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Physical education teachers' self-reported use and perceptions of various teaching styles

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Abstract

Increasing recognition of the constructivist nature of learning as well as the diversity of student learning styles highlights the need for teachers to use different teaching styles. Unfortunately, little is known about teachers' use and perception of various teaching styles. The purpose of this study was to explore physical education teachers' self-reported use and perceptions of various teaching styles. Participants were 212 physical education teachers representing a variety of elementary and secondary school settings. Teachers had significantly different experiences in the use and perceptions of the different teaching styles. Their perceptions also differed according to self-rated teaching ability related to using the styles.
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1. Introduction

What is the best way to teach? The search for that question's answer drives teachers' and researchers' actions on a daily basis, and has since the inception of education. One frequently discussed component of the "best way to teach" is the use of various teaching styles. A number of different teaching styles have been proposed that range from a focus on a singular style such as cooperative learning (Johnson & Johnson, 1994; Slavin, 1990) to a wider range of options (Joyce & Weil, 1986). No matter how the styles are conceptualized, however, the ability to teach in different ways to match the wide variety in students, content, and educational goals suggests that effective teachers should master multiple teaching styles.

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The increasing importance of teachers' mastery of various teaching styles is related to a number of developments within education. First, the increasing awareness of the constructivist nature of learning suggests traditional teacher centered styles may not maximize student learning. Whether viewed from a sociocultural or individually focused constructivist theory, a student's active engagement is a key to learning—an engagement likely promoted via a variety of teaching styles. A second factor supporting teachers' use of different teaching styles is the increasing diversity of students, and educators' better understanding of how to meet students' wide variety of learning needs. Students may vary in learning style (Curry, 1999), intelligence (Armstrong, 1994) or self-regulation (Zimmerman, 1990) to name but a few of the differences that affect how students learn. No matter what the differences, however, it remains the teacher's duty to reach all children and to do that teachers need an increased repertoire of methods (Bellanca, 1998). A third development promoting the use of various teaching styles is the current standards reform initiatives. Doolan and Hongsfeld (2000) suggest that by using more styles, teachers can increase student performance and meet the increasingly higher standards mandated by reform initiatives.

With so much support for the importance of different teaching styles, it would seem pertinent for educators to understand which styles are currently being used and how teachers perceive the ability of various styles to meet different educational goals. Unfortunately, there is little research that has been completed in this area. Much of the information shortage is due to the theoretical and practical difficulty of comparing multiple teaching styles since many of the styles are not linked in a common theoretical framework.

Perhaps the most comprehensive and coherent framework encompassing numerous styles is Mosston's Spectrum of Teaching Styles (Mosston & Ashworth, 2002) which has been in use and refinement for over 30 years. The spectrum represents a continuum from teacher centered to student centered and is an attempt to describe a unified theory of teaching that encompasses a wide array of teaching style options. The current version of the spectrum comprises 11 different teaching styles, which are denoted by the corresponding letters: (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. Although the model was specifically developed for physical education, it has also been proposed for and used by traditional academic subjects (Mosston & Ashworth, 1985; Mosston & Ashworth, 2002).

The purpose of the styles varies from reproducing knowledge (styles A–E) to producing new knowledge (styles F–K). The reproductive cluster styles are very similar to direct instruction guidelines as the teacher makes a vast majority of instructional decisions and students are directed to gain and utilize knowledge in ways designed by the teacher. In contrast, the productive cluster of styles includes the learner in decision making to promote the learner's involvement in the process of discovery and use of knowledge.

Byra (2000) provided an overview of research findings from the last 30 years related to the two different clusters. He found that the most commonly researched

cluster is the reproductive one, with the exception of the self check style which has been overlooked in research designs. In general, research findings suggest that the reproductive styles are all effective in promoting motor skill learning, although findings are particularly mixed for high and low skilled learners in the inclusion style. Style use also affects non-motor skill aspects of the learning environment. For example, more feedback is given to learners when using the reciprocal style and fewer anti-social behaviors occur with that style when compared to other reproductive styles.

The much smaller body of literature related to the productive cluster of styles was also addressed by Byra's (2000) synthesis. Overall findings suggest that students' experience and age influence their ability to produce divergent movement, the use of divergent style teaching leads to differences in children's movement patterns, and that divergent movement and critical thinking skills are related.

