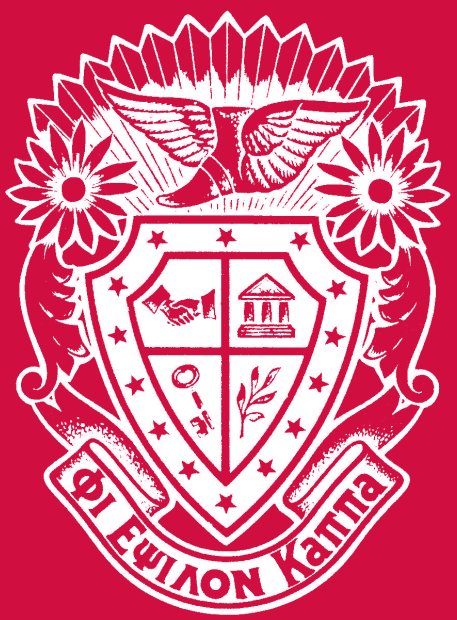
The Physical Educator

Volume 75 Early Winter 2018 Number 5



A PUBLICATION OF

Phi Epsilon Kappa Fraternity

THE PHYSICAL EDUCATOR
Early Winter 2018
Volume 75, Number 5

The Physical Educator

(ISSN print: 0031-8981; online: 2160-1682)
(USPS 431-220)

of Phi Epsilon Kappa

THE OFFICIAL PUBLICATION OF
PHI EPSILON KAPPA FRATERNITY

Phi Epsilon Kappa

CONTENTS

THE PHYSICAL EDUCATOR (Print ISSN: 0031-8981, Ejournal ISSN: 2160-1682) is published five times a year in the spring, summer, fall, early winter, and late winter by Sagamore Publishing, 1807 N. Federal Drive, Urbana, IL 61801.

POSTMASTER: Send address changes to *The Physical Educator*, Sagamore Publishing, 1807 N. Federal Drive, Urbana, IL, 61801.

The Phi Epsilon Kappa web page is located at http://www.phiepsilonkappa.org

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Terre Haute, IN 47802

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Sagamore Publishing LLC
1807 N. Federal Drive
Urbana, IL 61801

The Physical Educator
(TPE) Volume #76
Print ISSN: 0031-8981 | Online ISSN: 2160-1682
Five issues annually | Print and electronic archives

	Online	Both
Ind.	$140.00	$180.00
Ind. (Int'l)	$140.00	$196.00
Inst.	$498.00	$548.00
Inst. (Int'l)	$498.00	$586.00

http://bit.ly/2Jn7fgk

Average number of copies printed per issue (net press run) during the preceding 12 months is 7679; number of copies nearest to filing date is 1408. Average number of copies of each issue distributed in mass mailing to subscribers during the preceding 12 months is 6796; number of copies nearest to filing date is 1334. Average number of copies of each issue distributed free during the preceding 12 months is 33; number of copies nearest to filing date is 8.

Send address correspondence concerning subscriptions and change of address to Membership/Subscription Department, *The Physical Educator*, Sagamore Publishing, 1807 N. Federal Drive, Urbana, IL 61801. Make check or money order payable to Sagamore Publishing, order online at www.sagamorepublishing.com, or call 800-327-5557.

The Physical Educator Vol. 75 • pp. 739–755 • 2018
https://doi.org/10.18666/TPE-2018-V75-I5-8293

ASSESSMENT

Accuracy of a Peer Process Assessment Performed by Elementary Physical Education Students

Andrew E. Alstot

Abstract

The practice of peer assessment has been widely recommended for use in physical education (PE) classes. However, it is unknown how accurately students in lower elementary grades can assess peers' performance. Therefore, this study examined the accuracy at which students in lower elementary PE perform peer assessments of a throwing skill. Students in first, second, and third grades conducted assessments of peers' overhand throw performance once per week for 4 weeks. Sessions were video recorded; a researcher viewed the videos and examined participants' assessments for accuracy. Results indicate that students in lower elementary grades can assess peers' performance with a relatively high degree of accuracy, with third graders performing significantly better than their younger counterparts. Results also show that students can accurately perform a peer process assessment immediately after a reasonably short assessment training session. It can be concluded that physical education teachers can implement peer process assessments with young students with the confidence that they will be conducted accurately.

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Physical education (PE) students benefit greatly from receiving fast and accurate feedback on motor performance (Fredenburg, Lee, & Solmon, 2001; Silverman, Tyson, & Krampitz, 1992); this augmented feedback maximizes learning and student achievement within the PE environment. However, when class sizes grow exceedingly large, it becomes nearly impossible for teachers to provide this feedback consistently to all students directly. One suggested solution to this problem is the use of peer assessments (Kniffin & Baert, 2015; Lund & Veal, 2013; Veal, 1995). Peer assessments where students observe a partner's performance of a motor skill and make judgments on the quality of that performance can allow for all students in a class to receive augmented feedback on their skill behavior, thus maximizing the opportunity for motor learning within the PE context. However, despite the recommendations for the use of peer assessments, little evidence indicates the ability of students in elementary PE to correctly complete an assessment of their peers' performance of a motor skill and thereby provide accurate augmented feedback. Therefore, this study examined the accuracy at which lower elementary students can perform a peer process assessment in PE.

Benefits of and Recommendations for Using Assessments in Physical Education

Using assessments within PE has a variety of potential benefits. Formalizing the assessment process demonstrates to students that the content within PE has inherent value (Kniffin & Baert, 2015; Reeves, 1986), thereby improving the likelihood that students will understand the importance of the activities being assessed (Kniffin & Baert, 2015) and possibly increasing their motivation for engagement in PE activities (Tan & Wright, 2004). This process also allows students to receive important feedback about their performance (Reeves, 1986) in the short and long term (Veal, 1988), aiding in the facilitation of learning within a PE class (DeJong, Kokinakis, & Kuntzleman, 2002; Veal, 1992). Assessments can also provide evidence to school administrators and parents regarding the educational process that occurs in PE (Reeves, 1986). Finally, teachers can evaluate the data gathered from the assessment process to make informed judgments about teaching effectiveness (Fencl, 2014); the main role of a teacher is to facilitate learning, and the only way to

know if learning has occurred in a PE class is for assessments to be successfully administered (Kniffin & Baert, 2015). The use of assessments within PE has many potential benefits for students, teachers, and administrators.

The most fundamental purpose of using assessments within PE, however, should be to help students learn (DeJong et al., 2002; Veal, 1992). Teachers can link assessments to their instruction (Veal, 1992) with the purposes of helping students achieve the national standards for PE (DeJong et al., 2002); if this is done effectively, ultimately students will be learning and achieving within the PE environment. Fencl (2014) suggested using multiple forms of assessment within a class; as students have different learning styles, using various forms of assessments can help teachers to target this variety of learning styles, thereby increasing the potential for learning and performance of PE students.

To accomplish this, teachers can implement published assessments in their classes, such as PE Metrics (Fisette & Franck, 2012), or create their own (Lund & Veal, 2013). Veal (1995) suggested a variety of ways that teachers can implement the assessment process into PE to measure an assortment of psychomotor skills: (a) assessments can be performed by the teacher, by the students themselves, or by student peers; (b) assessments can measure the product of performing motor skills, such as the number of shots made in basketball, long-jump distance, or mile run time; and/or (c) assessments can evaluate the process of performing a skill (Veal, 1995), such as the technique the participant uses to perform a golf swing or an overhand throw in softball.

Veal (1992) also distinguished between formative and summative assessment—formative assessments occur concurrent with instruction, are ongoing and recurring, and focus on the process of student learning, while summative assessments usually occur at the end of an instructional unit, assessing how much a student has learned, and are typically associated with grading and evaluation. Both formative and summative assessments have important roles within PE instruction, but formative assessments, because of their effective use as tools that aid in student learning, are recommended for more frequent use. Regardless of whether teachers implement teacher-, self-, or peer-directed assessments, whether the product or process of

engaging in motor skills is measured, and whether the tool is used for formative or summative purposes, the assessments used in PE classes should have a high degree of validity (Hay & Penney, 2009).

Validity of Psychomotor Assessments

Several published assessments have gone through laborious validation processes. For example, the Team Sport Assessment Procedure (Grehaigne, Godbout, & Bouthier, 1997; Nadeau, Richard, & Godbout, 2008) and the Game Performance Assessment Instrument (Oslin, Mitchell, & Griffin, 1998) have been shown to have a high degree of validity. The psychometric properties of the PE Metrics series of assessments (Society of Health and Physical Educators, 2010) have been rigorously examined as well (Fox et al., 2011). Additionally, the Fitnessgram test battery (Meredith & Welk, 2007) has been investigated and shown to hold quality psychometric properties (Morrow, Martin, & Jackson, 2010). Teachers are encouraged to introduce these and other published assessments into their PE classes, to provide valuable feedback and aid in the facilitation of learning.

Some studies have also examined the accuracy of assessments completed by student peers, a method suggested by Veal (1995). Hill and Miller (1997) examined the precision at which fifth grade PE students assessed their peers when performing the curl-ups, push-ups, back-saver sit and reach, and trunk lift tests of the Fitnessgram and found that the student peers performed the assessments accurately. Conversely, Patterson, Bennington, and De La Rosa (2001) examined the psychometric properties of the curl-up component of the Fitnessgram and found that students aged 10 to 12 tended to overestimate the amount of correct repetitions performed by peers.

Despite these minor discrepancies in the ability of peers to assess curl-up performance, other researchers have discovered that students can accurately perform a variety of peer assessments of additional skills. Kolovelonis and Goudas (2012) found that fifth and sixth grade PE students accurately conducted peer assessments of the product and process of performing a basketball chest pass. Similarly, Nadeau et al. (2008) examined the accuracy at which 14- to 17-year-old ice-hockey players assessed peers during game play and found they did so with a high degree of accuracy. Ward, Crouch, and colleagues (Crouch, Ward, & Patrick, 1997; Ward, Crouch, &

Patrick, 1998; Ward, Smith, Makasci, & Crouch, 1998) conducted a series of studies examining the effects of a peer-mediated accountability intervention in PE and its effects on student performance; one of the components of this tool included students conducting a peer assessment. It was discovered that children in Grades 4 and 5 can accurately assess the process and product of performing volleyball (Crouch et al., 1997; Ward, Crouch, & Patrick, 1998) and basketball skills (Ward, Smith, et al., 1998).

Finally, only one study examined the accuracy of peer assessments with younger elementary PE students. Alstot (2015) looked at the use of a token economy for reinforcing overhand throw performance; a part of this intervention required second grade participants to peer-assess throwing technique. These students performed peer process assessments of two components of the overhand throw with a high degree of accuracy. These studies provide evidence that elementary students can accurately provide feedback to peers via an assessment on not only the product of performing a motor skill, but also the process.

Despite the recorded levels of validity of several psychomotor assessment instruments (Grehaigne et al., 1997; Morrow et al., 2010; Nadeau et al., 2008; Oslin et al., 1998), and despite the evidence supporting the ability of upper elementary students to perform forms of assessments within PE accurately (Hill & Miller, 1997; Kolovelonis & Goudas, 2012; Patterson et al., 2001), little is known regarding how accurately younger elementary students can engage in the practice of peer assessments and provide precise feedback on the process of performing a motor skill. Veal (1995) suggested that students of any age can be taught to perform peer assessments properly, but it is unknown how accurately they can do so. Alstot (2015) initially investigated the accuracy of second graders' peer assessments of overhand throw performance, but it was a minor variable in that study and necessitated further inquiry. Therefore, this study expands on these findings and examines Veal's suggestions, by investigating the accuracy at which first, second, and third grade PE students can perform a peer process assessment of overhand throw technique, an elementary skill appropriate and recommended for lower elementary–aged children (Pangrazi & Beighle, 2010).

Method

Participants and Setting

Thirty-eight PE students (19 male, 19 female) from in-tact first, second, and third grade classes at a private elementary school located in the Pacific Northwest were selected as participants. Upon approval from the university institutional review board, informed consent was obtained from participants' parent(s) or guardian(s) and assent was obtained from the participants. Data were collected during regularly scheduled PE classes in a covered outside area on the school grounds. Students in each class who were not subjects of the study performed the same overhand throw and assessment tasks as participants; these tasks were conducted as part of their regular PE classes, despite data not being collected on these students.

Data Collection and Equipment

For each grade level, sessions were video recorded; a digital video camera was set up on a tripod and arranged to capture video of each participant's overhand throw performance. Additional equipment included the assessment sheets peers used to analyze correct and incorrect performance of the first two critical components of the overhand throw performed by their partners (see Figure 1). Pencils were also provided for participants to complete the assessment sheets and bean bags were used for partners to throw during the overhand throw trials.

Procedures

The researchers met with each grade level during their regularly scheduled PE classes once per week for 5 weeks. During the first week, following assessment demonstration guidelines suggested by Johnson (2004), the students were trained to use the peer assessment sheet, which included analysis on the first two components of the overhand throw (see Figure 1): (a) "place the throwing-arm side of the body away from the target" (Pangrazi & Beighle, 2010, p. 674)—*side to target* and (b) step toward the target with the foot opposite the throwing hand" (Pangrazi & Beighle, 2010, p. 674)—*step toward target with opposite foot*. These aspects of overhand throwing skill are characteristic of more proficient performance (Haywood & Getchell,

Your Number _____

Thrower's Number _____

Your partner will throw the bean bag 5 times as far as he or she can. Every time your partner throws the bean bag, you will make sure he or she is throwing the right way.

Put an X next to each part of the skill your partner does correctly. Leave it blank if he or she does not do that part of the skill.

	CUES	Throw 1	Throw 2	Throw 3	Throw 4	Throw 5
	Side to target					
	Step toward target with opposite foot					

Figure 1. Peer process assessment participants used to analyze two critical components of the overhand throw skill: (a) "place the throwing-arm side of the body away from the target" (Pangrazi & Beighle, 2010, p. 674)—*side to target* and (b) step toward the target with the foot opposite the throwing hand" (Pangrazi & Beighle, 2010, p. 674)—*step toward target with opposite foot*.

2014) and are a typical focus of elementary PE. This assessment training took approximately 20 min and consisted of a researcher modeling correct and incorrect technique of the overhand throw and discussing how to appropriately complete the peer assessment based on the observed performance (i.e., students were to view their partner's performance of five trials of the overhand throw and, after each trial, write an *X* in the appropriate box if the corresponding skill

component was performed correctly, while leaving it blank if the component was not performed correctly). Students then observed the researcher perform several overhand throw trials and completed an assessment of his performance. The students' sheets were then examined by the researchers to ensure students were appropriately checking the boxes on the assessment.

During the second through fifth weeks, participants were placed in pairs. Partner A was given instructions to complete five trials of an overhand throw, attempting each time to throw a bean bag as far as he or she could while trying to maintain correct technique. During these five trials, Partner B completed the peer assessment. After the five trials and assessment sheet were completed, the partners switched roles; Partner B then completed five overhand throw trials while Partner A assessed the performance. This allowed each participant to complete five overhand throw trials and an assessment of a peer. For each session, a digital video camera was placed in the corner of the instructional area and recorded each participant's performance. Each session took approximately 10 min and was conducted at the beginning of the students' regularly scheduled PE class.

Data Analysis

After each session, the videos were returned to the university lab for analysis. Videos were viewed in slow motion while the participants' performances of the overhand throw were assessed with the same assessment sheets used by the peers. These researcher-conducted assessments served as the criterion for comparison; the researchers then compared the peer assessments to the criterion assessments to check for accuracy of each trial and then recorded them as correct or incorrect. Mean percentage of correctly assessed components and standard deviations were calculated for each grade for Weeks 1 to 4 and a combined score for Grades 1 to 3 across all 4 weeks. Further analyses included one-way ANOVAs that examined differences in assessment accuracy across grades, differences between Weeks 1 to 4 for all participants, and differences between Weeks 1 to 4 within each grade level. SPSS 21 was used for data analyses.

Interobserver Agreement (IOA)

To ensure the criterion assessment data were analyzed appropriately, a trained second observer randomly selected and viewed 25% of the sessions. The second observer's scores were then compared to the criterion assessments and analyzed for agreement. Percentage agreement was calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. Overall agreement was 96.1%, while agreement across first, second, and third grades was 96.0%, 94.6%, and 97.3%, respectively, indicating the criterion assessments were initially analyzed appropriately.

Results

Across all 4 weeks of data collection, the accuracy with which participants assessed their peers' performance for first, second, and third grade students was 79%, 77%, and 92%, respectively. When comparing assessment accuracy across grade levels, significant differences were discovered, $F(2, 143) = 9.182$, $p < .001$ (Figure 2). Post hoc analyses found differences between third grade ($M = 91.77$ %, $SD = 13.97$) and first grade ($M = 78.95$, $SD = 22.76$; $p = .005$) and between third grade and second grade ($M = 77.17$, $SD = 22.28$; $p < .001$). These results indicate that the third grade students conducted the assessment with a significantly higher degree of accuracy than their younger counterparts.

