores was estimated through assessing the internal consistency among items using Cronbach's alpha. Reliability coefficients were estimated for all items related to teachers' perceptions of the teaching styles (i.e., Items 2-4 for all styles) and for perceptions of individual teaching styles (i.e., Items 2-4).

The construct validity of the scores produced by the instrument was examined through cross comparisons by self-rated level of teaching ability using MANOVA. Teachers' self-ratings were re-coded into three levels (i.e., very good, good, and average to not good). The last three foils were combined into a category called "average to not good" due to the small number of participants who rated themselves as "below average" or "not good" at using the teaching styles. Participants from one state were used for the ability analyses due to a very small sample in the second state. Construct validity also was measured with confirmatory factory (CFA) analysis using the AMOS program (Arbuckle, 1997). Items 2-4, that relate to teachers' perceptions of teachings styles were used in the factor analyses due to the strength of the relationship among the items (e.g., alpha=.90, for perceptions of styles A-K). In order to confirm the theoretical distinctions of reproductive and productive teaching styles, separate analyses were run for the reproductive teaching styles and the productive teaching styles. Confirmatory factor analyses were selected based on results from the students' perceptions of teaching styles study. The exploratory factor analysis results from the previous study of students' perceptions of teaching styles indicated that each style was an independent factor (Cothran et al., 1999).

Teachers experiences. A repeated measures ANOVA test was used to investigate significant differences among teachers' experiences with teaching styles. Repeated measures ANOVA with the repeated measure "I have used this way to teach physical education" was used to investigate differences among teachers in their use of the teaching styles. Contrast post-hoc tests were used to further investigate differences using a pattern of Style A to Style B, Style C to all previous styles, Style D to all previous styles, etc.

The number of styles taught by teachers was investigated by creating a new variable through the summation of the number of teaching styles that were reportedly taught (i.e., "used the style" recoded all responses except "never" and summed scores). Descriptive statistics were conducted on the new variable (i.e., number of styles taught) that represents the total number of styles taught out of 11.

A more in-depth investigation into teachers' experiences with the styles was conducted using linear regression to estimate the breadth of teachers' experiences with the styles. Two new variables were created for the analyses, teacher used the style (they answered rarely to always used the style) and total experience with the styles (sum of responses on the 11 experience questions of the instrument). Total attitude (weighted sum of questions 2-4) was the dependent variable and "teacher had used the style" and "total experience" were the predictor variables. Relationships

among frequency of experiences and perceptions were further investigated with correlational analyses.

Teachers perceptions. Repeated measures ANOVA tests were used to investigate significant differences among teachers' overall perceptions of the teaching styles (items 2-4). Differences in their perceptions of the beneficial aspects of the styles related to fun (item 2), effectiveness for learning (item 3), and motivation for learning (item 4) also were investigated with the individual items as the repeated measures.

Separate MANOVA tests were performed in order to determine if differences were present in teachers' perceptions of teaching styles based on gender, age, self-reported teaching ability, years of experience, length of class sessions, number of students, the environment (i.e., urban, suburban or rural), or the teaching level. Significant MANOVA tests were followed by Constrast post-hoc tests.

Teachers versus students experiences and perceptions. MANOVA also were used to investigate differences between teachers' and students' experiences with the teaching styles as well as their perceptions of the benefits of the teaching styles related to fun, effectiveness and motivation. Scheffe post-hoc tests were employed to follow-up on significant differences. Parallel items on the data sets allowed for the aggregation of teacher data with student data from a previous study for these particular analyses.

## Results

Instrument. Reliability scores (Cronbach's alpha) for teachers' perceptions of the individual teaching styles ranged from .82-.93 and for the overall instrument was .90. Significant differences were found among teaching ability groups. According to a significant MANOVA ($F(22, 130) = 1.82$, $p=.02$). there was a trend that as teachers became more confident using a variety of teaching styles, their perceptions of the styles became more favorable supporting the construct validity of the instrument.