Although insightful, these spectrum studies provide limited generalizability as only a small number of styles and student ages are compared, and the teachers involved are part of a mandatory implementation which does not reveal their overall use of styles. Similar shortcomings are present in other style research using different models in general academic subject matter areas. What is needed, yet remains unknown, is the current status of teachers' use and perceptions of a wide variety of different teaching styles.

The purpose of this study was to address the gap in the literature related to teaching styles. As a first step, a research project focused on physical education teachers was designed. Physical education teachers were chosen for two reasons. First, it is important to investigate the potentially differential use of style at different grade levels and physical education is one of the few subject matter areas that has a large population of experts from kindergarten through to senior high school level. For example, it is nearly impossible to find maths educators who teach only maths at the primary grade level thus there is no way to compare typical primary teaching methods to senior high maths teaching methods. Second, physical education is unique in that a single teaching style framework, Mosston's spectrum, is so well developed and so widely included in physical education teacher education programs around the world. No other subject matter field has such a well delineated spectrum of styles that is so widely presented in teacher preparation.

The specific questions that guided this study were: (a) What styles do physical education teachers self-report using? (b) Do physical education teachers differ in their overall perceptions of the teaching styles? (c) Do physical education 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) Does the "Physical Education Teachers' Perceptions of Teaching Styles" instrument produce reliable and valid scores in teachers?

Understanding teachers' experiences with and perceptions of teaching styles is significant for a number of reasons. First, understanding more about teachers' experiences and perceptions related to various styles helps establish a baseline which can then be used in the design of teacher pre-service and in-service programs. For

example, programs might be designed to promote the more effective use of styles that are commonly used by teachers or to help teachers add new styles to their teaching repertoire. Understanding teachers' underlying perceptions of the ability of styles to reach different goals can also lend insight into educators' understanding of teacher pedagogical knowledge. The results can also inform teacher education programs as to what teaching styles are most commonly taught in schools and how better to prepare pre-service teachers to meet or exceed current practice.

2. Methods

2.1. 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, Kuliinna, & Ward, 2000). 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 reliabilities of the scores were estimated by assessing the internal consistency among items related to students' perceptions (i.e., items 2–4 for each style). The reliability assessments showed a high level of inter-item agreement among items for each style with Cronbach alpha coefficients ranging from 0.86 to 0.91. Construct validity of the scores produced by the instrument was measured using an exploratory factor analysis. The analysis extracted 11 factors with perfect correspondence to the 11 teaching styles with eigenvalues for the factors ranging from 7.11 to 1.05 and structure coefficients from 0.78 to 0.90. Additionally, the majority of the fitted residuals were less than 0.05. Each teaching style was a factor identified in the analysis. The validation process included a pilot study, content reviewed by experts, and a reliability and validity study with 438 college students (Cothran, Kuliinna & Ward, 2000).

For the current study, the wording on the original instrument was slightly modified to reflect teachers' self-reported use 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 (items 1–4): (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. The instrument includes a 5-point Likert-like scale (from 1=never and 5=always). The teaching scenarios from the "Physical Education Teachers' Perceptions of Teaching Styles" instrument are summarized in Table 1.

Table 1
Teaching style scenarios

A	Command	The teacher breaks down the skills into parts and demonstrates the right way to perform the skill. Students try to move when and exactly how the teacher tells them. The teacher provides feedback and the students try to look like the teacher's model.
B	Practice	The teacher makes several stations in the gym where students work on different parts of a skill or different skills. Students rotate around the stations and do the tasks at their own pace. The teacher moves around and helps students when needed. Two students work together on a task that the teacher has designed. One student practices while the other student gives feedback to the partner. The students might use checklists to help them give good feedback to each other.
C	Reciprocal	Students work alone on a task and check their own work. The teacher might give them a checklist so that the students can provide feedback to themselves while they learn the task.
D	Self check	The teacher designs a learning task and there are several levels of difficulty. Students choose the level at which they want to work. Students can decide to make the task easier or harder by changing levels of the task to match their ability.
E	Inclusion	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.
F	Guided discovery	Students try to learn a skill or concept by using logical reasoning. The teacher asks a question and students try to reason and think about different solutions. By critically thinking about the question and trying solutions, students can discover the single, right answer.
G	Convergent discovery	The teacher asks students to solve a movement question. The students try to discover different movement solutions to the teacher's question. There are multiple ways for the students to answer the question correctly.
H	Divergent production	The teacher picks the general subject matter, but the student makes most of the decisions about the learning experience. The student decides what will be learned as well as how it will be learned. The teacher and student set some basic criteria, but the student is responsible for all the decisions about how and what to learn. The teacher can help with information if the student needs it.
I	Learner's individual designed program	The student decides everything about learning something new. They even decide if they want to involve the teacher or not. The student needs it.
J	Learner initiated	The student decides what will be learned as well as how it will be learned. The teacher and student set some basic criteria, but the student is responsible for all the decisions about how and what to learn. The teacher can help with information if the student needs it.
K	Self teaching	The student decides everything about learning something new. They even decide if they want to involve the teacher or not. The student needs it.