However, one-way ANOVA results indicated no significant differences in the participants' accuracy across time, $F(3, 142) = 0.392$, $p = .759$, indicating the participants' accuracy did not change from week to week (Figure 3). There was also no difference in first grade, $F(3, 34) = 0.327$, $p = .806$, second grade, $F(3, 42) = 0.112$, $p = .953$, or third grade, $F(3, 58) = 1.814$, $p = .155$, across weeks, indicating each grade level remained consistent in its accuracy over time. Regardless of grade level, participants' assessment accuracy showed no improvement from week to week, which demonstrates the students were as accurate in their assessment practices during the first week after training as they were during the fourth week.

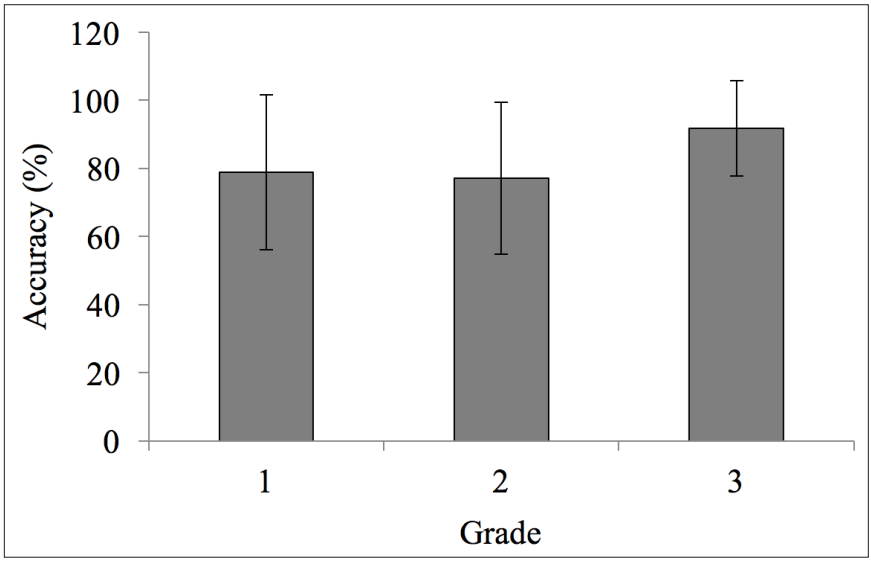

Figure 2. Accuracy of completed assessments by grade level across all 4 weeks. Grade 3 participants assessed peers' performance with a significantly higher degree of accuracy than the first and second grade participants. Error bars indicate ± standard deviation.

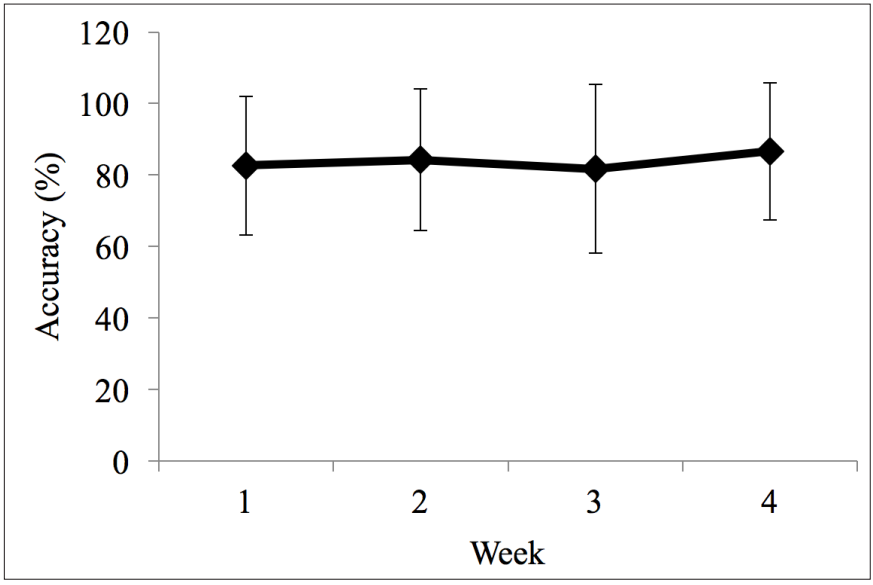

Figure 3. Accuracy of completed assessments for all participants (Grades 1 to 3, $N = 38$) across 4 weeks. Participants' completed assessment accuracy did not significantly change across time. Error bars indicate ± standard deviation.

Discussion

The main objective of this study was to examine the accuracy at which younger elementary-aged PE students perform a process assessment of their peers' overhand throw performance. These younger students assessed their peers with a relatively high degree of precision, with each grade level exceeding 75% accuracy. The third grade students, however, performed the assessments with a significantly higher degree of accuracy (i.e., greater than 90%) compared to their younger counterparts. These results indicate that, although not as accurate as older children, students as young as first grade can peer-assess the process of performing a motor skill; PE teachers can implement these types of assessments and be confident that the feedback partners are receiving is relatively accurate. Another finding of the study showed that students neither improved nor regressed in their assessment accuracy across time. This indicates that students could immediately and accurately implement the peer process assessment after only one short training session. Elementary PE teachers can introduce assessments to their students and be assured that they can immediately assess their peers with a relatively high degree of accuracy.

Veal (1995) suggested that students of any age can be trained to engage in the assessment process, including peer assessments. Although some studies have shown this was correct for some elementary grades (Hill & Miller, 1997; Kolovelonis & Goudas, 2012; Patterson et al., 2001), little was known regarding how true Veal's assertion held for younger elementary PE students. The results of this study, though, support Veal's claim and Alstot's (2015) findings with second grade PE students; first and second grade students performed the assessment with a relatively high degree of accuracy. However, it is not known if, for participants in this study, the precision of the assessments was high enough; despite students' assessments reaching greater than 75% accuracy in Grades 1 and 2 and greater than 90% in Grade 3, a suggested minimum criterion for acceptable assessment accuracy in PE was not found in the literature, so the results cannot be compared to a standard. The author of this study suggests an agreement criterion similar to that accepted for measuring behavioral data: 80% (Cooper, Heron, & Heward, 2007). If this is used as the standard for comparison, third grade participants easily

surpassed the minimum criterion, but the first and second grade students did not; however, the younger students were within a few percentage points of reaching the benchmark. Third grade students assessed their peers with a high degree of accuracy, while first and second graders assessed their peers with a relatively high degree of accuracy, nearly reaching the 80% criterion.

Johnson (2004) suggested several steps for teachers to demonstrate to students in PE how to conduct an assessment, including demonstrating how to perform the skill, how to observe peers' performance, how to record observations, and how to provide appropriate feedback to peers based on the assessment. During Week 1 of this study, the researchers followed similar steps in training participants how to properly complete the peer assessment. After only one 20-min training session, the students could fully engage in the assessment process. These specific overhand throw peer assessments were included in the students' regularly scheduled PE classes once per week for 4 weeks following the assessment training session. In the week immediately following the training session, students in all three grades could immediately conduct the peer assessment with a relatively high degree of accuracy and maintained consistent performance throughout the remaining 3 weeks. The assessment accuracy did not change over time; students engaged in the process with the same level of accuracy during the first week as they did the last. These results indicate that there may be no lag in younger students' learning of how to perform simple process assessments. First, second, and third grade students could immediately understand how to conduct the assessment properly and maintained similar engagement throughout the study.

This study had two main limitations, and suggestions for future research are provided. First, the assessment used with the students was relatively simple, only assessing two components of the overhand throw, *side to target* and *step toward target with opposite foot*, while ignoring the other critical components of a proficient throw. It was designed intentionally with younger students' cognitive development in mind. Based on the results of the study though, the simplistic nature of the assessment may have been appropriate for the younger students (i.e., the first and second graders whose accuracy was 79% and 77%, respectively), while the third graders,

whose accuracy exceeded 90%, could have successfully completed a more complex assessment, inclusive of the remaining components of proficient overhand throw. Future research should examine how more complex process assessments are performed by younger elementary PE students, investigating various levels of complexity in assessments.

The second limitation was associated with the sample used in this study. Students were selected from a private elementary school, and although no screening was conducted for participants' socioeconomic status (SES), reading comprehension, or other cognitive or social components, it was assumed that the students who participated were likely at a middle or high SES with appropriate levels of reading comprehension, representing a relatively homogeneous subset of the population. Future studies should focus on implementing peer process assessments with a wider sample of first, second, and third graders, particularly concentrating on public schools in lower SES areas. A future study could examine the influence that moderating variables, such as SES, reading comprehension levels, and cognitive development, have on assessment accuracy in younger elementary PE students.

Conclusion

Unfortunately, the use of assessments in PE lacks regularity (Lopez-Pastor, Kirk, Lorente-Catalan, MacPhail, & Macdonald, 2013). Perhaps the lack of widespread use is due to, in part, an unawareness of the ability of students to conduct these assessments properly. Regardless, assessments are ". . . an integral and necessary aspect of education across all subject areas of the school curriculum, and physical educators can no longer afford to be ambivalent about this practice . . ." (Lopez-Pastor et al., 2013, p. 73). PE teachers should embrace the many benefits of the assessment process, not the least of which is that assessments help facilitate student feedback, of which the importance for student learning is well documented (Fredenburg et al., 2001; Silverman et al., 1992). When teachers are significantly outnumbered by students, the feedback process becomes more complicated; as suggested by Kniffin and Baert (2015), Lund and Veal (2013), and Veal (1995), having students engage in peer assessments can help to alleviate some of these complications. Students can, through the peer assessment process, provide immediate and

accurate feedback; all students will be engaged cognitively and receive augmented feedback on their performance, which thus maximizes the learning opportunities within PE. Teachers can implement peer process assessments with students as young as first grade with the confidence the assessments will be performed accurately, providing immediate feedback to all students in the class and maximizing the opportunity for learning and student achievement in PE.

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The Physical Educator Vol. 75 • pp. 756–773 • 2018
https://doi.org/10.18666/TPE-2018-V75-I5-8326

ASSESSMENT

Effect of Pairing by Ability on Performance, Physical Activity, and Time-on-Task During Reciprocal Peer Teaching in Swimming

Tom Madou and Peter Iserbyt

Abstract

This study investigated the effect of pairing by ability in peer teaching on swimming performance, physical activity, and time-on-task. During a 4-lesson unit in front crawl swimming, 113 (36 female, 77 male) university students in Kinesiology were randomized over gender-homogeneous same-ability (low with low and high with high) and mixed-ability (high with low) dyads. Swimming performance was assessed before and after the four lessons. Physical activity and time-on-task was coded based on video recordings of all lessons through the System of Observing Fitness Instruction Time (SOFIT). Although not significant, results showed higher swimming improvement in mixed-ability dyads, especially for low-ability swimmers. Overall, students spent 37% of lesson time in moderate-to-vigorous physical activity and were on task 82% of the time. Further research should focus on the effect of pairing by ability during longer units of instruction and investigate peers' verbal interactions.

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The need to address a wide variety of learning outcomes in physical education (PE) requires the employment of different types of instruction (Gurvitch & Metzler, 2013). According to Metzler (2011), peer teaching is one of eight instructional models used in PE together with direct instruction, Personalized System of Instruction, cooperative learning, Sport Education, inquiry teaching, Tactical Games, and Teaching Personal and Social Responsibility (TPSR). An instructional model provides teachers with a blueprint on what teaching and learning will look like and what outcomes to expect. While models such as peer teaching could emphasize psychomotor learning more, others such as TPSR focus more on social outcomes. Each instructional model has clear benchmarks that serve as non-negotiable features of the model, such as the element of working in pairs as tutor and tutee during peer teaching (Metzler, 2011).

In PE, a large body of literature demonstrates the effectiveness of peer teaching to influence a wide range of learning outcomes (for reviews, see Byra, 2006; Lafont, Rivière, Darnis, & Legrain, 2016; Ward & Lee, 2005). Research outcomes in PE are consistent with those from general education (Walberg, 1990), and regardless of study methodology, they show significant psychomotor learning in students of varying age levels and abilities (Ward & Lee, 2005). The reciprocal style of teaching is a specific form of peer teaching in which learners are paired and exchange roles of doer (i.e., tutee) and helper (i.e., tutor) during instruction (Mosston & Ashworth, 2008). While the doer is performing the task, the helper is observing and providing performance-related feedback, often supported by task cards (Iserbyt & Byra, 2013b). Task cards are instructional tools that often include doer and helper names, directions for behavior, and space for recording student performance (Byra, 2004). In addition, task cards can also focus on the psychomotor skill that needs to be learned, combining a picture of the skill with written instructions about how to perform the skill (Iserbyt & Byra, 2013b). While task cards to record the partner's performance are helpful to hold students accountable for learning (Dyson, 2002), task cards presenting the skill through pictures and written instructions facilitate performance and the provision of feedback (Iserbyt, Elen, & Behets, 2010).

Despite well-established evidence for the effectiveness of using peers to effect student learning, some questions regarding how best

to group students remain unanswered. Ward and Lee (2005) and Lafont et al. (2016) mention the mediating effect of pairing by ability on learning outcomes. In gymnastics, a better learning effect and retention was found in mixed-ability compared to same-ability dyads for learning a somersault (d'Arripe-Longueville, Fleurance, & Winnykamen, 1995). In high school, breaststroke swimming males benefited more from highly skilled tutors, whereas females benefited from high- and average-skilled tutors (d'Arripe-Longueville, Gernigon, & Huet, 2002a). In both studies, tutors were not trained prior to the peer-teaching episode. Legrain, d'Arripe-Longueville, and Gernigon (2003) described the training of university peer tutors to identify common errors that novices would make and how to formulate appropriate advice in a French boxing setting. Compared with untrained tutors, trained tutors exhibited more coaching behavior and demonstrated greater learning.

Although it is generally accepted that tutor training leads to improved outcomes (Ensergueix & Lafont, 2011), research has shown that peer teaching is also particularly effective when the learning environment is deliberately organized and peers have access to instructional materials. Acknowledging that merely putting students together is not sufficient to provoke learning (Lafont et al., 2016), Dyson (2002) argued that clearly defining roles of doer and helper is an element that improves learning through enhanced interaction between peers. Together with instructions on role switching, defining roles as doer and helper and having access to instructional tools such as task cards or tablet computers have been shown to improve performance in peer teaching regardless of purposeful pairing by skill level or prior tutor training (Iserbyt & Byra, 2013a; Iserbyt et al., 2010). Without some form of structure in the learning environment and instructional support, it is generally accepted that mixed-ability dyads, where students of different skill levels work together, demonstrate higher learning because of the expert–novice relationship in those dyads. High-ability learners learn from explaining the content, while low-ability learners learn from the proximity of quality demonstrations and feedback (King, 1998; Wilkinson & Fung, 2002).

In the United States, the Institute of Medicine (IOM, 2013) stated that PE lessons should engage students in moderate-to-vigorous physical activity (MVPA) at least 50% of the time. This benchmark

is often not reached in PE, especially through the direct instruction model (Roberts & Fairclough, 2011). Harvey, Smith, Fairclough, Savory, and Kerr (2015) found that a games-based approach achieved higher PA levels compared with direct instruction. With an increased emphasis on models-based instruction, research investigating the physical activity (PA) levels in those models is warranted. To date, literature investigating PA levels during peer teaching is nonexistent. One could argue that average PA will be lower through peer teaching compared with a direct instruction approach because learners divide the available time between practicing (i.e., higher level of PA) and helping (i.e., lower level of PA). Using the variable of trials performed, studies have shown that peer learning can increase students' total amount of trials and the percentage of correct trials (Crouch, Ward, & Patrick, 1997; Ward, 1993). However, an increase in the amount of trials does not necessarily mean performance will increase. Ward, Smith, Makasci, and Crouch (1998) found that although elementary students' opportunity to respond increased during peer learning, average-skilled students increased their number of correct trials, whereas low-skilled students did not. Only when partners were given the responsibility to provide their partner with verbal performance-related feedback did the performance of low- and high-skilled students increase. Cardon, Verstraete, De Clercq, and De Bourdeaudhuij (2004) found that average MVPA levels were higher in elementary swimming classes compared with nonswimming classes (52% vs. 40%). During swimming classes, an average 40% of time was spent standing. However, 41% of all swimming classes did not reach the recommended 50% MVPA. To date, it is unknown how PA levels during peer teaching in swimming differ as a function of pairing by ability.

From an ecological perspective, class life contains a set of three interrelated systems (instructional, managerial, and student social) in which changes in one system affect the other systems (Hastie & Siedentop, 1999). Although order and academic work have been put forward as the most significant systems (Doyle, 1986), the student social system cannot be underestimated. When students are misbehaving, the teacher will most likely suspend the instructional system to restore order (i.e., managerial system). According to Allen (1986), students have two major goals during lessons: socializing and passing

the course. Some instructional models have the potential to align the student social system with the managerial and instructional system. Carlson and Hastie (1997) found the student social system crucial for the accomplishment of managerial and instructional tasks during a Sport Education unit. In Sport Education, similar to peer teaching, working with peers is considered an attractive element for achieving lesson objectives. Following this ecological perspective, researchers have investigated the student social system on the level of on-task behavior and verbal exchanges. Brock and Hastie (2016) found that although verbal exchanges were higher during a Sport Education unit in homogeneous skill teams compared with heterogeneous skill teams, exchanges were mostly on task. During a peer-teaching unit in tennis, Iserbyt Madou, Vergauwen, and Behets (2011) paired middle school students in dyads as coaches and players. Results showed that student players remained on task more than 90% of the time, whereas their coaches were on task 80% of the time. On-task behavior was defined as executing the expected behavior at a certain time and place. To date, no research has investigated how on-task behavior differs as a function of pairing by ability during peer teaching.