Both confirmatory factor analyses provide evidence of an adequate fit of the data to the model thus, providing additional support for the construct validity of the "Teachers' Perceptions of Teaching Styles" instrument. The reproductive styles CFA, including items 2-4 related to perceptions of styles A (command) through E (inclusion) showed a good fit of the data to the model. Root Mean Square Residual [RMR] (.03), Goodness of Fit [GFI] (.93), and the Relative Chi Squared [$\chi 2$ ] (1.52) all support the fit and are within recommended fit guides. In addition to fit indices, the standardized regression weights (similar to factor loadings) were all high ranging from .77-.98. As the variable increases 1 unit, the regression weights indicate the change that is expected in the factor, with higher values suggesting a closer relationship.

The CFA for the productive styles, including perception items for styles F (guided discovery) through K (self-teaching) showed similar results. One of the teaching styles, however, was not related to the others (or was independent) and was deleted (style I). Fit indices for the productive styles also were within the recommended ranges for demonstrating fit of data to a model, including RMR=.02, (relates to error and should be small) GFI=.91, (unity is a perfect fit) and Relative $\chi 2$ =1.70 (ratio of 5 or less is reasonable, 2-5 suggests a good fit [Wheaton, 1977]).

Standardized regression weights also were high for the productive styles ranging from .76-.96. Confirmatory factor analyses support the differences among the teaching styles (with the exception of style I).

Teachers experiences. Repeated measures ANOVA results indicated that differences were present among teachers' experiences with the teaching styles ($F(10, 198) = 140.22$, $p<.01$). Refer to Table 2 for descriptive statistics related to teachers' experiences with the teaching styles. Teachers used between 3 and 11 styles ($M= 8.34$, $SD=1.98$). The following is a breakdown of the new variable "number of styles" reported the number of styles teachers indicated using in their physical education programs: 3 styles ($n=5$ teachers), 4 styles ($n=6$), 5 styles ($n=10$), 6 styles ($n=13$), 7 styles ($n=25$), 8 styles ($n=44$), 9 styles ($n=43$), 10 styles ($n=34$), and 11 styles ($n=31$). Thirty-one teachers reported having used all 11 of Mosston's teaching styles.

Along with the number of styles used, the breadth of experience also was investigated. Breadth of experience using the styles was calculated by creating new experience variables for the number of styles teachers reported under each frequency category from 5 "always" to 1 "never". For example, teachers total number of styles with a 5 or "always" became their experience score for "always taught", total number of styles with a 4 or "frequently" became their score for "frequently taught", etc. Results indicated that the more often teachers used a variety of styles, the higher their overall perceptions of all of the teaching styles based on an aggregated total perception score ($R=.37$, $p<01$). Style A (command) was the only style that did not show this relationship, presumably due to the fact that all teachers have used this style.

Correlating the new breath of experience variables with total perceptions also illuminated some interesting relationships. For styles that were "never" used by teachers, significant negative correlations were present with perceptions of all styles except A ($r=.029$). Infrequently used styles were negatively correlated with perceptions of style A ($r=-.167$, $p<.05$). Styles that were sometimes used also were negatively correlated to style A ($r=-.194$, $p<.01$) as well as positively related to style F ($r=.149$, $p<.05$). Frequently used styles were positively correlated with perceptions of most styles, that is, A-H ($r=.147$-$.207$, $p<.05$) and K ($r=.181$, $p<.01$). Finally, styles that were "always" used were positively correlated with style A ($r=.228$, $p<.01$) and negatively correlated with style F ($r=-.137$, $p<.05$).

Teachers perceptions. Repeated measures ANOVA results showed that differences were present among teachers' overall perceptions of teaching styles ($F(10, 202) = 60.43$, $p<.01$). Their perceptions were the most favorable for the practice (b), reciprocal (c), inclusion (e), divergent production (h), and command (a) teaching styles. Table 3 presents descriptive results related to teachers' overall perceptions of the teaching styles.

Differences also were present among teachers' ratings of the styles for fun, learning and motivation. The repeated measures ANOVA with fun (item 2) as the repeated measure ($F(10, 202) = 45.22$, $p<.01$) suggested that teachers hold various viewpoints about how fun the teaching styles are for their students. Teachers rated the practice, inclusion and divergent production styles as the three top styles that are fun for their students. The repeated measure ANOVA with learning (item 3) as the repeated measure ($F(10, 202) = 68.86$, $p<.01$) also supported differences among teachers' viewpoints regarding the effectiveness of various teaching styles in promoting student learning. The top three rated styles for learning were practice, reciprocal and command.