After much deliberation on the issue, no attempt was made in the research design to define what constituted “use” of a style for the teachers. For example, is a 5 minute portion of class in which students are engaged in a reciprocal style task before transitioning to a divergent production style for the remainder of the class, the use of one or two styles? The “correct” answer could be either “one” or “two”, as it is possible to use multiple styles in a single lesson assuming the basic tenets of each style are adhered to regardless of the time involved. Since this research focused on teachers’ perceptions it was determined that the teacher was the expert on what constituted a style use for the purposes of this study. If the teacher believed his/her teaching matched the style description on the instrument, the teacher’s perception of style use was considered valid.

2.2. Participants

Participants for the study were 212 physical education teachers from the United States. 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 Caucasian (90%), with a small number of participants indicating African-American, Hispanic, Multiracial or other. A few participants did not complete all of the demographic information items on the instrument therefore the total number of participants varies slightly for different aspects of this study. All participants, however, completed the entire teaching style portion of the instrument.

2.3. Data collection

The “Physical Education Teachers’ Perceptions of Teaching Styles” instrument was completed by participants in order to examine teachers’ self-reported use and perceptions (i.e., fun, effectiveness, motivation) of the 11 teaching styles. Participants were recruited through professional development meetings, and mailings to teachers involved in state professional organizations. Teachers who agreed to participate in the study were given the following materials: (a) a letter explaining the study, (b) informed consent form, (c) teaching styles instrument and (e) stamped return envelope. At the professional development meetings, teachers gave completed research materials directly to one of the two authors. Teachers recruited through mailings sent completed research materials to the first author.

2.4. Data analysis

2.4.1. Instrument

The reliability and validity of the scores produced by the modified teacher instrument were first examined. The reliabilities of the scores were 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) and for perceptions of individual teaching styles (i.e., Items 2–4 for each style separately).

Cross-comparison by self-rated level of teaching ability were conducted using MANOVA in order to add support for the construct validity of the instrument. The last three level options on the self-rated teaching ability question were combined into a category called “average to not good” due to the small number of participants ($n=8$) who rated themselves as “below average” or “not good” at using teaching styles.

Construct validity also was verified with confirmatory factor (CFA) analyses using the AMOS program (Arbuckle, 1997). Items 2–4 for each style, which relate to teachers’ perceptions of teachings styles (total items=33) were used in the factor analyses due to the high correlation among the items (e.g., $\alpha=0.90$, for perceptions of styles A–K). In order to confirm the theoretical distinctions of the reproductive and productive clusters, separate analyses were run for the reproductive cluster (i.e., styles A–E) and the productive cluster (i.e., styles F–K). The best source of ideas for respecification (in this case two separate analyses) is theoretical knowledge (Bollen, 1989). 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. As discussed earlier, the factor analysis extracted 11 factors with exact correspondence to the 11 teaching styles (Coltrán, Kulinna & Ward, 2000).

2.4.2. Teachers’ self-reported use of styles

A repeated measures ANOVA was used to investigate differences among teachers’ experiences using the teaching styles. The use of teaching styles was defined based on their response to the item “I have used this way to teach physical education” in the instrument. Post-hoc contrasts were used to further investigate differences among styles if the repeated measures ANOVA was statistically significant.