This study sought to investigate the effect of pairing by ability during a 4-day reciprocal peer-teaching unit with university students in Kinesiology on (1) front crawl swimming performance, (2) MVPA levels, and (3) time-on-task. It was hypothesized that mixed-ability pairing would lead to higher performance improvement and low-ability learners would benefit the most from this configuration. It was also hypothesized that MVPA and time-on-task would be higher for individuals in mixed-ability pairings. Student roles as doer and helper were clearly defined, and task cards were used as instructional tools so that helpers could provide the doer with performance-related feedback.

Method

Subjects

One-hundred twenty-one (38 females, 83 males) university students in Kinesiology participated in this study. Students had an average age of 19 years (range 18–21). Students participated in four 50-min lessons in front crawl swimming where the reciprocal style of teaching was applied. This course was included in the yearly PE

curriculum. All lessons were taught by the same teacher (female, 48 years of age), who was familiar with the reciprocal style of teaching and had over 25 years of teaching experience in swimming. Students had no previous experience in the reciprocal style of teaching at the university level. Only dyads attending all tests and lessons were withheld for analysis, leading to a dropout of 8 and leaving 113 participants for analysis

Experimental Groups and Procedures

At the start of this study, all 121 students, constituting two female (n = 17 and 21, respectively) and three male (n = 28, n = 26, and n = 29, respectively) classes, participated in a two-part assessment as a pretest. The first part consisted of a 50-m sprint test where all subjects swam the 50-m front crawl as fast as possible. During this assessment, the sprint time and the number of strokes to complete 50 m were measured. In the second part of the assessment, students swam 25 m technically to the best of their abilities while being filmed with multiple underwater cameras. All assessments were conducted under similar conditions. Both parts of the assessment started with a competition race dive, and each subject swam alone in one lane of a 25-m swimming pool.

Based on sprint time, all students were classified as either low-skilled (up to 50th percentile) or high-skilled (up to 100th percentile). This categorization was used to create similar-ability dyads (low with low and high with high) and mixed-ability dyads (high with low; see Figure 1). The gap in percentiles between students in mixed-ability dyads was at least 50%. For low- and high-ability dyads, partners representing percentiles that were the closest to each other formed a dyad. Since the individual student was the subject of analysis, four categories of individuals were defined, namely, low-skilled students paired with either a low- or high-skilled partner, and high-skilled students paired with either a high- or low-skilled student.

Next, a four-lesson intervention was conducted. In the first lesson, students analyzed the underwater video footage of their own performance together with their assigned partner. To complete the analysis, students had access to sports performance analysis software (Dartfish v7). This assignment was designed to help students identify technical errors to work on during the next swimming lessons.

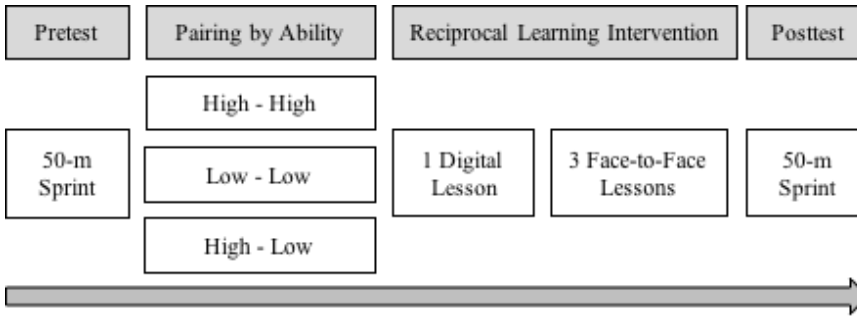

Figure 1. Study overview.

Students could finish the assignment at any preferred time prior to the second lesson. Upon completion of the online assignment, students attended three face-to-face lessons of 50 min, during which they practiced their front crawl performance through the reciprocal style of teaching. The lessons took place once a week in the 25-m university swimming pool. Students worked with the same partner throughout the four-lesson unit.

Reciprocal Style of Teaching

During the swimming lessons, the roles of doer and helper were explained and modeled by the teacher, but the students were responsible for selecting and executing exercises. The high level of autonomy persisted throughout all lessons. A set of task cards containing exercises to address common technical errors was available during practice to support this process. Task cards contained a picture of the skill, written instructions about how to perform the skill technically correct, and potential errors. Nine task cards including a total of 19 technical elements were provided for student practice. The teacher was responsible for implementing the reciprocal style of teaching during practice but was not allowed to give feedback about the swimming performance of the students. She was responsible for correctly implementing the reciprocal peer-teaching model and communicated solely with the helper. Students decided when to switch roles of doer and helper. All lessons in the swimming pool were videotaped, and students wore unique colored swim caps for identification purposes on video. Lessons were single-gendered, meaning that boys were always paired with boys, and girls were

always paired with girls. After the four-lesson intervention, a second assessment was organized where all subjects retook the 50-m front crawl sprint test. Swimming time and number of strokes used to swim 50 m were determined (see Figure 1). Lessons were supervised by the first author of this study for fidelity purposes. No incompatibilities with the reciprocal style of teaching were noted.

Dependent Variables

Performance. For all students, 50-meter sprint time and number of strokes used were measured during pretest and posttest. All tests were videotaped. Based on this footage, a trained assistant counted the number of strokes. A finger entering the water was counted as one stroke. Based on previous research (Barden & Kell, 2009; Toussaint & Beek, 1992), it was assumed that longer stroke lengths in swimming are largely responsible for higher velocities. High-ability swimmers separate themselves from low-ability swimmers, needing fewer strokes to cover the same distance (Toussaint & Beek, 1992; Barden & Kell, 2009). To account for exponentially increasing water resistance at higher velocities and diminishing improvement potential for improving swimming times, the variable of sprint time was converted to an individual performance score using the formula (Belgian Record/Sprint Time)^3 × 1000 = Individual Performance Score. This conversion formula has been used in other research (Iserbyt, Ward, & Martens, 2015).

Physical activity and time-on-task. A subset of 44 students (16 female, 28 male) were randomly selected for assessment of PA levels and time-on-task based on video recordings. The System of Observing Fitness Instruction Time (SOFIT) was used for coding PA levels based on momentary time sampling with 10-s intervals (McKenzie, Sallis, & Nader, 1991). The following categories were used: (1) Lying Down, (2) Sitting, (3) Standing, (4) Walking, (5) Swimming. The sum of Categories 4 and 5 was labeled as MVPA. Similarly, the 10-s observe/record interval was used for coding on-task behavior through momentary time sampling. Doers were coded as on task when they were swimming, listening to the helper, returned to their starting position in the swimming pool to switch roles, or engaged in a combination of the previous. Helpers were coded as on task when they were observing their partner, communicating with their partner, reading the task cards aloud or silently, returned to their

starting position to switch roles, or engaged in a combination of the previous. Data on PA levels and time-on-task were collected during all three reciprocal peer-learning lessons in the swimming pool.

Observer Training

Two observers were trained to code PA levels and time-on-task from video recordings. Prior to coding the study videos, they memorized the coding categories and practiced coding with a sample video. Reliability was calculated for 22% (i.e., 10 of 44 students) of the sample, which is higher than the recommended 12% (McKenzie, 2015). Reliability as measured with Cohen's kappa averaged 0.91 for PA and time-on-task.

Results

Performance

The average sprint time at pretest was 39 s (range 28–64) with a standard deviation of 7 s. At posttest, the average sprint time was 39 s (range 27–58) with a standard deviation of 7 s. After sprint times were converted to individual performance scores, no significant differences were found between groups. The results suggest a higher improvement for low-ability students paired with high-ability students (see Figure 2). At posttest, low-ability students paired with a high-ability partner swam on average 1.2 s (i.e., 10 performance score points) faster than they did at pretest.

The average number of strokes to cover 50 m at pretest was 50 (range 28–73) with a standard deviation of 9. At posttest, the average number of strokes was 49 (range 32–73) with a standard deviation of 9). No significant differences were found between groups. Significant positive correlations were found between number of strokes and sprint time, at pretest ($r = .65$, $p < .01$) and posttest ($r = .69$, $p < .01$).

Physical Activity

PA output based on momentary time sampling was converted to percentages of the total number of observed intervals per subject. No significant differences were found between groups. Descriptive statistics show that low-ability students paired with high-ability students spent the highest amount of time swimming (22%).

Homogeneous high-ability dyads spent the least amount of time swimming (15%; see Figure 3). MVPA levels showed no meaningful differences between groups with an overall average of 37% (range 36–38), although students in mixed-ability dyads had higher PA levels.

Time-on-Task

Time-on-task output based on momentary time sampling was converted to percentages of the total number of observed intervals per subject. No significant differences were found between groups, and overall time-on-task was 82%. Descriptive statistics show that mixed-ability dyads spent the highest amount of time on task, with low-ability students spending 83.6% and high-ability students spending 83.8% of time on task. Homogeneous high-ability dyads spent the lowest amount of time on task (78.5 %; see Figure 4).

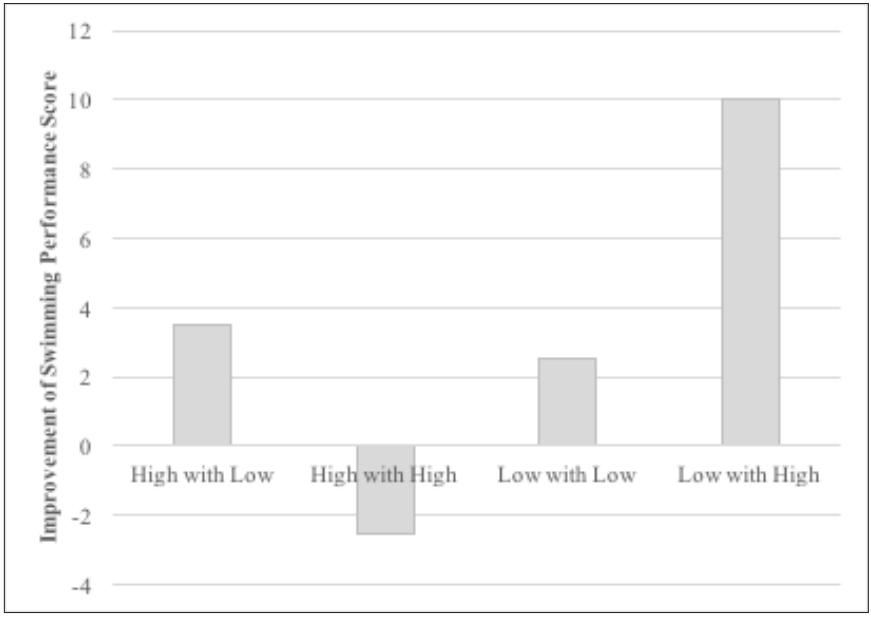

Figure 2. Average improvement from pretest to posttest in performance score of low- and high-ability students as a function of their partner's ability level. All performance scores were calculated using the formula (Belgian Record/Sprint Time)^3 × 1000.

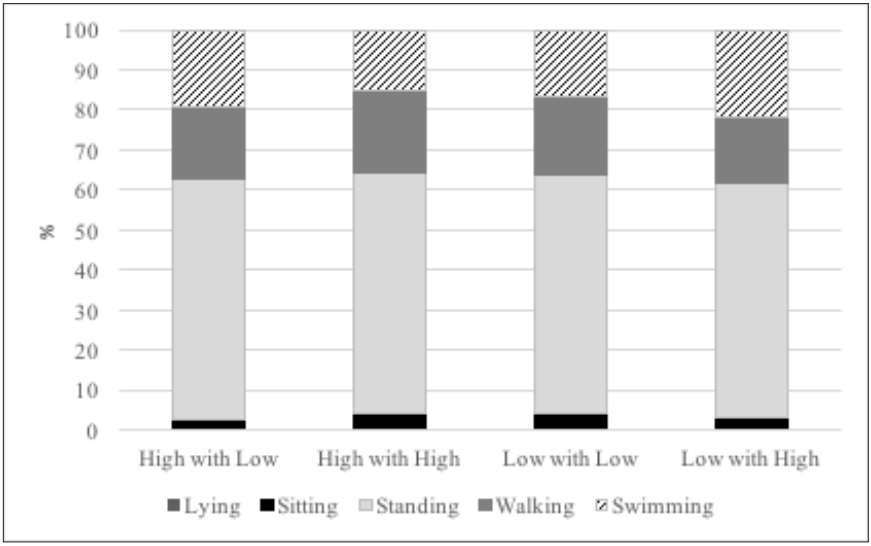

Figure 3. Average physical activity levels of low- and high-ability students as a function of their partner's ability level.

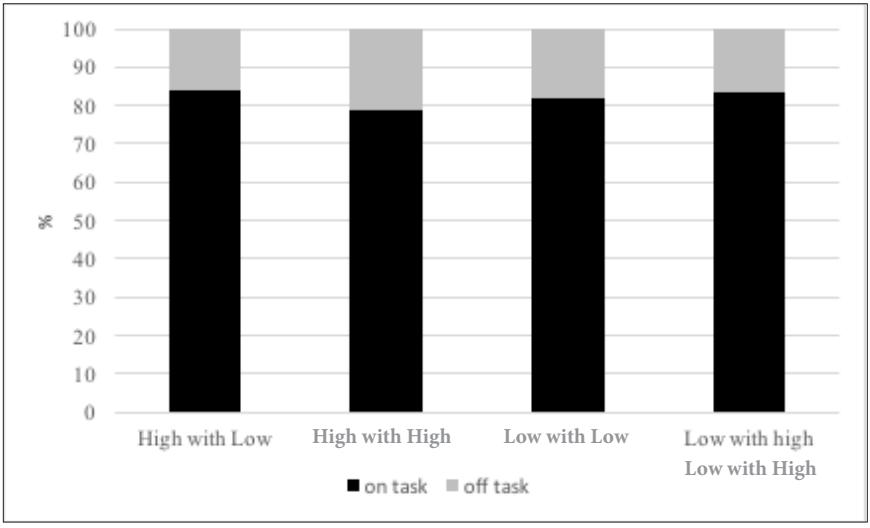

Figure 4. Average time-on-task of low- and high-ability students as a function of their partner's ability level.

Discussion

This study investigated the effect of pairing by ability on swimming performance, PA, and time-on-task. Overall, swimming performance did not improve from pre to post on the level of sprint time and number of strokes needed to cover 50 m. The limited duration of the intervention and the fact that all participants had already received one swimming lesson per week during a full semester (i.e., ceiling effect) as part of their curriculum might explain this finding.

Previous work in high school swimming has shown no learning effect, even after a 10-day unit (Iserbyt et al., 2015). Although not significant, analysis of swimming performance by ability level showed that low-ability learners paired with high-ability learners improved their swim time from pre to post, whereas other students did not. These results fit the hypotheses that for improvement in performance, low-ability learners benefit most from working together with a more skilled peer. This result also fits the contention that when the learning environment is highly organized in terms of role definition, role switching, and access to instructional tools, the effect of pairing by ability on learning is reduced.

Previous work by d'Arripe-Longueville et al. (2002b) with same-sex dyads revealed a significant difference in swimming performance after an 8-min peer-teaching episode. In that study, however, the peer-teaching episode was not reciprocal in nature. In this study, a low-ability student was identified as scoring below the 50th percentile, whereas a high-ability student scored above the 50th percentile. This classification still implicates a wide ability range (i.e., percentile 55 vs. 95) and might be fine-tuned through the addition of the category "average-ability," as was the case in the study by Legrain et al. (2003). Although they hypothesized that average-skilled tutors would lead to greater learning in low-ability learners compared with high-skilled learners because of the presence of a "zone of proximal development," the contrary was the case since high-skilled learners also experienced significant learning.

The present study only used the categories low- and high-skilled and thus the results are limited in that way. A positive correlation was found between sprint time and the amount of strokes needed to cover 50 m. These findings confirm research on this topic (Toussaint & Beek, 1992). Number of strokes is a simple and objectively

measurable variable that learners and teachers can use to evaluate swimming technique. They can use it to provide swimmers with insight into their own ability, to set clear and observable goals, and to map progress. Previous research in the field of sport pedagogy already focused on a reduction of strokes needed to cover 50 m as a learning outcome (Iserbyt et al., 2015). Although a four-lesson unit represents an average learning period in secondary schools in Flanders and thus is ecologically valid, longer interventions will be necessary for more insights into performance improvement to be gained.