Finally, the repeated measures ANOVA with motivation (item 4) as the repeated measures ($F(10, 202) = 45.05$, $p<.01$) showed similar findings with the practice, reciprocal and inclusion styles rated the highest in terms of potential for motivating students to learn. Refer to Table 4 for descriptive results for all of the teaching styles related to fun, learning, and motivation.

Results from the MANOVA tests revealed that the three ability groups (i.e., very good, good, and average to not good) differed in their attitudes ($F(22, 130) = 1.82$, $p=.02$). Polynomial contrast follow-up tests showed significant linear contrasts for the guided discovery and convergent discovery styles. Self-rated high ability teachers indicated the highest perceptions of the guided discovery style ($m=11.91$), followed by the moderate ability ($m=10.62$) and the low ability groups ($m=9.97$). The same trend was observed for the convergent discovery style for high ($m=11.09$), moderate ($m=10.49$) and low ($m=9.63$) ability groups.

The MANOVA test investigating gender differences in teachers' perceptions was not significant ($F(11, 184) = 1.80$, $p=.057$). A trend was identified, however, suggesting that some variation may be present between genders due to differences in their perceptions of the divergent production style. The MANOVA test investigating differences in perceptions based on frequency of physical education classes was significant ($F(44, 562) = 2.05$, $p<.01$. Suggesting that differences in teachers' overall perceptions were influenced by the frequency of classes (i.e., from 1 to 5 times per week). Contrast follow-up tests showed differences for styles B-D and I-K. There were no clear trends, however, in teachers' perceptions based on the number of times they met with students per week. The remaining MANOVA tests did not suggest that significant differences were present among teachers' age differences ($F(44, 526) = .92$, $p=.63$), years of teaching experience ($F(44, 756) = 1.12$, $p=.27$), length of class sessions ($F(44, 522) = 1.27$, $p=.12$), number of students ($F(44, 262) = .94$, $p=.59$), urban, suburban or rural environment ($F(22, 214) = .64$, $p=.89$), or level of teaching ($F(22, 250) = .78$, $p=.75$).

Teachers versus students experiences and perceptions. The MANOVA tests comparing teachers and students suggested that significant differences were present in their experiences ($F(11, 620) = 21.44$, $p<.01$) and their perceptions of the teaching styles ($F(11, 616) = 11.25$ $p<.01$). There were significant differences related to perceptions of fun ($F(11, 625) = 11.44$, $p<.01$), effectiveness ($F(11, 632) = 9.36$, $p<.01$), and motivation ($F(11, 627) = 9.45$, $p<.01$) of Mosston's teaching styles between teachers and students.

Scheffe post-hoc tests revealed significant differences between teachers and students in their experiences and their perceptions of Mosston's Spectrum of teaching styles. Teacher and student experiences were significantly different for all of the teaching styles, except learner's individual designed program and self-teaching. Descriptive results suggest that students had more experience than teachers with the learner's individual designed program and learner initiated style, while teachers indicated more experience with all of the other teaching styles.

Teachers' and students' overall perceptions were different for all styles, except the command and self-teaching. Teachers had higher perceptions of the majority of the styles (i.e., command through divergent production), with higher student perceptions for three styles (i.e., learner's individual designed program through self-teaching).

Students and teachers also held significantly different perceptions of all of the styles related to their potential for fun, except for the command style. Teachers rated most of styles higher for fun than students (command through divergent production). Students perceived three styles as being more fun than teachers did, that is, the three styles with the largest number of decisions given to the students (i.e., learner's individual designed program, learner initiated, and self-teaching).

Similar trends were found related to teachers' and students' perceptions of the styles related to effectiveness for learning and for motivating students. Significant differences for both variables were found for all teaching styles, except the extreme styles (i.e., command and self-teaching). Again, teachers' rating of the styles for promoting learning and motivating students were higher for the command through divergent production styles, while students' ratings were higher for the last three styles (I-K).