The number of styles used by teachers was investigated by creating a new variable: (a) recoding the use of each teaching style “1=never used” as “0” and the rest (from “2” to “5”) as “1” and (b) summing the recoded items together for all the styles. Descriptive statistics were conducted on the new variable (i.e., number of styles used) that represents the total number of styles used out of 11.

2.4.3. Teachers’ perceptions

Repeated measures ANOVAs were used to investigate differences among teachers’ overall perceptions of the teaching styles (summed items 2–4 for each style). 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. Post-hoc contrasts again were used to further investigate statistically significant differences among styles.

Separate MANOVAs were performed in order to determine if differences were present in teachers’ perceptions of teaching styles based on gender, frequency of

classes, age, number of years taught, length of class sessions, number of students, the environment (i.e., urban, suburban or rural), or the teaching level. Significant MANOVAs were followed by post-hoc contrast analyses. An alpha value of 0.05 was used throughout the analyses to identify statistically significant findings.

3. Results and discussion

3.1. Instrument

Reliability scores (Cronbach's alpha) for teachers' perceptions of the individual teaching styles ranged from 0.82–0.93 and for the overall instrument was 0.90. Both confirmatory factor analyses provide evidence of an adequate fit of the data to the model, thus giving additional support for the construct validity of the "Physical Education 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] 0.03 (relates to error and should be small), Goodness of Fit [GFI] 0.93 (unity is a perfect fit), and the Relative Chi Squared [χ^2] 1.52 (ratio of 5 or less is reasonable, 2–5 suggests a good fit [Wheaton, Muthen, Alwin, & Summers, 1977]) 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 0.77–0.98. 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=0.02, GFI=0.91, and Relative χ^2 =1.70. Standardized regression weights also were high for the productive styles ranging from 0.76–0.96. Confirmatory factor analyses support the differences among the teaching styles (with the exception of style I).

3.2. Teachers' experiences

Repeated measures ANOVA results indicated that differences were present among teachers' use of teaching styles ($F(10, 198)=140.22, p<0.05$). Contrast post-hoc analyses suggested that differences were present among all styles. Refer to Table 2 (left column) for descriptive statistics related to teachers' use of 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" that 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

Table 2
Means and standard deviations for teachers' use and perceptions of styles

Style	Experience Mean (SD)	Perceptions Mean (SD)
Command	3.62 (0.86)	10.33 (2.50)
Practice	3.59 (0.82)	11.59 (2.14)
Reciprocal	2.93 (0.91)	11.04 (2.06)
Self check	2.45 (1.01)	8.92 (2.83)
Inclusion	2.86 (1.08)	10.94 (2.42)
Guided discovery	2.78 (0.85)	10.32 (2.35)
Convergent discovery	2.66 (1.04)	9.77 (2.57)
Divergent production	2.99 (1.09)	10.81 (2.45)
Learner's individual designed program	1.88 (0.98)	9.20 (2.61)
Learner initiated	1.57 (0.87)	8.03 (2.78)
Self teaching	1.54 (0.78)	6.95 (2.74)

Note. Scores for experience ranged from 1–5 and for overall perceptions from 3–15; $n=212$ teachers.

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.

3.3. Teachers' perceptions

Repeated measures ANOVA results showed that differences were present among teachers' overall perceptions of teaching styles ($F(10, 202)=60.43, p<0.05$). Contrast post-hoc analyses suggested differences were present among all styles. Their perceptions were the most favorable for the practice (b), reciprocal (c), inclusion (e), divergent production (h), and command (a) teaching styles. Table 2 (right side) also presents descriptive results related to teachers' overall perceptions of the teaching styles.

Significant differences in perceptions were found among self-rated teaching ability groups, according to the MANOVA results ($F(22, 138)=1.82, p<0.05$). There was a trend that as teachers became more confident about their teaching ability using a variety of styles, their perceptions of the styles became more favorable supporting the construct validity of the instrument. Post-hoc polynomial contrasts investigating differences in teachers' perceptions by ability group 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 ($M=11.91, SD=2.43$), followed by the moderate ability ($M=10.68, SD=2.16$) and the low ability groups ($M=9.72, SD=2.36$). The same trend was observed for the convergent discovery style for high ($M=11.09, SD=2.12$), moderate ($M=10.61, SD=2.33$) and low ($M=9.42, SD=2.00$) ability groups.