For PA, no significant differences were found regarding MVPA between groups, with an overall average of 37% of lesson time spent in MVPA. Descriptive statistics show that the time spent swimming during reciprocal learning was higher for mixed-ability dyads compared with same-ability dyads. Within mixed-ability dyads, low-ability learners spent more time swimming than high-ability learners. This difference in time spent swimming could partly be explained by the fact that high-ability learners need less time to swim 25 m compared with low-ability learners. Also, perhaps high-ability learners reduced their own practice time in favor of their low-ability partners so that they could improve. Research investigating levels of PA during Flemish swimming lessons in elementary PE showed that learners spent around 50% of their time standing or walking (Cardon et al., 2004). In an English study, learners were active for just 9% of swimming lesson time (Warburton & Woods, 1996). Earlier research showed that "swimming more laps" does not always lead to superior swimming performances (Iserbyt et al., 2015). More important, data show relatively similar PA levels for all learners regardless of ability level. This is important since a large body of evidence demonstrates that low-ability children, adolescents, and adults have lower activity levels, whether expressed in terms of MVPA, trials performed, opportunity to respond, or motor appropriate behavior (for a review, see van der Mars, 2006).

Students in this study were on average on task 82% of the time, which is consistent with previous findings (Iserbyt et al., 2011) during classwide peer tutoring in tennis where doers and helpers were on task 90% and 80% of the time, respectively. This result supports the claim that an instructional model such as reciprocal peer

teaching aligns the student social system with the managerial and instructional system, regardless of student ability level. Given learners in this study stayed on task most of the time during reciprocal learning, this instructional model may prove its value in swimming education by engaging nonactive swimmers in the learning process.

Conclusion

Although not significant, results from this study suggest that in gender-homogeneous groups, mixed-ability pairing is to be favored in a structured reciprocal peer-teaching setting with task cards. Low-ability learners seem to improve most when paired with high-ability learners during reciprocal peer teaching. These learners also spent the most time swimming and on task. High-ability learners on the other hand improved their performance the least when paired with other high-ability learners. They also spent the lowest amount of time swimming and were least on task in such configuration. Overall, students did not improve their swimming performance after a 4-day lesson unit in swimming. Given the wide range in ability of participants, similar results in secondary education would be expected, although a higher need for the teacher to guard the process of high-quality interactions seems probable. In this study, all dyads were single gendered. Research has shown that heterogeneous or homogeneous grouping regarding gender has little effect on learning (Ernst & Byra, 1998). In general, reciprocal learning lends itself well as an instructional model in swimming classes because nonswimmers can stay largely involved in the lesson content.

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The Physical Educator Vol. 75 • pp. 774–794 • 2018
https://doi.org/10.18666/TPE-2018-V75-I5-8342

ASSESSMENT

Measuring Rhythmic Ability: Validation of a Digital Rhythmic Ability Evaluation Tool (DRAET)

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Abstract

This study aimed (a) to create a digital rhythmic ability evaluation tool (DRAET) that could record, compare, and appraise coordinated motions of subjects' body parts, using accelerometer sensors with various music rhythms, and (b) to certify and validate the DRAET, compared with an accepted rhythmic ability evaluation methodology (i.e., the High/Scope Beat Competence Analysis Test, H/SBCAT). After the DRAET was constructed, 120 individuals (6 to 15 years old) were tested while engaging in seven tasks, toward synchronization with 36 beats at a rhythm of 2/4. Rhythmic performance was simultaneously estimated digitally by the DRAET and H/SBCAT. Correlation analysis via Pearson's r, Cronbach's α, and kappa coefficients revealed a significant relationship between digital recordings and judges' evaluations through observation in practical tests, certifying its validity and reliability. Results provide preliminary support for the validity and reliability of the DRAET and suggest that it can be used as a tool for measuring rhythmic ability.

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The evaluation of rhythmic ability is an essential feature of human motion, as it enhances teaching approaches in both physical education and music-movement education that aims for smooth, kinetic, emotional development with rhythm. Gallahue (1996) emphasizes that when a motion is performed with rhythm, children tend to better create basic motional elements while improving their abilities. Considering this, creating and implementing reliable methodological tools (in terms of accuracy in digital recording, as well as evaluating the multifaceted aspects of rhythm and human motion) is important for researchers in many sectors of education (Chamberlain, 2003; Kuhlman & Schweinhart, 1999).

A survey based on the studies of musical education noted an absence in the evaluation of rhythmic synchronization of complex motions between individual body parts (Ben-Pazi, Gross-Tsur, Bergman, & Schalev, 2003; Chen, Penhune, & Zattore, 2008; Corriveau & Goswami, 2009; Grahn & Brett, 2007; Repp & Penel, 2004; Snyder & Krumhansl, 2001). This renders these works unfit for application in music-movement education and generally in physical education, where such complex motions are usually required. For example, to evaluate rhythmic ability, some tools assess the difference of the rhythmic correspondence to visual and auditory stimuli by applying a computer as an auxiliary tool, in which the user is called to press the space button or to click the left button of their mouse, according to visual samples on the screen (or the audio samples on the speakers). A common feature of these methods is the study of rhythmical and fine motion of a specific body part (e.g., finger motion), while ignoring other body parts and rhythmic coordination among them.

Moreover, in other studies examining rhythmic ability by tests that contain a wide variety of motions suited to physical education, lack of accuracy has been noticed by studies that collect data through visual observation. Specifically, one method often applied by those that study the influence of music and motional intervention programs in physical education is the High/Scope Beat Competence Analysis Test (H/SBCAT), which is offered in several variations with a common feature (i.e., the judges' evaluation through visual observation). An earlier version called Rhythmic Competency Analysis Test (RCAT) proposed by Weikart (1982) was applied as a rhythmic evaluation test by High (1994), who studied the effectiveness of

rhythmic education methods in the development of rhythmic correspondence in preschool children.

Zachopoulou, Derri, Chatzopoulos, and Ellinoudis (2003) assessed the rhythmic ability of children aged 4 to 6 in an updated version of the H/SBCAT (Weikart, Schweinhart, & Larner, 1987); subjects were asked to implement seven discrete motional tasks (clapping hands, preferred hand tapping, nonpreferred hand tapping, bilateral hands tapping, parallel hands tapping, bilateral foot movement, and walking) according to the beat pattern with a metronome at 100 bpm. Two judges and visual observers determined whether the motions were synchronized to the beat. Other researchers applied other variations of the H/SBCAT to preschool and young children (Agdiniotis et al., 2009; Derri, Tsapakidou, Zachopoulou, & Gini, 2001; Pollatou, Karadimou, & Gerodimos, 2005; Pollatou et al., 2012; Kuhlman & Schweinhart, 1999) and secondary school children (Pollatou, Liapa, Diggelidis, & Zachopoulou, 2005).

Weikart et al. (1987) provided evidence on the validity and internal consistency (αs between .70 and .79) of the H/SBCAT. The test has also shown a strong positive correlation with gross-motor ability (Kiger, 1994) and school achievement (Kiger, 1994; Weikart et al., 1987). Kuhlman and Schweinhart (1999) studied a group of children aged 4 to 11 for metronome timing, with a computer and input devices to measure response to unimpeded beeps; musical timing was measured with responses to beats embedded in instrumental music, as a variation of the H/SBCAT (Weikart et al., 1987), and a strong correlation was found between tests.

Its reliability was established via high internal consistency, whether assessed with a metronome or musical timing. Venetsanou, Donti, and Koutsouba (2014) measured the rhythmic ability of 70 preschool children, using "jumps on the rhythm" (or the Democritus-Psychomotor Assessment Tool for Preschool Children (Kambas & Venetsanou, 2014). The participants were tested in four tasks with a duration of 10 s each, with the music having a 4/4 rhythmic pattern with 100 bpm tempo. The evaluation criteria included timing, as well as rhythm and exercise duration throughout the visual observation. In another study, Phillips-Silver and Trainor (2005) evaluated infants for associated timing to the rhythm of bouncing their knees, examining the hypothesis that movement influences auditory encoding of rhythm patterns in infants. Their

findings provided evidence that musical rhythm perception is significantly affected by the experience of body movement. The described methods present some limitations, however, such as the evaluation through visual observation instead of computer-assisted digital recording; in addition, the tasks were restricted to single motions instead of free motions and only with the rhythmic pattern of 2/4.

The need for more precise and specific evaluations of rhythmic ability led researchers to propose several new methods that digitally record the motional data, without the need for visual observation. Rose (2016) studied the ability of 119 preschool children to synchronize a rhythm in three tempos (80 bpm slow, 100 bpm moderate, and 120 bpm fast) by tapping their hands simultaneously and their feet bilaterally on a pair of Musical Instrument Digital Interface (MIDI) controllers (DrumKat 3.8) connected to a computer for digital analysis. Similarly, Fotiadou et al. (2006) studied the rhythmic ability of deaf children, by recording the 4/4 beat pattern of a metronome, along with motions and steps on a floorboard; then they compared the deviation (in milliseconds) of the steps of deaf children to the metronome beat, which yielded a score through which they could calculate this deviation as a quantitative measurement. Aschersleben and Prinz (1995) calculated the time interval between a tapping finger and a foot on a sensor with a rhythmical sound sample. Similarly, Fraisse (1995) studied synchronization between hand and foot motions with a sound stimulus.

A couple of studies about multimedia technology used some tracking platforms to deal with the credibility of dance performances. Essid et al. (2012) and Gowing et al. (2011) assessed dance performance with a platform based on the Kinect skeleton tracking system and the Wireless Inertial Measurement Units (WIMU). Individual choreography was watched via screen, with measurement tools analyzing joint position and tracked footsteps through accelerometer sensors of the Kinect and WIMU; the synchronization of motion steps with demonstrated choreography was used by the researchers to calculate the corresponding deviation as a measurable score.

A common feature of motional abilities and evaluation methods is the use of an accelerometer sensor, which can digitally record motion in space and time and its attributes (intensity, speed, etc.; Naghshineh, Ameri, & Zereshki, 2009). Several research studies used a widely known computer game platform (i.e., the Nintendo

Wii) to evaluate the rhythm and recording of motion; this included the accelerometer sensor and the wireless communication of the Bluetooth protocol, which can be done with the remote controller. De Bruyn, Leman, and Moelants (2008) examined children at age 9 for the rhythmical motion of their hands while they listened to specific musical tracks. They wanted to compare the children's performance as individuals and as a group of classmates. They recorded mean values of the Wii accelerometer on a graph, to compare individual and group performance. Phillips-Silver et al. (2011) used the Wii remote to study the performance of 33 adults in bouncing their knees and tapping their hands, versus the performance of a person with no sense of rhythm, but with the aim of studying the issue of amusia. The performance evaluation compared the accelerometer graphs.

The Nintendo Wii has been used as a research tool for motion recording. Sheridan (2010) studied a group of children clapping their hands and observed that the action could be traced on a graph, in which the acceleration (in [x, y, z]) shows sharp and sudden changes. Shih, Wang, and Wang (2014) used the Nintendo Wiimote to study the behavior of two hyperactive children in class. The tilt of the sensor was monitored via Bluetooth while attached to the child's leg, such that the monitoring system caused the Wiimote to vibrate each time the child stood up.

The construction of a tool that can digitally evaluate the performance of rhythmic motions coordinated to different rhythms would be a challenge in various scientific fields (e.g., physical education, music education, dance, and special education). The efficiency of several intervention programs on children's rhythmic education could be tested, allowing for the identification and classification of conceptual problems, as well as a person's rhythmic performance. It is essential for dance and physical education to use technology (Dania, Hatziharistos, Koutsouba, & Tyrovola, 2011), with the aim to create a measurement tool that could evaluate rhythmic ability and the efficiency of an athlete's technique in training and help detect new talents.

This study aimed to create a digital rhythmic ability evaluation tool (DRAET) that can record, compare, and appraise precisely coordinated motions of subjects' body parts, using a set of accelerometer sensors with various music rhythms. The study also aimed to certify

and validate DRAET, in comparison with an accepted rhythmic ability evaluation methodology (i.e., the H/SBCAT; Weikart et al., 1987). Furthermore, the DRAET can evaluate motions in space using a set of simple or complex rhythmical patterns with accompanying beats or even music, and it can be applied in the individual's own environment or in the presence of other people (e.g., classmates), which can reduce the stress caused by a strict evaluation in a research lab.

Method

Technical Overview of the Measurement Tool (DRAET)

An innovative method that can evaluate rhythmic ability using computer-assisted recording and analysis techniques through a set of accelerometer sensors was developed. For the data acquisition, a device of a widely known gaming console was used (i.e., the remote control of the Nintendo Wii). This device was chosen for its compact size, which allows it to be attached to any body part, with a belt or some tape, and because it can easily communicate with a computer through its wireless Bluetooth interface, which allowed the researchers to evaluate subjects' rhythmic ability in a defined area within a range of 5 to 100 m^2.

For the measurement of an individual's rhythmic ability, a set of accelerometer sensors records the changes in the acceleration on the attached body part as a waveform such as the one in Figure 1. The steepest changes in the waveform correspond to the moments where a motion starts or ends. When a foot takes a step, the moment it touches the ground it suddenly stops moving. The waveform recorded by the accelerometer sensor will have a peak at this moment. For this reason, the method focuses on such motions, which are represented in the waveform as the points of local maxima (or minima). Depending on the trajectory of the motion and the orientation of the attached device, sometimes the important information is located at the local maxima of the waveform and other times at the local minima. If the device, for example, is attached vertically on a body part, the motions may be contained in the local maxima, and if the device is attached horizontally, the motions may be contained in the local minima. Additionally, motions that are performed on the z-axis (up-down) are recorded by the accelerometer sensor separately from the motions on the x-axis (left-right) and the y-axis (front-back).

Depending on the case, the method may focus on motions at a single direction—while the other directions are ignored—or a combination of many directions may be used.

Rhythmic ability was evaluated via a comparison of the moments of local maxima (which represent the steps or motions) with the beat of the music at the moment of the recording. For the extraction of the beats of the music, a sound processing tool was used (Audacity, 2017). Figure 1 illustrates the beats as vertical lines below the waveform (note that the x-axis of the waveform is the time expressed in seconds). For the numerical evaluation of the correspondence of the recorded steps and the beats, a numerical analysis tool (Mathworks, 2017) computed the deviation of the steps to the beats with a tolerance expressed in milliseconds. Depending on the attributes of the test sample (e.g., age) and the aim of the research, a threshold (in milliseconds) is defined, where a step is in rhythm when the time interval between the step and the corresponding beat is within the given threshold. This condition allows for some remarks and conclusions regarding the rhythmic ability of an individual to be made. These conclusions are expressed as absolute numbers (e.g., number of synchronized or unsynchronized steps or motions), as a percentage (e.g., ratio of unsynchronized steps to the total number of steps), or even as a time deviation (e.g., the sum error of the steps and the corresponding beats, expressed in milliseconds). These calculations allow the development of a digitally accurate evaluation criterion of rhythmic ability.

For the implementation of the DRAET, the open-source Wiimote Lib (Microsoft, 2013) was used for the communication between the sensor and the computer via Bluetooth. The user interface was implemented in the Visual Basic programming environment (Microsoft, 2011). Figure 1 illustrates a waveform that consists of 37 steps. Twenty-nine of the steps are identified as synchronized and eight steps out of limits. Additionally, two steps have been falsely assigned to the same beat, which caused another beat to remain orphan. The steps are illustrated in various shapes and colors (green circle for steps within limits, red square for steps out of limits, green filling for single steps, red filling for double steps). The error per step and the total error are also illustrated in Figure 1 (expressed in milliseconds), which allows for visual observation for the evaluation of an individual's rhythmic ability.

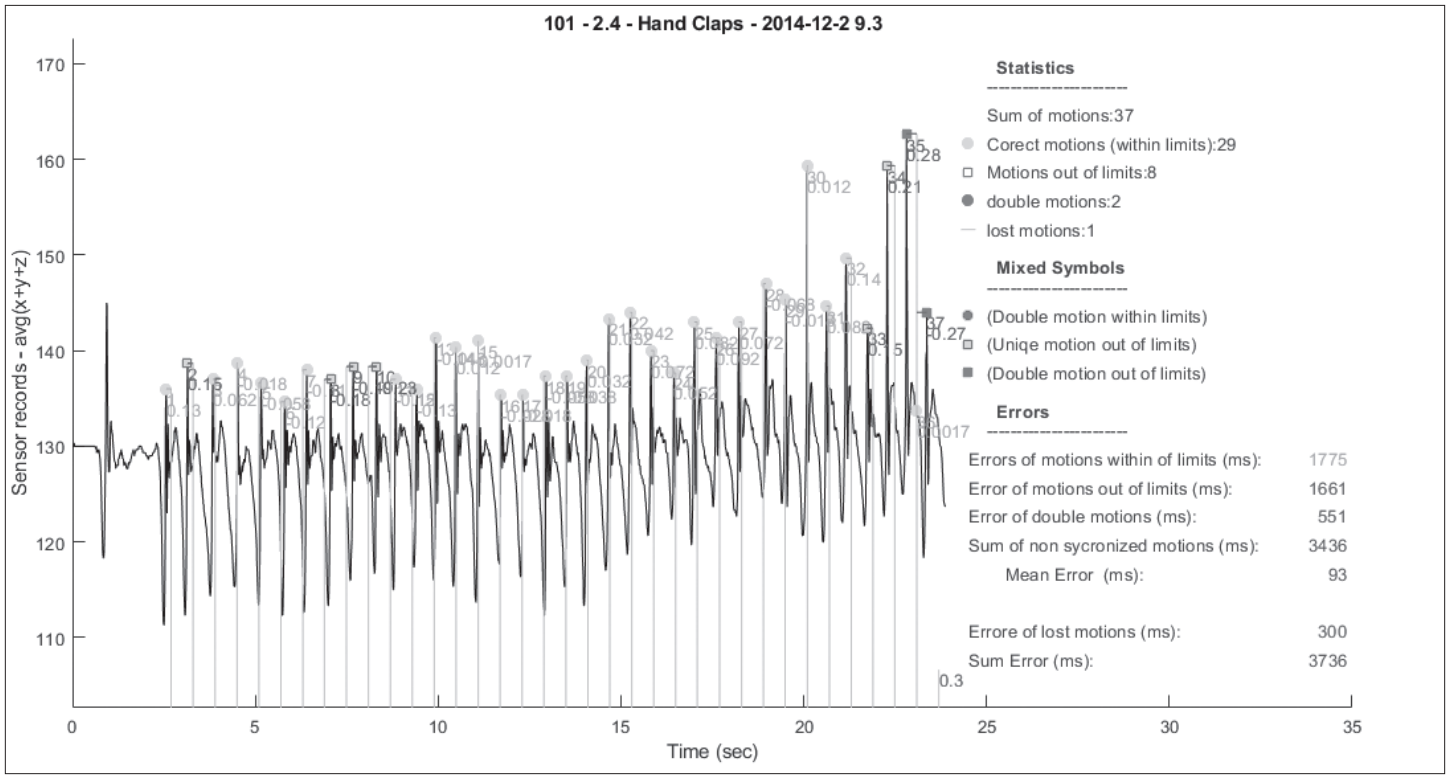

Figure 1. Measurement of rhythmic ability is achieved with the recording of the motions in various body parts using accelerometer sensors.