## Discussion

### Teachers Experiences and Perceptions of the Styles

An instrument has been validated for use with K-12 physical education teachers to assess their experiences and perceptions of Mosston's teaching styles. The internal consistency measures showed that the instrument produced reliable scores. Content validity of the teaching scenarios that represent the eleven teaching styles was validated in an earlier study (Cothran et al., 1999). Construct validity was shown through ANOVA and CFA results. The majority of the results support the structure of the instrument representing eleven unique teaching styles. One style, learner's individual designed program (i.e., I), may not be an independent factor. When this style is implemented in physical education settings, it may be overly similar to the practice teaching style. In both styles, students work independently. The learner's individual designed program style, however, allows students to make most of the decisions about the learning experience. There were no published studies located investigating the learner's individual designed program teaching style.

Teachers reported using many of the teaching styles in their physical education programs, with a mean of eight styles. These findings suggest that teachers are using an array of teaching styles and may be considering a variety of important factors, such as the cognitive ability of the students and the content, when making teaching and learning decisions.

Younger teachers may have greater exposure to and use of Mosston's spectrum of teaching styles than older teachers, although the MANOVA test investigating differences in teachers' perceptions based on "years of teaching" was not significant in this study. White (1998) found in a study of faculty and PETE students' perceptions of the extent of use and exposure to Mosston's spectrum that there were some significant differences among the faculty related to years of teaching. An age trend was identified with younger teachers providing more exposure and use of the teaching styles.

Beyond the number of teaching styles used by teachers, the breadth of experience also provides a reflection of how the styles are used in physical education programs. Breadth of experiences with the teaching styles increased teachers' overall perceptions of the spectrum. Using the styles "frequently" also was positively related to teachers' perceptions of the majority of the individual styles (A-H and K). Along with the positive effects of frequency of use on

teachers' perceptions, a lack of use may have a negative outcome. Correlational tests revealed negative relationships between "never" using teaching styles and teachers' perceptions of the styles (except for the command style presumably due to the vast experience most teachers have with this style).

Correlational results also suggested that the guided discovery style (F) is pivotal in influencing teachers' perceptions. For example, having some exposure to teaching styles was positively related to their perceptions of style F. The guided discovery style is the first style in the productive cluster and may be the easiest style in this cluster for teachers to use. Experience with this style may influence teachers' perceptions of the other productive cluster styles.

Teachers' use of the productive styles is much lower than their use of the reproductive styles. Only one productive styles (divergent production) was in the top five styles that were used by teachers. Similar results were noted in the companion paper on students' experiences indicating that divergent production also was the only productive style reported in the top five styles students had experienced (Cothran et al., 1999). Lack of adequate preparation for teachers to use the productive styles (White, 1998) and a paucity of research on these styles (Goldberger, 1995; Metzler, 1983) have been reported.

Although teachers have had much less experience with the productive styles, two of them--divergent production (h) and guided discovery (f)--were ranked fairly high in teachers' overall perceptions (ranked 4th and 6th). The guided discovery style also has received high ratings by teachers in other studies (e.g., White, 1998). The few available studies investigating the effectiveness of styles in the productive cluster have had promising results. Cleland (1994) found an indirect teaching style increased students' ability to generate alternative movement responses on fundamental movement tasks in response to employing critical thinking skills. Similarly, Goldberger, Vedelli, and Pitts (1995) found that students' taught using the divergent production style had more success in solving problems than students taught with the practice style. The top three rated teaching styles by the teachers in this study in overall perceptions were the practice, reciprocal and inclusion styles, rated first through third, respectively.

Teachers' perceptions of the styles related to fun, learning, and motivation were similar to their overall perceptions of the teaching styles. One notable exception was teacher ratings of the command style as highly effective for learning with lower ratings for fun and motivation. This may be related to studies reporting the effectiveness of the command style (Boyce, 1992) and/or their experiences using the style. Although the command style has demonstrated its effectiveness, students have indicated that they do not enjoy using the style in physical education (e.g., Boyce, 1992). Students also have indicated significantly different perceptions of the command teaching style by self-rated learning ability in physical education. The high ability students indicated a preference for this style while low ability students had low ratings for this style (Cothran et al., 1999) suggesting that low ability students may be more successful when allowed to make choices in their learning experiences.