To further understand differences in teachers' perceptions of the educational characteristics, their ratings of the styles for fun, learning and motivation were individually investigated. The repeated measures ANOVA with fun (item 2) as the

repeated measure ($F(10, 202)=45.22, p<0.05$) suggested that teachers hold various viewpoints about how fun the teaching styles are for their students. Contrast post-hoc tests indicated all styles were significantly different from each other. Teachers rated the practice, inclusion and divergent production styles as the three top styles that are fun for their students.

The repeated measures ANOVA with learning (item 3) as the repeated measure ($F(10, 202)=68.86, p<0.05$) also supported differences among teachers' viewpoints regarding the effectiveness of various teaching styles in promoting student learning and post-hoc analyses showed significant differences were present among all styles. The top three rated styles for learning were practice, reciprocal and command.

Finally, the repeated measures ANOVA with motivation (item 4) as the repeated measure ($F(10, 202)=45.05, p<0.05$) showed similar findings with the practice, reciprocal and inclusion styles rated the highest in terms of potential for motivating students to learn. Contrast post-hoc tests again indicated significant differences among all styles. Refer to Table 3 for descriptive results for all of the teaching styles related to fun, learning, and motivation.

To understand differences in perceptions related to teacher characteristics MANOVAs were performed. The MANOVA investigating gender differences in teachers' perceptions was not significant ($F(11, 184)=1.80, p=0.057$). To explore whether time limitations influence teachers' perceptions of teaching styles for use in physical education classes, a MANOVA investigating differences in perceptions based on frequency of physical education classes (i.e., number of days classes met per week from 1 to 5) was performed. It was significant ($F(44, 562)=2.05, p<0.05$), suggesting that differences in teachers' overall perceptions were influenced by the frequency of classes. Contrast follow-up analyses showed differences in teachers' perceptions of styles B–D and I–K. There were no clear trends, however, in teachers'

Table 3
Means and standard deviations for teachers' rating of various teaching styles for the educational components of fun, effectiveness for learning and motivation in descending order

Fun style	Mean±SD	Learning style	Mean±SD	Motivation style	Mean±SD
B	3.89±0.78	B	3.95±0.81	B	3.75±0.84
E	3.69±0.85	C	3.80±0.75	C	3.67±0.82
C	3.55±0.79	A	3.73±0.93	E	3.63±0.90
H	3.60±0.88	E	3.61±0.88	H	3.63±0.85
F	3.36±0.87	F	3.61±0.83	F	3.41±0.90
A	3.23±0.88	H	3.52±0.81	A	3.32±0.94
G	3.14±0.91	G	3.33±0.94	G	3.26±0.93
I	3.12±0.94	I	3.05±0.91	I	3.09±0.96
D	2.95±0.95	D	3.01±1.01	D	2.98±1.03
J	2.73±0.98	J	2.60±1.04	J	2.68±1.01
K	2.48±1.06	K	2.16±0.94	K	2.31±1.02

Note: $n=212$ teachers.

perceptions based on the number of times they met students per week. The remaining MANOVAs did not suggest that significant differences were present among teachers' age differences ($F(44, 526)=0.92, p=0.63$), years of teaching experience ($F(44, 756)=1.12, p=0.27$), length of class sessions ($F(44, 522)=1.27, p=0.12$), number of students ($F(44, 262)=0.94, p=0.59$), urban, suburban or rural environment ($F(22, 214)=0.64, p=0.89$), or level of teaching ($F(22, 250)=0.78, p=0.75$).

3.4. Discussion

These findings provide initial insights into teachers' use of teaching styles across a theoretically linked spectrum. Although these results are specific to physical education teachers and Mosston's Spectrum of Teaching Styles, this first step in exploring teachers' use of styles is an important one. The findings suggest issues that are worthy of further discussion and research.

Teachers' overall perceptions of the teaching styles were similar to their individual ratings of the styles for fun, learning, and motivation. One notable exception was teacher ratings of the command style as highly effective for learning with lower ratings for fun and motivation. Although the command style has demonstrated its learning effectiveness, Boyce (1992) found that students did not enjoy using this style in physical education. Yet in other movement activities (i.e., aerobics, martial arts) students seem to willingly embrace the very direct instruction format of command style. Future research is needed to clarify why the command style with some movement forms in some settings is viewed positively, or alternatively, why those students in command environments such as aerobics continue to engage in those movement forms despite disliking the teaching style.