High/Scope Beat Competence Analysis Test (H/SBCAT)

The validity and reliability of the DRAET can be determined through a comparison of its scores with those provided by other valid and reliable rhythmic ability evaluation methods. The most appropriate method to serve as a criterion is the H/SBCAT, which uses a wide range of motions (clapping, tapping, walking, etc.) in the context of music-movement education and physical education. The approach of recording and evaluating the rhythmic ability with the H/SBCAT variation proposed by Weikart et al. (1987), as well as other researchers (Derri et al., 2001; Zachopoulou et al., 2003), includes visual observation of the synchronized motions (in a total of 36 motions) according to a rhythmical sound by judges who perform the evaluation.

Although the DRAET can evaluate motions in space using a set of simple or complex rhythmical patterns with accompanying beats or even music, the subjects were tested exclusively with the rhythmical pattern of 2/4 with beats and no music. This was decided so that the test conditions performed by the other studies were not modified (Derri et al., 2001; Zachopoulou et al., 2003). Moreover, Pollatou, Hatzitaki, and Karadimou (2003), who studied the rhythmic synchronization on 30 adult female students (M_{age} = 20.1 years old), concluded that the subjects performed higher scores with beats than with music.

Sample and Procedure

The sample consisted of 120 individuals (60 boys, 60 girls) aged 6 to 15 years old (M = 10.53, SD = 2.719). All of them were schoolchildren of primary and secondary education levels, who were chosen through convenience sampling so that the researchers could test the effectiveness of the DRAET in a large range of school ages. Each participant underwent the series of seven motional tests described in the H/SBCAT (Weikart et al., 1987) and tried to synchronize with the 2/4 beat pattern at 100 bpm for 36 beats. The motional tests included clapping, preferred hand tapping, nonpreferred hand tapping, bilateral hands tapping, parallel hands tapping, bilateral foot movement, and walking. During the tests, the accelerometer sensor of the DRAET was attached on the corresponding body part,

for digitally recording their motions. At the same time, one visual observer acted as a judge to evaluate the participant. Two more judges evaluated the test through visual observation, not at the same time, but using a video recording of the test instead. All three judges were experts, as they were specialized in rhythmic gymnastics judgment. The evaluation score was computed as the number of synchronized motions (in a total of 36) as observed by the judges, as well as with the digital recording of the DRAET. The threshold in which a motion was considered to be within limits was defined as 150 ms, as a result of adjustments provided in collaboration with the judges, given the young age of the subjects, which included very young children. The participants were properly informed about the context of the test and were allowed attempts without being recorded. Then, in the beginning of the test, a set of four warning sounds accompanied the verbal instruction of the examiner, "one, two, three, go," to start synchronizing their motions with the rhythmical pattern of 2/4 in 100 bpm.

Statistical Analysis

For the statistical analysis of the results, SPSS 22.0 was used. A number of descriptive statistics were calculated such as means and standard deviation, as well as Pearson's *r* correlation analysis, which verified the construct and criterion validity. The internal consistency of the variables was verified through Cronbach's α, while the index kappa was calculated through crosstabulation analysis between the results provided by the DRAET and the H/SBCAT judges. The level of significance was set to .05.

Results

Table 1 summarizes the means and standard deviations of the scores obtained by the DRAET and the judges.

Construct Validity

An analysis of correlation among the results of the DRAET for all seven trials demonstrated a strong correlation among them, between the number of synchronized motions and between the values of error (in milliseconds), as summarized in Table 2.

Tale 1

Means and Standard Deviations for the Evaluation Results for the DRAET and the Three Judges

	DRAET				Judge 1		Judge 2		Judge 3		Judges *M*	
DRAET	*M*	*SD*	*M* (ms)	*SD* (ms)	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Clapping	34.72	3.07	1558.64	1042.81	34.81	3.01	34.51	2.90	34.63	3.33	34.64	3.06
Preferred hand tapping	35.06	3.03	1313.66	966.07	35.22	2.37	34.88	2.64	35.10	3.06	35.08	2.62
Nonpreferred hand tapping	34.67	3.69	1453.17	1102.63	34.98	2.87	34.54	2.94	34.78	3.45	34.77	3.05
Bilateral hands tapping	34.53	3.24	1775.38	1370.01	34.85	2.80	34.35	2.84	34.73	2.86	34.79	2.79
Parallel hands tapping	35.11	2.62	1283.64	1016.80	35.20	2.55	34.98	2.53	35.02	2.77	35.08	2.63
Bilateral foot movement	32.97	4.701	2317.33	1644.35	33.37	4.43	33.08	4.52	33.10	4.24	33.38	4.06
Walking	32.19	5.70	2273.91	1725.98	32.96	5.12	32.85	4.80	32.55	5.02	32.84	4.89

Table 2

Correlations Between Number of Synchronized Motions by DRAET and the Values of Error in Milliseconds

		Clapping		Preferred hand tapping		Nonpreferred hand tapping		Bilateral hands tapping		Parallel hands tapping		Bilateral foot movement		Walking	
Pearson correlation (*r*)		**Beat sync**	**ms**	**Beat sync**	**ms**	**Beat sync**	**ms**	**Beat sync**	**ms**	**Beat sync**	**ms**	**Beat sync**	**ms**	**Beat sync**	**ms**
Clapping	Sync.			.58**		.53**		.38**		.42**		.25**		.53**	
	ms				.59**		.57**		.48**		.49**		.49**		.46**
Preferred hand tapping	Sync.	.58**				.29**		.33**		.40**		.28**		.52**	
	ms		.59**				.54**		.53**		.65**		.48**		.57**
Nonpreferred hand tapping	Sync.	.53**		.29**				.51**		.63**		.41**		.45**	
	ms		.57**		.54**				.66**		.65**		.70**		.56**
Bilateral hands tapping	Sync.	.38**		.33**		.51**				.62**		.53**		.53**	
	ms		.48**		.53**		.66**				.75**		.60**		.58**
Parallel hands tapping	Sync.	.42**		.40**		.64**		.62**				.54**		.50**	
	ms		.49**		.65**		.65**		.75**				.59**		.53**
Bilateral foot movement	Sync.	.25**		.28**		.41**		.53**		.54**				.49**	
	ms		.49**		.48**		.70**		.60**		.59**				.59**
Walking	Sync.	.53**		.52**		.45**		.53**		.50**		.49**			
	ms		.46**		.57**		.56**		.58**		.53**		.59**		

**$p < .01$, two-tailed.

Criterion Validity

The criterion validity concerns the criteria that render the choice of the H/SBCAT (Weikart, 1987) for certifying the reliability and validity of the results provided by the DRAET. The H/SBCAT tool developed by Weikart et al. (1987) has been proven as a valid and reliable tool for measuring and evaluating rhythmic ability. Based on some literature (Kuhlman & Schweinhart, 1999), it can serve as an adequate criterion for measuring the validity of the newly developed DRAET.

The correlation analysis according to Pearson's *r* between the scores of each test of the DRAET and each judge, as well as the mean of the judges, indicated a strong correlation in all cases, as summarized in Table 3. An examination of the kappa factor shows a moderate agreement among the DRAET results and the judges nearly on all trials, with some exceptions concerning the second judge, as shown in Table 3, which adds one more element of criterion validity. The element of subjectivity in the evaluation of the judges through visual observation, combined with the digital and accurate results of the DRAET, justifies this moderate agreement of the results, which, however, is constant on all trials, without irregular variations in the kappa value. Additionally, the examination of the mean values in Table 1 indicates that the results provided by the DRAET are consistent with the observations of the three judges in all seven trials.

Internal Consistency of the DRAET

The internal consistency of the results provided by the DRAET among the seven evaluation tests was tested with Cronbach's α coefficient and supported the internal consistency of the tool concerning the variables of synchronized motions (α = 84) and total error in milliseconds (α = .89), as shown in Table 4. Moreover, the calculation of the coefficient α with the absence of each variable indicates that the coefficient α does not increase, a fact that certifies the additional individual internal consistency of the results in each trial.

Table 3

Mean Value and Correlations Between the DRAET and the Judges of H/SBCAT

	DRAET	Judge1			Judge2			Judge3			Judges *M*		
DRAET	*M*	*M*	*r*	Kappa	*M*	*r*	Kappa	*M*	*r*	Kappa	*M*	*r*	Kappa
Clapping	34.72	34.81	.95**	.42**	34.42	.93**	.30*	34.63	.96**	.50**	34.64	.95**	.40**
Preferred hand tapping	35.06	35.22	.97**	.45**	34.85	.92**	.34*	35.10	.95**	.47**	35.08	.98**	.47**
Non-Preferred hand tapping	34.67	34.98	.98**	.42**	34.50	.91**	.27*	34.78	.97**	.47**	34.77	.97**	.42**
Bilateral hands tapping	34.53	34.85	.94**	.45**	34.51	.93**	.26*	34.73	.93**	.46**	34.79	.93**	.43**
Parallel hands tapping	35.11	35.20	.96**	.42**	35.00	.95**	.42**	35.02	.94**	.40**	35.08	.960*	.41**
Bilateral foot movement	32.97	33.37	.97**	.42**	33.02	.89**	.28*	33.10	.93**	.41**	33.38	.93**	.38*
Walking	32.19	32.96	.95**	.42**	32.92	.95**	.36*	32.55	.95**	.38*	32.84	.96**	.34*

Note. Kappa is considered as 20–40 fair agreement*, 40–60 moderate agreement**, 60–80 good agreement***, and 80–100 very good agreement****.

*$p < .05$. **$p < .001$.

Table 4

Internal Consistency of the DRAET Results

Reliability statistics in beat synchronization and ms error	Cronbach's α with absence of the specific variable	
Cronbach's α in beat synchronization: .838 **Cronbach's α ms error: .891**	**Beat synchronization < .838**	**ms error < .891**
Clapping	.82**	.88**
Preferred hand tapping	.83**	.88**
Nonpreferred hand tapping	.81**	.87**
Bilateral hands tapping	.81**	.87**
Parallel hands tapping	.81**	.87**
Bilateral foot movement	.83**	.88**
Walking	.81**	.88**

Note. The coefficient Cronbach's α < .83 in sync and α < .88 in error (ms) certifies the internal consistency of each trial.

**$p < .001$.

Discussion

This study aimed to create a digital rhythmic ability evaluation tool (DRAET) that can record, compare, and appraise precisely coordinated motions of subjects' body parts, using a set of accelerometer sensors with various music rhythms. The study also wanted to certify and validate the DRAET, in comparison with an accepted rhythmic ability evaluation methodology (i.e., the H/SBCAT).

The results of the analyses indicate that the DRAET is an evaluation tool of rhythmic ability that can measure the motional synchronization of a subject's body parts with a rhythmic pattern or music with significant accuracy, due to digital recording. The DRAET tracks the synchronized motions similarly to the H/SBCAT, but can calculate the total error in milliseconds of all motions (synchronized or not), providing a more accurate rhythmic ability evaluation tool. The validity of the DRAET results have been corroborated by statistical analyses and comparison of the results to

other methods, thereby confirming the research assumptions. The strong correlation ($p < .001$) among seven trials (evaluated digitally) between the number of synchronized motions and between the values of error (in milliseconds) provided elements of construct validity. It can be substantiated that the DRAET examined the same variable in all tests (i.e., rhythmic ability) as judges did via observation for the H/SBCAT.

Few tools can synchronize body parts with a motion in open space, or rhythmical patterns (simple or complex) in free motion conditions, which created a limitation of this study. For a comparison of the DRAET's results to other evaluation methods, the H/SBCAT (Weikart et al., 1987) was used, as it includes trials such as clapping, tapping, and walking, which are suitable for activities in music-movement education and physical education. This allowed for simultaneous application of the DRAET and H/SBCAT for simultaneous digital examination and visual observation. Moreover, the H/SBCAT is considered a valid method, according to Weikart et al. (1987) and Kuhlman and Schweinhart (1999). Thus, it was a good choice for comparison to the DRAET's effectiveness and provided a significant element of criterion validity.

The DRAET uses the H/SBCAT as a comparison tool, and the strong correlation between judges' results and digital recording provides validation of the DRAET as a rhythmic ability evaluation tool. The stable values of the kappa factor and analysis of the mean results of all trials gauge the results between judges and the DRAET's digital recording. The similarity of these evaluation methods was confirmed, which established the capability of the DRAET to judge rhythmic ability parameters. These facts lead to the ascertainment that those measuring rhythmic ability need to avoid the subjectivity of the H/SBCAT, with which observers evaluate rhythmic ability, and trust the objectivity of the DRAET, which provides digital accuracy. Moreover, the assessment of Cronbach's α coefficient among the digital recording of synchronized motions and among the total error recording in milliseconds for all trials indicates significant internal consistency of the DRAET ($\alpha > .80$), thus corroborating strong homogeneity.

Conclusion

The DRAET is a valid and reliable digital tool capable of recording and evaluating the parameters of rhythmic ability of the human body and its body parts. The tool shows significant correlation to the valid H/SBCAT. As a digital tool, it offers increased accuracy, using additional criteria for the evaluation of rhythmic ability. Unlike other methods, it can be applied with various rhythmic patterns (simple or complex) and offers freedom of motions in open space, which makes it suitable for applications in the fields of physical education, music-movement education, dance, and sports. In future research, the DRAET could be applied as an evaluation method in education, in the form of intervention programs in music-movement education, with various motions and various rhythmic patterns or music. With some adjustments, it could also be used as an evaluation tool in dance or sports, providing new capabilities in analysis of technical performance. The DRAET could also be used as an evaluation tool in special education, providing essential feedback to a possible connection of rhythmic ability and various learning difficulties and to the effect of music-movement education programs in special education.

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The Physical Educator Vol. 75 • pp. 795–815 • 2018
https://doi.org/10.18666/TPE-2018-V75-I5-8229

COACHING EDUCATION

Student Coaches in Sport Education: A Case Study Examination of Their Influence on the Perceptions and Experiences of Their Players

Dana Perlman and Greg Forrest

Abstract

A developing line of Sport Education (SE) inquiry has been the motivational responses of students. While initial evidence supports that SE can positively influence the motivation of physical education students, there is a continued need for further research in this area. Specifically, there has been call for a deeper examination into the influence that specific features of SE (i.e., roles) have on the outcomes, behaviors, and experiences of physical education students. This study examined the influence of team leaders (i.e., coaches) on the students' experiences and perceptions within their team. This study used a case study approach, with self-determination theory (SDT) as the motivational lens. Qualitative data collection measures of individual and focus group interviews, student journals, and researcher observations and field notes were implemented. Analysis of data was conducted via the constant comparative method and verified with trustworthiness elements of triangulation, member checks, and peer debriefing. Coding of interviews, journals, and observer field notes revealed overarching themes of (a) method of coach selection, (b) knowledge of the sport and practices, (c) leading by example, and (d) managing the downside. The

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coaches led and coached in a manner that influenced the key psychological needs of autonomy, competence, and relatedness. While each psychological need was influenced, the level of support seemed to align with the style of coaching delivered. The findings of this study can assist the physical education teacher in designing and implementing the role.

Sport Education (SE) has become a well-researched instructional approach over the last few decades (Araujo, Mesquita, & Hastie, 2014; Wallhead & O'Sullivan, 2005). Units taught through SE have been aligned with influencing elements such as psychomotor performance (Pritchard, Hawkins, Wiegand, & Metzler, 2008) and physical activity behaviors (Wallhead, Garn, & Vidoni, 2014). Furthermore, a developing line of inquiry has been the motivational responses of students when taught using SE (Perlman, 2014). The importance of examining motivational research within physical education is the strong association between motivated students and a variety of positive student outcomes, experiences, and behaviors (S. Chen, Sun, Zhu, & Chen, 2014).