Self-rated teaching ability also played a role in teachers' perceptions of the teaching styles. Contrast follow-up tests suggested that differences among the ability groups related to using Mosston's styles (i.e., high, moderate, low) were due to teachers in the low and moderate

ability groups reporting lower perceptions of the productive styles. Less favorable perceptions may be related to having little or no experience using the productive styles.

Results related to teachers' experiences with and perceptions of Mosston's spectrum of teaching styles strongly support the need for increased teacher exposure and training related to the spectrum, particularly for productive cluster styles. Increased exposure to various teaching styles may lead to higher overall perceptions of the spectrum. Programs targeted at particular productive cluster styles that were highly rated by teachers such as divergent production, guided discovery, and convergent discovery, as well as the learner's individual designed program (ranked third in overall perceptions for students [Cothran et al., 1999]) are warranted. The results of this study also have important implications for teacher education programs. This is the place where future teachers need to learn how to use all of the spectrum's styles. White (1998) reported significant difference in PETE students and faculty perceptions related to how effectively the students were prepared to use the teaching styles comprising the spectrum. Her findings suggested that most students were adequately prepared to teach the command and practice styles, while very few were ready to use the learner-initiated and self-teaching styles (White, 1998).

Teachers Versus Students' Perceptions

Teachers' and students' expressed significantly different experiences with the spectrum of teaching styles. The number of teaching styles used reported by teachers (i.e., 8.34) is quite a bit higher than the number of styles that students have reported, including up to nine teaching styles with a mean of 5.44 (SD=2.26) during their K-12 physical education experiences.

Teachers and students often view teaching and learning events differently. Teachers' and students' overall perceptions for all the styles also were significantly different, except for the styles at the extremes of the spectrum (i.e., command, self-teaching). Descriptive analyses results suggest that teachers had higher overall perceptions of most of the teaching styles than students, with the exception of three styles--learner's individual designed program, learner initiated, and self-teaching. Higher student ratings for these three styles suggest that students might enjoy making more decisions in their physical education experiences.

The same relationships were observed between teachers' and students' ratings of the educational aspects of the teaching styles (i.e., fun, effectiveness for learning and motivation). Teachers gave styles A-H (i.e., command through divergent production) higher ratings for fun, learning, and motivation, while students rated styles I-K (learner's individually designed program through self-teaching) higher for these three areas.

Students found styles I-K more motivational than their teachers did. A classic leadership study (White & Lippitt, 1960) involving the investigated the behaviors of three groups of children in a club sport setting. Groups were lead by democratic, authoritarian or laissez-faire leaders. The children in the authoritarian group spent the most time working except when the leader left the room. Children in the democratic group remained on task during the leaders absence. This study suggests that if students are allowed to make some of the decisions in the learning process that they may become more intrinsically motivated to participate. Similarly, Goudas, Biddle, Fox and Underwood (1995) found in a study comparing a direct (practice) and a differentiated (inclusion) teaching style, that the differentiated style group was associated with

higher levels of intrinsic motivation, task goal involvement and lower levels of avoidance behaviors.

Further study is needed related to students' perceptions of the productive teaching styles I-K. Are physical education students ready to take on many of the instructional decisions and to be responsible for their own learning? Students may also see their participation in these indirect teaching styles as giving them control over the content and interactions with other students, thus enabling them to "do what they want". The dissimilarly between teachers' and students' values and the curriculum of most worth have been shown with the primary point of contention being the value of an educational focus with teachers showing a higher value for an educational focus while students highly valued time to socialize (Cothran & Ennis, 1997, 1998).

Even though students had higher perceptions for three of the productive styles than teachers, they held lower perceptions of the remaining eight teaching styles. Students' perceptions may improve with additional experience. The range of student responses related to their experiences with the styles went from only having experienced the command style to having experienced all 11 styles. The average number of styles experienced by students, however, was about five. The reactions of students to particular educational methods may be negative if they are different than their previous educational experiences (Cothran & Ennis, in press).