Teachers reported using many of the styles in their classes, however, their use of the productive styles was much lower than their use of the reproductive styles. Only one productive style (divergent production) was in the top five styles used by teachers. Similar results were noted in the companion paper on students' experiences indicating that divergent production was also the only productive style reported in the top five styles students had experienced (Cothran, Kulimna & Ward, 2000). It is encouraging that teachers report the use of many styles, but these results must be interpreted cautiously as prior research suggests that teachers over-estimate the variety of teaching behaviours they use (Mosston & Ashworth, 2002).

Although teachers report less use of the reproductive styles, two of them—divergent production and guided discovery—were ranked fairly high in teachers' overall perceptions (ranked 4th and 6th).

If teachers believed those styles to be effective, why were they not used as much as the productive cluster styles? Perhaps teachers remain unconvinced or unsure of the style's use because of the lack of confirmatory research on these styles (Goldberger, 1995). More likely, the teachers' lack of experience with the styles is a factor as teachers were less likely to have experienced the styles as students in physical education classes, or in their pre-service programs (White, 1998). This lack of experience and exposure impacts teachers' efficacy and consequently their use of the styles. Results from post-hoc contrasts 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. White (1998) found that most pre-service teachers felt adequately prepared to teach the command and practice styles, while very few were ready to use the learner-initiated and self-teaching styles.

This relationship between perceived ability and use of teaching styles is suggestive for pre-service and professional teacher development. Programs targeted at particular productive cluster styles that were highly rated, but not frequently used by teachers such as divergent production, guided discovery, and convergent discovery, as well as the learner's individual designed program are warranted. These results and White's (1998) findings also suggest that teacher educators must re-examine their effectiveness in the teaching of teaching styles as White reported significant difference in student and faculty perceptions related to how effectively the students were prepared to use the teaching styles comprising the spectrum.

Also related to professional development and change is the intriguing relationship between those styles that were perceived well, but not frequently used. Traditional change models attempt to improve a teacher's attitude toward the innovation and then it is presumed that the teacher's positive attitude will motivate the teacher to implement and maintain the change. Guskey (1986), however, argues that for change to occur, teachers must first see positive results in their own settings from the innovation and then their attitudes toward the innovation will be more positive thus promoting further use. These findings seem to support Guskey's contention that attitude alone will not change teacher behaviour, as these teachers held overall positive attitudes, but still did not use the indirect styles as frequently as they did the direct styles. If Guskey's model is correct, then teachers at all levels need multiple opportunities to practice the styles in controlled environments as well as in classroom setting. Those teaching opportunities must be accompanied by support, feedback, and reflection on the use and outcomes of the style.

It is also possible that the teachers had the ability to teach the productive cluster styles, but intentionally chose not to do so. If it was an intentional choice by the teachers, one possible reason might be student control. Many teachers value class control over class learning (Cothran & Ennis, 1997), and the reproductive styles initially appear to offer more control as all students are engaged in similar tasks producing similar outcomes. Future research is needed to clarify why teachers did not implement the productive cluster styles despite their positive views towards at least some of the styles in the cluster.

It was somewhat surprising to find that a teacher's individual (i.e., gender, experience) and school characteristics (i.e., number of students and location) did not significantly influence the teachers' self-reported use or perceptions of styles. In particular, the lack of influence of teaching level on style use is intriguing. It is possible that the content of physical education is so similar across grade levels that similar teaching strategies are appropriate regardless of the developmental level of students. It might also be possible that teachers are not being adequately prepared to address the developmental needs of learners at different age levels. Many physical education teachers are certified to teach from kindergarten to senior high school, a

professional demand on their knowledge base that exceeds other subject matter experts who more typically specialize in a specific age group.

This study provides initial insights into physical education teachers' self-reported use and perceptions of various teaching styles. The teaching style "picture", however, is far from complete. It is important to continue this line of inquiry in order to gain a more thorough understanding of how teachers are currently using various teaching styles in a variety of subject matter areas and across age groups. With increased understanding of teachers' current practices, educators are better prepared to maximize and/or change teacher practice to improve student learning opportunities.

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