As research on SE continues, a trend has been toward understanding and examining specific features of SE so that insight into their influence on the physical education student can be gained (Araujo et al., 2014). In particular, Araujo et al. (2014) suggested a deeper inquiry into understanding elements of the process when students take more control over elements of learning, as occurs in SE. As such, this study used a self-determination theory (SDT; Deci & Ryan, 1985) motivational perspective to examine the team coaches (e.g., the SE feature of roles) and their influence on the students within their team.

Theoretical Framework of Motivation

This study used SDT (Deci & Ryan, 1985) as the motivational framework for examining features of SE, specifically the role of coaches. SDT posits that a person in a leadership role (e.g., team coach or teacher) has a major influence on the motivation of others under their leadership (Deci & Ryan, 2012). The interpersonal style or approach a coach adopts and implements can support and/or thwart key psychological needs of autonomy, competence, and relatedness of their peers (Deci & Ryan, 1985; Reeves, 2009). According to Deci and Ryan (2002), autonomy is a perception that students are

provided a sense of control and/or choice over their learning experience, competence is a perception of being successful or provided an appropriate level of challenge, and relatedness is a feeling of being cared for or socially connected with classmates. While each psychological need is important for the facilitation of a student's motivation, an effective leader or coach will be supportive of all three needs (Deci & Ryan, 2012). As a student is supported (at different levels) of each psychological need, this will in turn influence the degree or level of self-determined motivation of a student (Vallerand, 2001). For instance, a coach who is supportive of all three needs will more likely positively influence the motivation and behaviors of his or her players. While supporting all three needs is critical toward influencing student motivation, the interpersonal style plays an important role.

The interpersonal style and approach used by a leader is the interplay between three overarching concepts of support, control, and structure (Jang, Reeve, & Deci, 2010). Supportive interpersonal behaviors focus on the intrinsic motivations of students such as interest, enjoyment, and personal growth (Reeve, Jang, Carrell, Jeon, & Barch, 2004). A teacher or coach who delivers supportive instruction will relate their activities to the internal motives of students, be flexible in their language in the way they speak to others and how much time is provided to complete a task, and demonstrate empathy and care for those under their leadership (Reeve et al., 2004). Controlling behaviors are implemented when the instructional approach aligns with extrinsic elements, are facilitated through the use of deadlines and statements that lack flexibility, and do not demonstrate care for students or peers in need (Reeve et al., 2004). While supportive and controlling elements are viewed as distant concepts on the interpersonal continuum, a leader can and most likely will use both within their instruction (Silk, Morris, Kanya, & Steinberg, 2003). Furthermore, the concept of structure plays an important role on the motivations and behaviors of students (Jang et al., 2010). Structure is associated with the managerial aspects that align with success or how tasks should be completed in a specific setting (Carter & Doyle, 2006). When a teacher establishes clear expectations and learning goals, and communicates policies and procedures for how things should be done, this aligns with a high level of structure (Jang et al.,

2010). On the opposite end, being vague in terms of expectations that are viewed as a level of chaos aligns with low structure (Jang et al., 2010). Structure within a learning setting allows students to have an increased understanding of the educational direction and gives them a greater ability to perceive a higher level of control over their behaviors (Skinner, Furrer, Marchand, & Kindermann, 2008).

Sport Education and Motivation Research and Literature

In regard to instructional approaches that may facilitate or align with motivation, Perlman (2014) identified a strong connection between elements of SDT and SE. A growing body of knowledge illustrates the motivational influence of engaging students within a unit taught through SE (Perlman, 2014). SE motivational research has focused on the areas of (1) student responses and (2) elements of the learning climate. Student response research aligns with understanding the perceptions and experiences of students as they engage in lessons taught through SE. Engagement within a unit of SE has elicited positive changes associated with student enjoyment (Perlman 2010), perceived competence (Spittle & Byrne, 2009; Wallhead & Ntoumanis, 2004), and psychological needs support (Perlman, 2011, 2012a). In addition, students have reported significantly higher levels of situational motivation (Sinelnikov, Hastie, & Prusak, 2009) and self-determined motivation (Perlman & Goc Karp, 2010) when taught through SE.

Learning climate inquiry has been aligned with the type of educational setting that either thwarts or supports student motivation. Researchers who have grounded their studies in the achievement motivation theory reported that SE assists to create a climate that focuses on elements of personal growth (Hastie, Sinelnikov, Wallhead, & Layne, 2014; Sinelnikov & Hastie, 2010; Spittle & Byrne, 2009; Wallhead & Ntoumanis, 2004), while SDT-grounded projects reported significantly higher levels of a context that is supportive of students psychological needs (Perlman, 2011, 2012a, 2012b; Perlman & Goc Karp, 2010). Irrespective of the theoretical framework, evidence has lent support for the creation of a beneficial educational setting for students.

Previous research into SE has examined the approach in a holistic manner, and the motivational influence has been attributed or inferred to a variety of specific characteristics that the approach encourages. These include the implementation of fair play or sportspersonship measures (Perlman, 2011), peer coaching (Wallhead & Ntoumanis, 2004), and use of roles beyond being a player (Sinelnikov et al., 2007). A limitation of the aforementioned research is that inferences about the mechanics of specific features of SE and their potential influence on student behaviors have been identified. From a holistic perspective, it has been demonstrated that SE can facilitate motivational enhancement, but little is truly known about the specific elements that assist or support such change. Calls for more micro-analysis of SE and an understanding of key elements and their influence on students have been made (Araujo et al., 2014; Perlman & Goc Karp, 2010). Therefore, this study examined the influence of team leaders (i.e., coaches), using an SDT lens, on the students' experiences and perceptions within their team.

Method

Before beginning this study, University Ethics Board approval and participant consent were obtained. As each student was under the age of 18, parental or guardian consent was provided. This study used a case study approach (Merriam, 1998) that was grounded in the motivational framework of SDT (Deci & Ryan, 1985). Qualitative data were collected through individual and focus group interviews, student journals, and researcher observations and field notes. Analysis of data was conducted via the constant comparative method (Strauss & Corbin, 1998) and supported through trustworthiness elements of triangulation, member checks, peer debriefing, and examination of negative cases.

Participants

Twenty-five (15 male, 10 female) students were placed into five teams. Each team engaged in a 15-lesson unit of basketball taught through SE. The basketball unit was taught toward the end of the semester. Each team had one head coach for the entire unit, while the rest of the players were provided various roles throughout the unit such as record keeper and official.

Sport Education Unit and Fidelity

The unit of study was a 15-lesson basketball unit taught to a required ninth-grade physical education class. The SE unit was conducted in phases of (a) player development, (b) regular season, and (c) postseason. Each phase lasted five lessons. Player development engaged students in a variety of games and activities that focused on the development of psychomotor and cognitive elements of basketball. During Phase 1, students were placed into teams and coaches were selected. Many of the activities were initially teacher designed and allowed each student to gain a sense of their own ability to play basketball. Beginning in Lesson 3, coaches were given greater responsibility to implement and design learning activities with their teams. The regular season (Phase 2) consisted of a combination of preseason and regular season games. Throughout the phase, students were taught concepts of fair play and game evaluations. The postseason (Phase 3) was a double round-robin tournament in which each team played each other twice. The team with the most points at the end of the postseason tournament was crowned the champion. Table 1 provides more details about the SE unit.

The researcher used the benchmark assessment for verification of SE grounded in the work of Ko, Wallhead, and Ward (2006) and Perlman (2010). During each lesson, the researcher identified when a key feature of SE was implemented (see Table 2 for more details). The researcher identified that all elements and features of SE were implemented in the unit. While the study was only focused on the coaches and their players, it was deemed important that SE was taught in a manner that was appropriate to the model.

Data Collection Measures

Interviews (individual and focus group). The intent of the interviews was to investigate the perceptions, experiences, and thoughts of students (coaches and players) within each team throughout the unit in relation to the coach, player, and team dynamics. Each student was interviewed individually once per week, while focus group interviews were conducted each Friday. Focus group interviews were conducted as a team, players only or coaches only. Each interview was conducted in the physical education office with an audio recorder placed on the table to record all verbal statements and lasted between 20 and 30 min. The interview protocol

Table 1
Sport Education Unit of Basketball

Lesson	Content
1	• Unit introduction • Small-sided games (assessment of student abilities) • Class vote of coaches
2	• Coaches and players announced • Teacher-led practice and activities (passing and dribbling) • Inter-team games (3 vs. 3) • Team activities (introduce duty team and team name)
3	• Teacher-led practice and activities (shooting and attack) • Teacher-created team practice (coach implemented) • Inter-team games (3 vs. 3) • Student roles
4	• Teacher-led activities (defense) • Coach-created team practice • Inter-team games (3 vs. 3) • Introduction of fair play and sportspersonship
5	• Teacher-led activities (defense) • Coach-created team practice • Inter-team games (3 vs. 3) • Introduction of game-play scoring rubric
6–7	• Team warm-up/practice • Preseason games (3 vs. 3)
8–10	• Team warm-up/practice • Regular Season (3 vs. 3)
11–14	• Team warm-up/practice • Postseason tournament
15	• Final competition • Awards ceremony

followed a semistructured format (Merriam, 1998) with the use of follow-on or probing questions when more detail, clarification, or information was deemed necessary. Sample questions focused on constructs of Sport Education (How do you think your coach is doing? What are his or her strengths as a coach? What are his or her areas for improvement?) and SDT (Are you able to provide your opinion within the team?)

Table 2
Verification Criteria of Sport Education

Sport Education aspect	Criteria
Season	• Students placed on a team • Season elements (preseason, regular season, and postseason) • Championship game(s)
Affiliation	• Students involved in the team selection process • Consistent teams throughout unit or season
Formal Competition	• Formalized schedule of games • Evaluation of games (winning, completion of roles, etc.)
Record Keeping	• Students keep record of game elements (winners, completion of roles, fair play)
Responsibility	• Implementation of student roles • Students are accountable for elements of model • Teacher supports student knowledge of sport

Student journals. Each participant completed a weekly reflective journal. Each week, students responded in detail to specific prompts. Topics included perceptions of their teammates, their role within the team, motivational constructs (e.g., enjoyment, choice, social connection), and elements of SE. Each journal entry was electronically submitted via a confidential and password-protected online submission system supported by the university. Typically, each week focused on one or two prompts so as to not overwhelm students and to allow for a deeper reflection and response.

Researcher observations and field notes. Researcher observation and field notes helped the researcher to identify during the SE unit students' critical behaviors, statements, and interactions that align with elements and concepts of student motivation. Using the guidelines of Burgess (1991), the researcher recorded notes during data collection and followed with field note preparation (e.g., detailed

description of observation). Furthermore, a daily self-reflection on lessons provided further meaning or understanding of researcher field notes.

Data Analysis

Data from all qualitative sources were analyzed via the constant comparative method (Strauss & Corbin, 1998). Initially, data from interviews, student journals, and observer field notes were transcribed verbatim and reviewed for accuracy. Two researchers conducted open coding whereby initial codes, descriptions of each code, and supportive quotes were created within each data set. Cross-checking of codes and themes was conducted each time the researchers met. The aforementioned process of analysis was continued and reviewed ongoing until both researchers felt a level of saturation was achieved.

Trustworthiness

Trustworthiness was established through the use of triangulation, member checks, and peer debriefing (Creswell, 1998). Triangulation of data was achieved through the use of the three overarching data sources (interviews, journals, and field notes). Data were member checked whereby a research student or lead researcher provided each participant with their individual data sets and analyzed interpretation to ensure the intent and meaning were accurately portrayed. Peer debriefing was achieved through two independent coders cross-checking all information to ensure a level of consistency in the analysis and representation of data.

Findings

The major focus of this research was how a student placed in a leadership position (i.e., coach) influences the experiences and perceptions of students within their team from a self-determination perspective. Initial coding of interviews, journals, and observer field notes revealed within this study overarching themes of (a) method of coach selection, (b) knowledge of the sport and practices, (c) leading by example, and (d) managing the downside. While the four themes were consistent throughout the data analysis, it seemed that the use and implementation of the aforementioned themes supported players' motivational constructs in a range of different ways. This section

provides a brief definition of each theme, supporting raw data, and an explanation of each theme aligned with the motivational theory of SDT.

Method of Coach Selection

The theme of *method of coach selection* aligned with how team leaders within the SE unit were chosen. Coach selection in the unit was determined through a ballot system. Each student was provided a list of behaviors and characteristics of a good leader and coach. The teacher developed characteristics and behaviors of a good coach, based on the concepts of a coach listed on page 37 of the *Complete Guide to Sport Education* (Siedentop, Hastie, & van der Mars, 2011). For instance, a good coach provides "good leadership to players within a team." Students read the list and ranked the top five students in their class who best represented these characteristics. Ballots were collected and tallied, and the five students who earned the most votes were selected as coaches. The teacher then allocated those not selected as coaches into five teams. From a motivational perspective, the process of voting for team coaches can be conceptually aligned with supporting the need of autonomy (*providing control*), relatedness (*giving students a voice*), and structure (*expectations of an effective coach*).

There was a range of student responses in relation to the ballot process of coach selection. First, the majority of students indicated that the process for selecting coaches was a positive experience as reflected in player and coach comments: "I like that we got to vote for the coach" (Player 7, Interview) and "Voting is something I have never done in PE . . . I see the value in it" (Coach 4, Reflective Journal).

The selection process also yielded students who both played the sport and were perceived as "good" players generally in sport. This is reflected in both coach and player responses. For example, Coach 2 during an interview suggested that he or she was selected for the following reasons: "Look, I am the coach because people in the class know I play basketball . . . am good at most sports." Player 18 said, "[Coach 1] should be a coach . . . he is a good athlete . . . we seem to follow his lead in class." (Interview).

However, popularity also became a key indicator of coach selection in the response from players. For example, "Just look at the

people [coaches], they are all the sporty and popular" (Player 12, Interview). In addition, Player 3 suggested that the coaches represented "the more popular students in the class" (Interview). While Deci and Ryan (1985) indicated that a key element for creating a setting that is supportive of students' motivational needs is providing choice and making sure students' voices are heard, the exercise in coach selection and the reasons for selection did not always allow increased control or choice. For example, a few students felt that their voices were not heard despite the voting process, and they questioned the use of the process itself: "They [the coaches] always get to be the leaders in class, even if there is a vote" (Player 5, Interview).

While it could be interpreted as discontent due to not being selected, other responses indicated support for this:

> I know that based on the list we were supposed to use, the best person to be a coach is Sandra. Yet she didn't get voted in. I'm not sure if people really looked at the list or just picked their friends. (Player 19, Interview)

> It was pretty clear that when the coaches were announced there were two camps of students. Those that agreed with the decision and those that did not. The overall mood of the class was positive, yet you can see the group of students who did not agree with the vote are immediately disengaged. (Field Notes, Week 1)

From the onset of the SE unit, the selection of the coach had a clear impact on the motivation of all students in class. The students' need for autonomy seemed, for the most part, to be supported or satisfied through the ballot system. However, the disconnect between the identified behaviors needed to be a good coach and those who were selected is of interest. In particular, conducting an exercise designed as fair (e.g., ballot) resulted in some students' need for relatedness diminishing, because they perceived the basis for fairness (the selection criteria) was connected to those selected. This meant that these students felt they had no meaningful voice. While the teacher created a list of behaviors of a quality coach and a process by which those with the characteristics could be recognized, these behaviors could be open to interpretation. Thus, while there was a

vote, selection could have been because (a) there may not have been five students who appropriately demonstrated all the behaviors of a quality coach, (b) the clarity of the qualities needed by a coach may have been vague, and (c) the students interpreted the qualities in a range of ways or ignored and replaced these with their own criteria. This meant the high level of structure as espoused by SDT was not met. Research supports the notion that students engaged in a unit taught through SE can be supportive of the need for autonomy and relatedness, based on giving students an increased sense of control and voice over their learning and through the infusion of different roles such as a coach (Perlman, 2011; Perlman & Goc Karp, 2010; Wallhead & Ntoumanis, 2004). While this theme supports the research, this level of psychological needs support may not be enough for all students. Simply giving students a voice in selection may not be enough to support these areas and, if not well managed, can create the attributes of "captains" selecting "teams" in class. A vote in selection, enacting of process, and the integrity of the process maintained by matching those selected to the set criteria are also required for SE to remain supportive of these two needs.

Knowledge of the Sport and Practices

Once the voting process determined the five coaches, the design and development of practice sessions was the responsibility of each coach. During the initial lessons of the season, the teacher engaged all coaches and players in a variety of activities aimed at developing psychomotor and cognitive skills related to basketball. As the season progressed, the coaches were given the responsibility of creating a practice plan that included (a) practice focus, (b) two activities or drills, and (c) strategy session. This was submitted to the teacher via e-mail. While coaches could create their own practice sessions, they could also reuse previously designed activities demonstrated by the teacher.