Although significant differences were observed between teachers' and students' overall perceptions of the teaching styles, there were some similarities. The five top rated styles for overall perceptions included four teaching styles from the reproductive cluster-- practice, inclusion, command and reciprocal--for both students and teachers. Students' also included the learner's individual designed program, while teachers' also favored the divergent production style.

One limitation related to this study was that teachers' and students perceptions' were not compared within the same classes due to the research design. The design included a balance of teachers from all three teaching levels. The participants in the companion study (Cothran et al., 1999) were college students enrolled in university activity classes in the areas of individual and dual sports, team sports, and fitness. College students were asked to reflect on their entire K-12 physical education experiences. Using college students instead of K-12 student participants, gave students an opportunity to reflect on their overall K-12 experiences when completing the instrument--rather than one particular setting. It also increased the likelihood that students were able to understand and accurately complete the questionnaire.

Summary

The "Teachers' Perceptions of Teaching Styles" instrument has been validated for use with physical education teachers. It can now be used to further study teachers' use and perceptions of the teaching styles. This study provides information about teachers' experiences with the spectrum of teaching styles as well as their current perceptions of the styles. It also extends our knowledge and understanding of teachers' and students' perceptions of the teaching-learning environment. Considering the differences and similarities between teachers' and students' views of instructional events, this is one step in the process. This study also may lead to information that can be used to decrease the incongruities between teachers' and students'

perspectives. It is important to continue this line of inquiry in order to gain a more thorough understanding of how teachers are currently using the spectrum of teaching styles in physical education programs and how teachers and students perceive the styles, including future in-depth investigations into students' views of the productive cluster styles. This will inform teacher education programs and can be used to improve the design of teacher inservice efforts.

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Table 2

Means and Standard Deviations for Teachers' and Students' Experiences with Mosston's Spectrum of Teaching Styles

| | Experiences with Teaching Styles | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Teachers | | | | Students | | | |
| | M | SD | MIN | MAX | M | SD | MIN | MAX |
| Command | 3.62 | .86 | 1 | 5 | 3.37 | 1.09 | 1 | 5 |
| Practice | 3.59 | .82 | 1 | 5 | 3.13 | 1.15 | 1 | 5 |
| Reciprocal | 2.93 | .91 | 1 | 5 | 2.25 | 1.17 | 1 | 5 |
| Self Check | 2.45 | 1.01 | 1 | 5 | 2.00 | 1.12 | 1 | 5 |
| Inclusion | 2.86 | 1.08 | 1 | 5 | 2.26 | 1.20 | 1 | 5 |
| Guided Discovery | 2.78 | .85 | 1 | 4 | 1.97 | 1.09 | 1 | 5 |
| Convergent Discovery | 2.66 | 1.04 | 1 | 5 | 2.08 | 1.10 | 1 | 5 |
| Divergent Production | 2.99 | 1.09 | 1 | 5 | 2.09 | 1.11 | 1 | 5 |

Table 1

Example Scenario and Items from the "Teachers' Perceptions of Teaching Styles Instrument"

The teacher asks students to discover a solution to a movement problem. The teacher asks students a series of specific questions and the students try out their answers until they discover the right answer that the teacher wanted them to discover.

| | Never | | Sometimes | | Always |
|---|---|---|---|---|---|
| 1. I have used this way to teach physical education. | 1 | 2 | 3 | 4 | 5 |
| | Strongly Disagree | | Okay | | Strongly Agree |
| 2. I think this way of teaching would make class fun for my students. | 1 | 2 | 3 | 4 | 5 |
| 3. I think this way of teaching would help students learn skills and concepts. | 1 | 2 | 3 | 4 | 5 |
| 4. I think this way of teaching would motivate students to learn. | 1 | 2 | 3 | 4 | 5 |

Note. Scenario for Guided Discovery Teaching Style.

Table 2 Continued

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Learner's Individual Designed Program | 1.88 | .98 | 1 | 5 | 2.00 | 1.17 | 1 | 5 |
| Learner Initiated | 1.57 | .87 | 1 | 5 | 1.83 | 1.11 | 1 | 5 |
| Self Teaching | 1.54 | .78 | 1 | 4 | 1.52 | .96 | 1 | 5 |

Note. MIN=minimum, MAX=maximum, n=212 teachers, n=438 students from a previous study (Cothran et al., 1999).