Once in lessons, players and coaches felt that the level of basketball knowledge their coach possessed in practices and game play was a key element that influenced their motivation in the lessons. Players in teams with coaches who had a high level of knowledge in activities to use and ability to give feedback on play reported an increased desire to be involved and engaged in practice sessions and games. For example, Player 11 noted, "It was clear that [the coach] knew a

lot about basketball . . . we did practices that were fun and I actually learned some stuff about basketball I didn't know about" (Player 11, Interview). Player 5 also noted,

> I have to admit that this is the first time that I get what we are doing in basketball. The games [practices] that [Coach 1] has us do are pretty cool. We don't just dribble a ball and not know why we are doing it. He is great. (Reflective Journal)

On the other hand, coaches with a lack of sport-specific knowledge created and implemented practices and activities that were deemed to be not as engaging and players indicated less desire to be involved. For example, Player 7 noted, "Sue is funny and stuff, but she didn't really know much about basketball. She would get us into our roles and that was about it . . . I know I would just shut down [and] not do much . . . IT'S BORING!!!!" (Student 7, Reflective Journal). Player 15 reported the same feelings: "We just do the same every time…dribble…lines…shoot. It is boring and I know that we [teammates] don't want to do this anymore" (Interview). This was also evident to the outside observer, who noted,

> You could really see the difference in motivation, engagement and involvement among teams depending on what the coach had designed and implemented . . . I wonder if there is a connection between the experience level of the coach in basketball and what they can do for their team. (Field Notes, Week 2)

Allowing coaches to create their own practice sessions seemed to bring out differences between coaches in terms of their sport-specific knowledge and impact on the motivation of their players. While the intent of coach-created practices was to allow more autonomy, the resulting sessions had a major impact on motivation from an SDT perspective. While coach-designed and -planned sessions were implemented to support autonomy (e.g., choice of practice sessions), this theme seemed to translate more toward influencing a player's need for competence. According to Deci and Ryan (2002), competence should be viewed in a manner that allows each student to demonstrate success (*winning or improvement*) and/or provides challenge at an optimal level (*balance between success and failure*). As

indicated through the data sets, from a player perspective those with coaches who were comfortable and knowledgeable in the content area reported a sense of being challenged and continually learning, while those on teams with coaches who did not have or were "perceived" not to have these qualities were bored (e.g., challenge could be deemed too low). From a selection criteria perspective, the support for autonomy via voting was not necessarily reflected in the criteria for coach selection. From a player perspective, the relatedness of giving the students a voice in selecting a coach was sometimes at odds with the coach they voted for. This, then, meant that that a rise in initial autonomy could result in a decrease in perceptions of competence.

Leading by Example

The *leading by example* theme relates to the degree by which coaches would put actions behind their words. Students within each team tended to be more motivated when their coach would "do what they would ask others to do" (Player 7, Interview). The following raw data sets support this: "It was really nice that [the coach] would do anything that needed to be done. He didn't just say it and have someone else do it" (Player 11, Interview) and "I struggled getting the field set up and [the coach] just jumped right it. It was nice to have someone help me" (Player 2, Interview).

While coaches (1, 2, and 4) would take the initiative to help players within their team complete a variety of tasks, two coaches (3 and 5) adopted the opposite style.

> There seemed to be two very different leadership styles displayed this week. The first was where the coach seemed to do anything and everything. With that it seemed that their teams were extremely engaged and almost everything was done at a high level. Very impressive!!! On the other hand, there seemed to be the "do as I say and get your role done" model. The players on these teams were fine and doing what they were supposed to do, but if something needed to be done that seemed to fit into two roles it did not get done, tension started and it put a bit of a downer on the day. (Field Notes, Week 3)

Coach 5 stated, "I'm responsible to make sure that [players on her team] do their job. If I do it for them . . . what does that mean for them and the rest of the team" (Interview).

A logical inference could be made that this theme aligns strongly with supporting the need for relatedness and the concept of structure. When a leader interacts and behaves in a manner that puts the collective group (i.e., team) over him- or herself, this can create a sense of caring. According to Gibbons (2014), a key strategy for the facilitation and support of relatedness is for people to act in a personally responsible manner that is focused on both themselves and others. This idea of coaches acting in a caring manner is further supported by students who reported that they witnessed their coach "doing more of their fair share" (Player 9, Interview) and they "felt like their team was a family" (Student 14, Journal). Furthermore, elements of this theme align with the concept of structure. Structure is where a leader or coach implements boundaries that direct students toward an intended learning goal (Carter & Doyle, 2006). Coaches who led by example used structure, as espoused by SDT, in a meaningful and motivationally supportive manner. According to Reeve (2006), coaches can provide structure by offering verbal guidance and assisting those in need. On the other hand, a coach who provides limited help and is critical of those who do not get their role done can be viewed as creating a low level of structure (Reeve, 2006).

Managing the Downside

The theme of *managing the downside* is associated with behaviors and actions of the coach when something within the lesson or unit did not go to plan or presented a level of challenge. It is unavoidable within an educational setting that elements of a lesson will not go to plan and some form of challenging situation will occur. In the unit of basketball, losing the game and having records not kept according to the prescribed rules were viewed as challenges: "You think you have everything planned and organized . . . [player] doesn't hand in the fair play record sheet" (Coach 3, Interview). Another coach said, "No matter what I do either [mentioned two players names] does the opposite or forgets to do it" (Coach 4, Journal).

How each coach dealt with these challenges was interesting, in regard to the style or approach they adopted. Coaches were either

disposed toward a strengths-based or deficit model of dealing with challenge.

The strengths-based coaches were more likely to try and find a solution to the problem and/or focus on elements that went well. For example,

> [Coach 1] was the coach of a team that lost a few games in a row. Instead of focusing on losing, he tried to come up with ways to help the team win by mixing up players in different positions or focusing on attacking the rim and not worrying about giving up easier chances on the defensive side of the ball. (Field Notes, Week 4)

Player 4 noted, "I think we all wanted to win, but it just didn't happen. Coach 1 was good at highlighting what went well" (Interview).

On the other hand, the deficit model coach was more likely to focus on the negative aspects of the situation or what went wrong: "If we lost points we all seemed to get this better then [*sic*] thou attitude by [the coach]. Like we wanted to not get something done or completed" (Player 17, Journal). Coach 4 noted, "Look, when a player does something wrong, [he/she] should know about it" (Interview).

From a self-determination perspective, these styles of coaching (e.g., strengths and deficit) align strongly with specific behaviors that a teacher or leader can use that either support or hinder the motivation of their students. Specifically, supportive leaders encourage persistence when challenged, praise improvement, and facilitate progress when a student is stuck or unsuccessful (Reeve, 2006). On the contrary, hindering motivation can occur when a leader places pressure on his or her team and judges performance based on their inabilities (Bartholomew, Ntoumanis, & Thogersen-Ntoumani, 2010).

Conclusion

Findings from this study indicate that coaches can play an integral part in influencing motivational elements such as the psychological needs of their players. While these findings align with previous motivation-grounded SE literature (Perlman, 2014; Wallhead & Ntoumanis, 2004), the unique contribution of this study is that it examined the role of the coach using a motivational lens.

The findings lend support that each psychological need of students was influenced, yet the level of support seemed to align with the individual coaching style. As such, when a teacher implements an SE unit and uses students in leadership roles, he or she should carefully consider (a) the specific qualities needed to be a coach and (b) how much responsibility or accountability to give the students.

When creating and implementing a unit that uses coaches or some form of team leader, the teacher and their students may benefit from having students who possess an adequate level of unit- or sport-specific knowledge and dispositions that align with good leadership qualities and the ability to connect with their players. The level of content knowledge may allow coaches to design activities and take on a role that allows for meeting the distinct and unique needs of their team. Designing activities that are engaging and educationally relevant is a key element to enhancing student motivation (Martin, 2006). It is important that students engage in relevant learning activities so that they understand the purpose of each activity and how it is important to them as students (Kember, Ho, & Hong, 2008). Furthermore, A. Chen and Ennis (1995) illustrated that when teachers (and in this case coaches) have a high depth of content knowledge, they are better armed to implement educationally relevant activities and in turn motivate students.

Dispositions of a coach should be considered. As with educational professionals, coaches may best be aligned to a caring person who is flexible and allows all students to voice their opinion. Implementing student roles in a meaningful way can be a daunting task. As such, teachers may need to become more flexible within their teaching to know how much responsibility and control each coach needs, to allow learning to continually occur.

The findings from this study illustrate that when creating and implementing specific roles, teachers should carefully consider the specific elements needed by the students to complete each role. In addition, as with the implementation of any role, the teacher needs to be able to support and balance the needs of the students in terms of how much responsibility and information each coach needs. While this study extends the body of knowledge around SE and motivation, more inquiry is needed. More micro-analysis studies that examine specific features or elements of SE would provide more insight into

the specific mechanics of the model and their influence on student outcomes and experiences. Second, this study was conducted at one school with a few coaches and teams. Possibly a multisite research project could illustrate the generalizability of these results and consider additional variables such as motivational profiles of players during the unit.

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The Physical Educator Vol. 75 • pp. 816–834 • 2018
https://doi.org/10.18666/TPE-2018-V75-I5-8297

FACILITY PLANNING AND DESIGN

Accessible Golf Courses: Web-Based Accommodation Communication

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Abstract

Websites are a critical tool for sport participants to seek logistical information prior to arriving at a facility. Given the challenge in accommodating mobility disabilities, research exploring how outdoor sport facilities, such as golf courses, precommunicate accommodation information via hosted websites is warranted. This study assessed website accommodation communication by nonprivate golf courses. To create a context and comparison, the researchers also collected data for commercial sport facilities. Of 268 nonprivate Indiana golf courses hosting websites, only two (< 1%) included Web-based accessibility announcements. Of 10 Indiana commercial sport facilities hosting websites, six included Web-based accessibility announcements (60%). Perceptions of undue burden and targeting the active-aging community inform the discussion of research results.

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Casey Martin, a professional golfer, suffered from a birth defect, a condition known as Klippel-Trenaunay syndrome. The disability caused severe pain and swelling in his right leg, preventing him from successfully walking long distances. When the Professional Golfers' Association (PGA) attempted to disallow Martin from using a golf cart in tournament qualification play, Martin confronted the PGA via lawsuit under the Americans With Disabilities Act (ADA; *PGA Tour, Inc. v. Casey Martin,* 2001). Numerous factors affected the court's decision: (1) The PGA tour, associated golf courses, and tournaments were disqualified as private entities; (2) providing Martin with a golf cart did not qualify as undue burden; and (3) allowing Martin to use a golf cart did not fundamentally change the game or give him an advantage over other opponents (Barnes, 2001). Martin won the case and was declared eligible for golf cart use in PGA Tour qualifying events. Although he never qualified for the PGA Tour, this landmark case sparked change in how the ADA would be applied to golf facilities and subsequently how golf managers would need to adapt (Barnes, 2001; Parziale, 2014).

This historic ruling supported accessibility progress with respect to auxiliary aid development (Parziale, 2014; SoloRider, n.d.), policy changes (United States Golf Association [USGA], n.d.), and law amendments (U.S. Department of Justice, Civil Rights Division [USDOJ CRD], 2010a). For example, wheelchair users now have the option to utilize single-rider golf carts equipped with specially designed tires that exert less pressure on a putting green than a typical 180-pound person. The 350-degree swivel seat allows riders to play their shots from a seated or semi-seated position (Parziale, 2014; SoloRider, n.d.). The USGA implemented an application process for golfers (the Golf Disability Review Board) who request accommodation, as well as implemented a complete set of adapted rules (USGA, n.d.). In 2010, the ADA was amended to include practical and specific ways golf courses should achieve accessibility (USDOJ CRD, 2010a). This set of changes was perceived to open golf courses to the ever-increasing active-aging market and/or the market for people with disabilities (Barnes, 2001).

Organizations use various means including websites to communicate access to patrons with disabilities. For example, Bankers Life Fieldhouse (home of the Pacers) includes, on their hosted website,

an accessible icon. After the user has clicked on the icon, a new page shows the variety of methods Bankers Life Fieldhouse employs to accommodate patrons with disabilities. The page provides instructions for obtaining assisted listening devices and directions to accessible seating arrangements (Bankers Life Fieldhouse, n.d.). Providing comprehensive facility information online, such as Web-based accessibility announcements, can increase customer satisfaction (Petrick, Backman, & Bixler, 1999). Websites are available 24 hours a day, 7 days a week, which allows customers to seek information as they need it and thereby increases consumer awareness and consumer demand (Gillentine, 2003).

Between 4 and 5 million Americans with disabilities have declared interest in playing golf or have already made playing golf a part of their lives (Gross, 2007). When a golfer is selecting a course to play, perceived course condition has a high influence on the golfer's decision (Won, Hwang, & Kleiber, 2009); for individuals with disabilities, course condition and accessibility are inextricably linked. Given that websites are a critical and central part of communication for sport organizations (Hur, Ko, & Claussen, 2012; Tuckman, Chatterjee, & Muha, 2004) and an important information provider for consumers (Filo & Funk, 2005; Seo & Green, 2008), an assessment of golf course website communication directed toward the community of people with disabilities is warranted. The literature surrounding ADA application to golf addresses legal issues and undue burden (Hedding, 2002), but fails to illustrate how golf courses communicate accessibility information to patrons and actively recruit this market. The dual purpose of this study was to understand how golf courses communicate accessibility to patrons with disabilities through their hosted websites and to understand this Web-based communication in comparison with commercial sport facility approaches. The following research questions guided this investigation:

- RQ1: What are the methods by which nonprivate golf courses communicate accessibility to patrons with disabilities through hosted websites?
- RQ2: How do the methods by which nonprivate golf courses communicate accessibility to patrons with disabilities through hosted websites compare to the methods used by commercial sport facilities?

Literature Review

The Standards Updated

The literature surrounding how golf courses should achieve accessibility focus on these areas: (1) various publications (government and otherwise) explaining the nature of the updated 2010 Accessible Design standards, (2) publications providing a specific guide and support for golf course managers to achieve and embrace inclusion, and (3) the ongoing debate of whether accommodations qualify as undue burden given the unique game of golf. Although nonprivate[1] golf course accessibility is mandated by law and governing bodies and disability advocacy groups support golf course accessibility, the game of golf presents well-acknowledged challenges with respect to inclusion.

The ADA of 1990 was developed "to prohibit discrimination and ensure equal opportunity for persons with disabilities in employment, state and local government services, public accommodations, commercial facilities, and transportation" (USDOJ CRD, 2016, para. 1). Section 36.104 of the 1991 Accessible Design standards included nonprivate golf courses as a place of accommodation. The intricacy associated with applying ADA standards coupled with a lack of specific recommendations for sport facilities, left golf course managers with a difficult set of guidelines to interpret and apply (Hedding, 2002; Wanless, Judge, Petersen, & Hindawi, 2015). In response to this associated difficulty, in 2010 the original ADA standards were updated (USDOJ CRD, 2010b).[2] Because questions arose with interpreting this new document, the Civil Rights Division provided an ancillary guide to aide understanding and application (USDOJ CRD, 2010a). The USGA (Gross, 2007) and National Alliance for Accessible Golf (2003) also produced a hands-on interpretation of accessible design, specifically with regard to course care. The evolution of the ADA standards to better accommodate facility operators, as well as patrons with disabilities, is well documented within legal documents and through guides to

[1]Private courses can often be considered places of public accommodation and be subject to ADA law in the same way as nonprivate golf courses. For an example, see *PGA Tour, Inc. v. Casey Martin* (2001).

[2]For a summary of the changes made from ADA 1990 to the 2010 standards, see Wanless et al. (2015).

support the interpretation of the law (Parziale, 2014; Wanless et al., 2015). The USGA (n.d.) took additional measures to implement an application process for golfers (the Golf Disability Review Board) who request accommodation, as well as implemented a complete set of adapted rules.

Many of the essential components of the game include difficult terrain (e.g., sandtraps). In addition, this difficult terrain requires a great deal of maintenance. Under the ADA, accommodations do not necessarily have to be made, if facility managers can prove the alteration creates undue financial burden or that the accommodations would fundamentally alter the game of golf (Barbookles, 2013). The discussion of whether golf accessibility is undue burden permeates two law reviews (Barbookles, 2013; Barnes, 2001), a philosophical position paper (Bowen, 2002), and two court cases (*Celano et al. v. Marriott Int'l, Inc.,* 2008; *PGA Tour, Inc. v. Casey Martin,* 2001). Critics of mandating accessible courses declare the nature of golf would be fundamentally changed (USDOJ CRD, 2010a). Barbookles (2013) identified several challenges in upholding the nature of golf and quality of the golf course and also ensuring access for populations with disabilities. For example, early in the golf season, greens are particularly vulnerable. Wheelchairs or adaptive carts may damage greens during this time. In an investigation of green damage from various forms of traffic, however, Gentilucci (1997) found that when greens are given at least 30 min of recovery time, even the most narrow wheels produce negligible damage. The study did not declare at what point in the year the greens were observed. Barnes (2001) and Bowen (2002) commented that although accommodations should be made for the general public, Casey Martin should not have been allowed to pursue qualifying tournaments for the PGA tour. Barnes related golf course accessibility to employment accessibility in that each individual needs to meet the job requirements and that one job requirement for a PGA golfer involves navigating difficult terrain. In a similar sense, Bowen discussed how court justices misinterpret the limitations by which the ADA should be applied.