Table 3

Means and Standard Deviations for Teachers' and Students' Overall Perceptions of the 11 Teaching Styles Comprising Mosston's Spectrum

| | Overall Perceptions of Teaching Styles | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Teachers | | | | Students | | | |
| | M | SD | MIN | MAX | M | SD | MIN | MAX |
| Command | 10.33 | 2.50 | 3 | 15 | 9.91 | 2.74 | 3 | 15 |
| Practice | 11.59 | 2.14 | 3 | 15 | 10.88 | 2.70 | 3 | 15 |
| Reciprocal | 11.04 | 2.06 | 3 | 15 | 10.08 | 2.76 | 3 | 15 |
| Self Check | 8.92 | 2.83 | 3 | 15 | 7.88 | 3.18 | 3 | 15 |
| Inclusion | 10.94 | 2.42 | 3 | 15 | 10.33 | 2.84 | 3 | 15 |
| Guided Discovery | 10.32 | 2.35 | 3 | 15 | 9.18 | 2.88 | 3 | 15 |
| Convergent Discovery | 9.77 | 2.57 | 3 | 15 | 8.78 | 3.00 | 3 | 15 |
| Divergent Production | 10.81 | 2.45 | 3 | 15 | 9.27 | 2.93 | 3 | 15 |

Table 3 Continued

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Learner's Individual Designed Program | 9.20 | 2.61 | 3 | 15 | 10.19 | 2.93 | 3 | 15 |
| Learner Initiated | 8.03 | 2.78 | 3 | 15 | 8.81 | 3.05 | 3 | 15 |
| Self Teaching | 6.95 | 2.74 | 3 | 15 | 7.41 | 3.19 | 3 | 15 |

Note. MIN=minimum, MAX=maximum, n=212 teachers, n=438 students from a previous study (Cothran et al., 1999).

Table 4

Means and Standard Deviations for Teachers' and Students' Rating of Mosston's Spectrum of Teaching Styles for the Educational Components of Fun, Effectiveness for Learning, and Motivation in Descending Order

| Fun | | | | Learning Effectiveness | | | | Motivation | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Teachers | | Students | | Teachers | | Students | | Teachers | | Students | |
| Style | Mean (SD) | Style | Mean (SD) | Style | Mean (SD) | Style | Mean (SD) | Style | Mean (SD) | Style | Mean (SD) |
| B | 3.89 (.77) | B | 3.65 | B | 3.95 | B | 3.74 | B | 3.74 | B | 3.50 |
| E | 3.68 (.84) | E | 3.48 | C | 3.80 | A | 3.61 | C | 3.66 | I | 3.39 |
| C | 3.59 (.85) | I | 3.43 | A | 3.74 | E | 3.46 | E | 3.64 | E | 3.37 |
| H | 3.59 (.90) | C | 3.26 | E | 3.62 | C | 3.45 | H | 3.61 | C | 3.33 |
| F | 3.37 (.88) | J | 3.07 | H | 3.60 | I | 3.38 | F | 3.42 | A | 3.26 |
| A | 3.24 (.88) | A | 3.05 | F | 3.53 | F | 3.26 | A | 3.34 | H | 3.11 |
| G | 3.16 (.90) | H | 3.00 | G | 3.35 | H | 3.14 | G | 3.26 | F | 3.04 |
| I | 3.10 (.95) | F | 2.88 | I | 3.02 | G | 3.11 | I | 3.08 | G | 2.97 |
| D | 2.94 (.95) | K | 2.77 | D | 3.01 | J | 2.88 | D | 2.98 | J | 2.92 |
| J | 2.74 (.99) | G | 2.72 | J | 2.60 | D | 2.66 | J | 2.67 | D | 2.56 |
| K | 2.49 (1.06) | D | 2.68 | K | 2.14 | K | 2.32 | K | 2.33 | K | 2.34 |

Note. MIN=minimum, MAX=maximum, n=212 teachers, n=438 students from a previous study (Cothran et al., 1999).

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