The questions surrounding undue burden and ADA in golf course accessibility have yet to be tested in court aside from the Casey Martin case. In 2008, however, a district court in Northern California ruled against Marriott hotels in California for failing to

meet accessibility standards. In *Celano et al. v. Marriott Int'l, Inc.* (2008), the district court deemed that it was a reasonable and necessary accommodation that Marriott provide single-rider carts for patrons with disabilities. Marriott had informed patrons they were able to bring their own single-rider cart, but would not provide them. The district court ruled otherwise. This court case may be just the beginning to understanding the standard to which golf courses and golf course managers will be held. The combination of court cases, related documents, and literature adds important insights to the discussion of golf course accessibility. The literature fails, however, to discuss the strategies by which golf course managers precommunicate with patrons with disabilities.

Websites: Information Providers

Websites allow consumers to gain knowledge, seek information, find entertainment, purchase products and services, communicate with others, and more (Moon & Kim, 2001). As a result, for sport organizations, websites have become an opportunity and expectation. Website communication and website content provides information that can be used to leverage product attributes and benefits in the minds of the consumer (Filo, Funk, & Hornby, 2009). Filo et al. (2009) stated that leveraging the uniqueness of a sport product online creates a competitive advantage among competitors in the market. Websites are now a critical sport marketing tool that sport consumers expect when browsing for information on the Internet (Filo & Funk, 2005; Seo & Green, 2008).

Online users will visit and revisit a particular website for many reasons (Hur et al., 2012). Suh, Ahn, and Pedersen (2013) identified five service quality factors of sport websites: usability, privacy, reliability, information, and appearance. When executed correctly to reach their target markets, these factors ensure repeat online page visits from their users. The Internet has become an integral place for consumers to seek sport information, as identified in the model presented by Suh et al. (Seo & Geen, 2008). "Information refers to the assessment of whether the material and knowledge provided on a website actually fulfills the needs of the customer . . . information is an essential element necessary to secure customer revisits to a website" (Suh et al., 2013, p. 163). When golf course managers, for

example, provide correct and timely information on their website, customer satisfaction increases.

Accessing information online is now commonplace for consumers, and accessing sport information has increased because of the growth of the online presence of sport business (Hur, Ko, & Valacich, 2007). When seeking information online, consumers are creating a behavioral access method that can happen repetitively with the same website if organizations structure their business marketing strategy and websites to capture these users (Moon & Kim, 2001). Businesses are positioning themselves online to disperse information about the business and its products through online marketing tactics (Filo et al., 2009). Nonprofit organizations and businesses alike use the Internet to disperse information and market to customers (Tuckman et al., 2004).

Marketing plans, specifically for golf course facilities, are embracing technology and the Internet by hosting websites (Gillentine, 2003). If a sport company can identify its markets and key consumers, it can design an effective website to reach and engage customers (Gillentine, 2003; Seo & Green, 2008). There is a strong need for websites to connect to users through online interactivity tactics that keep users on the website longer, which allows for more exposure to the sport company, brand, facility, and products (Ioakimidis, 2010; Suh, Ahn, & Pedersen, 2014). When structuring a website, the organization can strategically use its goals and the effect on target users in the marketing strategy (Gillentine, 2003; Seo & Green, 2008). An effective website must best meet the needs of the consumer base and website users (Seo & Green, 2008).

Value can be created and increased through having and effectively using websites (Ioakimidis, 2010). When a user or customer experiences satisfaction through perceived website effectiveness, that person also perceives the value of the organization (Petrick et al., 1999). Seo and Green (2008) designed a sport motivation scale for an online consumption study and found that information and knowledge are two of the 10 dimensions that lead to consumption. Information was again identified and significant in other studies as a substantial motivation for users to select browsing on a particular website (Filo et al., 2009; Hur et al., 2007). These findings support

the need to inform consumer decision-making processes via online modalities. The purpose of this study was to assess accommodation communication of nonprivate golf courses via information provided through the course websites and to assess this communication in comparison with Web-based accessibility announcements from commercial sport facilities.

Method

Population and Sample

Golf courses. To gain a representative sample and wide range of golf courses in rural and urban settings, the researchers evaluated golf courses within the boundaries of one state of the United States. The state of Indiana was selected because of its close proximity to the researchers. Researchers considered 360 nonprivate (public, semiprivate, resort, and military) golf courses from the total 439 Indiana golf courses. The sample for the study was also limited to nonprivate golf courses in the state of Indiana that hosted websites at the time of data collection, August to September 2015. Indiana Golf, a professional association, served as the intitial source for website identification; 183 of the 360 nonprivate courses included Web addresses with their Indiana Golf registration data (Indiana Golf, n.d.). To uncover potential host websites missing from the Indiana Golf database, the researchers used Google to search for the remaining 177 golf courses that were nonprivate and did not register a website with Indiana Golf. Eighty-five additional golf course websites emerged. Two hundred sixty-eight nonprivate golf courses hosting websites (74% of the 360 nonprivate Indiana golf courses) met the criteria for this study.

Commercial sport facilities. The researchers considered 16 Indiana commercial sport facilities in the investigation not only for the sake of comparison, but also to add context for the discussion of Web-based golf course accessibility communication. Commercial sport facility host websites were retrieved through professional sport team identification and Google. Of the 16 commercial sport facilities in Indiana, 10 contained facility websites (62.5% of the total). For the sake of consistency, the researchers did not consider team websites. For example, the Evansville Otters play at Bosse Field. Although the

Evansville Otters hosted a website, Bosse Field did not and therefore was not considered.

Content and Descriptive Analysis

Two researchers were trained to independently assess page content and features of nonprivate golf course and commercial sport facility websites in Indiana. Websites were independently reviewed during a 2-week period in September 2015. Given the exploratory nature of this study, it was necessary for the researchers to set parameters to enhance consistency in assessment across Internet sites. Review of content was limited to home page (primary page) and secondary pages. A page was operationally defined as the content available on screen (including scroll) with one click of the mouse. Each of the golf course websites was reviewed in the following manner: (1) The website home page or primary page was thoroughly checked for an accommodation notice, and (2) all subsequent pages considered secondary pages available through the primary page were thoroughly checked for an accommodation notice. For each home page and secondary page, the researchers determined if accommodation information was present. Responses were coded on a dichotomous scale (*lacked accommodation information* = 0 and *included accommodation information* = 1). The accessibility announcement, when present, was documented. The researchers recorded the results for primary and secondary pages in separate Excel spreadsheets. Discrepancies in codes did not arise between reviewers; therefore, the resulting Krippendorff's alpha was 100%.

Because of the exploratory nature of the study, and as a result of vastly different population sizes between golf course and sport commercial facilities in Indiana, descriptive statistics were used for data analysis. Specifically, the proportion of websites with accessibility announcements to the total number of facilities that met study criteria were calculated and represented in frequencies and percentages for golf and sport commercial facilities.

Results

Of the 268 nonprivate Indiana golf courses with websites, two golf courses listed an accessibility announcement on their website: Chariot Run Golf Course in Laconia, Indiana, and McMillen Park Golf Course in Fort Wayne, Indiana.

Chariot Run Golf Course, hosted in the Horshoe Southern Indiana (a casino and hotel), provided this notice on the primary page of its website. Accessibility information was not provided on secondary pages.

> Caesars Entertainment is committed to providing an excellent experience for our guests with disabilities.
>
> Our properties offer a wide range of accessible accommodations to meet the needs of our guests and welcomes service animals.
>
> Caesars also seeks to ensure that all guests with disabilities can make a reservation and have access to the information on this website. (Ceasars Entertainment, n.d., para. 1–3)

McMillen Park Golf Course provided the following notice on a secondary page labeled About under the General Information tab. McMillen Park Golf Course did not include a disability announcement on its primary page.

> Thanks to a partnership with Turnstone Center for Children and Adults with Disabilities and a grant made possible through the National Alliance for Accessible Golf, an accessible golf cart is now available for use at McMillen Park and Mad Anthony IIIs Golf Courses. (McMillen Park Golf Course, n.d., para. 2)

Of the 10 commercial sport facilities hosting websites, six included disability announcements on their websites: the Ford Center (on the primary and secondary pages), Allen County War Memorial Coliseum (on a secondary page only), Bankers Life Fieldhouse (on the primary and secondary pages), Lucas Oil Stadium (on the primary and secondary pages), Indianapolis Motor Speedway (on a secondary page only), and Lucas Oil Raceway (on a secondary page only).

The primary page of the website for the Ford Center located in Evansville, Indiana, included an Accessibility Services tab. This link also appears on secondary pages. Figure 1 shows the accessibility services communicated through the facility website.

The Allen County War Memorial Coliseum (n.d.) facility secondary ticket office page states, "The Allen County War Memorial

Coliseum is ADA compliant for accessibility including restrooms, parking, drop off lanes, and service counters" ("Special Needs," para. 1).

The Bankers Life Fieldhouse primary home page website contains an Accessibility link with the disability icon displayed next to it. This link was included on all secondary pages as well. Figure 2 shows the accessibility services offered at Bankers Life Fieldhouse.

The Lucas Oil Stadium primary home page facility website displayed an Accessibility tab that appears on both primary and secondary pages. Figure 3 shows the accessibility services offered to patrons attending events at Lucas Oil Stadium.

The Indianapolis Motor Speedway included, on a secondary page only, a declaration that the Hulman Terrace Club offers "ADA-accessible seating."

The Lucas Oil Raceway included, also on a secondary page only, an FAQ page discussing accessible parking and grandstand seating. "Q: Where is handicap parking for the Chevrolet Performance U.S. Nationals? A: Handicap parking is inside the oval. There will be transportation from the handicapped parking to the grandstands."

Discussion

The purpose of this study was twofold: (1) to investigate how nonprivate courses communicate accessibility to patrons with disabilities through their hosted websites and (2) to assess this communication in comparison with that of commercial facilities. Given that websites are a critical and central part of communication for sport organizations (Hur et al., 2012; Tuckman et al., 2004) and an important information provider for consumers (Filo & Funk, 2005; Seo & Green, 2008), an assessment of golf course website communication directed toward the community of people with disabilities was warranted. Of the 268 nonprivate Indiana golf courses hosting websites, only two (less than 1%) included accessible announcements on their website. Sixty percent of commercial sport facilities, however, included Web-based accessibility announcements. This result may be an indication of golf courses lacking accessibility, golf course managers linking golf accessibility with undue burden, failure to pursue the market of people with disabilities through online means, or perhaps a lack of comprehension with respect to implementing Web-based accessibility announcements. How golf course

managers adhere to, apply, and feel about ADA guidelines should be further investigated through a variety of methods and scope.

Undue Burden

Over 99% of nonprivate Indiana golf facilities with a website did not include accessibility announcements on their hosted website. Failure to produce Web-based accessibility communication does not necessarily mean a failure to comply with ADA law; ADA law does not mandate this type of communication. However, this lack of Web-based accessibility communication in comparison with that of commercial sport facilities may be a symptom of bigger issues associated with creating accessible golf courses. The concept of undue burden may be manifesting culturally in a number of ways, preventing golf course managers from providing necessary information to patrons with disabilities via hosted websites. First, even though nonprivate golf courses are mandated to be accessible, golf course managers may not have updated facilities to compliance with the 2010 ADA standards. Parziale (2014) suggested accessible golf courses exist throughout the nation. Websites such as mobilitygolf.com help patrons with disabilities to identify accessible courses. However, only a few golf courses within Indiana have declared with Mobility Golf. Eagle View Golf Club in Crane, Indiana, Eagle Creek Golf Course in Indianapolis, Indiana, and the Birk Boilermaker Golf Complex in Lafayette, Indiana, have declared as accessible through this mode (Mobility Golf, n.d.). (Interestingly, these golf courses did not have accessibility announcements on their pages, a concept addressed in the next section.) When so few are registered with the Mobility Golf website, and so few have announcements on websites, one begins to wonder how many are accessible or how many golf course managers emphasize accessibility.

Given the expense that might incur as a result of adjusting golf cart paths, weather shelters, and practice areas, and perceived adjustments to pace of play, golf course facility managers face a unique challenge when accommodating individuals with disabilities. Barbookles (2013) and Bowen (2002) acknowledged the intricacy of accommodating individuals with disabilities and upholding the nature of the game of golf. Golf involves tedious maintenance of grounds (Barbookles, 2013; Gentilucci, 1997) and the inclusion of inaccessible obstacles such as sand traps that are considered part of

the nature of the game (Bowen, 2002). When course quality is the most important determinant in choosing a golf course (Won et al., 2009), golf managers rightfully and carefully maintain their grounds. Golf course managers may hesitate to fully pursue golf course accessibility or to publicize an accessible course for fear that golf greens and other delicate grounds may be affected by equipment for patrons with disabilities. Gentilucci (1997) dispelled the notion that wheelchairs, especially those with increased tire width, disrupt the pristine condition of a golf course green. Golf culture, however, may vacillate and could require education and promotion prior to golf course managers supporting accessible golf equipment.

Several auxiliary aids can help support golfers with disabilities. For example, wheelchair users can use single-rider golf carts equipped with specially designed tires that exert less pressure on a putting green than a typical 180-pound person while allowing riders to play their shots from a seated or semi-seated position in a 350-degree swivel seat (Parziale, 2014; SoloRider, n.d.). Modifications to other types of golf equipment may include lighter clubs, clubs with altered angles to accommodate golfing from seated positions, and gloves specially made to accommodate individuals lacking grip strength. Golf course managers may fail to advertise to this group because obtaining and maintaining this equipment can be expensive. In addition, golf course managers may perceive that athletes with disabilities could slow play when using these devices.

Websites for Accessibility Communication

Websites are an important communication method for sport organizations (Filo & Funk, 2005; Filo et al., 2009; Seo & Green, 2008). At the time of data collection, two hundred sixty-eight of the 350 Indiana nonprivate golf courses hosted websites to communicate to consumers. Suh et al. (2013) identified gaining information as one of the five service quality factors of websites, and Hur et al. (2007) also identified websites as a critical vehicle to gain information. Eighty-two nonprivate golf courses in Indiana failed to provide websites as of September 2015. Golf courses that did not provide host websites may be failing to best communicate with current consumers or to recruit new consumers. The culture of golf may be supporting another mode of communication such as calling the clubhouse, but

failing to evolve and maximize websites may also be failing to gain new consumers or completely satisfy consumers.

Two hundred sixty-six of the 268 courses with host websites did not provide accessibility announcements. Although these golf courses may better meet the needs of communication with consumers through hosting a website, they may still fail to maximize recruitment of the active-aging and people with disabilities. The two Indiana nonprivate golf courses that registered on the Mobility Golf website did not have accessibility announcements on their hosted websites. Perhaps although golf course managers recognize the value of having a website as a marketing tool, they may not be realizing that providing information is a key service quality construct (Suh et al., 2013). Research has suggested prioritizing website use to key markets (Gillentine, 2003; Seo & Green, 2008). Perhaps golf course managers who do host websites do not view golfers with disabilities as priority consumers. Given that 4 and 5 million Americans with disabilities want to play or are already playing golf (Gross, 2007), and as the active-aging community continues to grow, golf course managers may be missing a key demographic to drive business to their courses.

The lack of accessibility announcements could also be a symptom that golf course managers may not know how to create such an announcement or what to include. Even though the USGA has provided an accessible set of rules (Hedding, 2002), and even though the 1991 Accessible Design standards were adjusted for practicality (Hedding, 2002; USDOJ CRD, 2010b) and governing bodies made efforts to resource golf managers with documents interpreting the standards (Gross, 2007; National Alliance for Accessible Golf, 2003), governing bodies have not extended their support to helping golf course managers provide communication to patrons with disabilities. Represented in Figures 1, 2, and 3, commercial facilities could serve as a model for recreation facilities (e.g., golf), to communicate with the active-aging market and people with disabilities.

Limitations

This exploratory study did not include dialogue with golf course managers about the accessible status of golf course websites, nor with patrons with disabilities about their attitudes toward use of

the facility. The discussion of the study, therefore, was limited to issues potentially surrounding the lack of accessibility announcements. Inferential statistics could not verify a significant difference in Web-based accessibility communication between commercial sport facilities and golf course facilities. The staggering differences, however, make a strong suggestion that a wide gap exists between golf course facilities and commercial sport facilities with respect to providing accessibility announcements. The researchers used two primary methods to locate Indiana golf course websites: the governing body, Indiana Golf, and the Google search engine, by golf course name. Through this process, the researchers deemed that ninety-two golf courses did not include course websites at the time of study. If the researchers had failed to locate existing golf course websites, research conclusions may have been altered. Given the proportion of courses that included accessibility announcements to those that did not, however, research conclusions incorporating additional websites would not represent significant variability.

Practical Applications and Future Directions

The findings of this research stress the need for disability information via sport facility Web pages, specifically websites for golf courses. In an age where the Internet has become a primary source of information, it is important that businesses recognize the diversity of the populations seeking information and visiting websites. Further application of the findings could aid in construction of golf courses featuring accommodations for disability and revisions of websites to include information on the availability of said accommodations. Future research should aim to dispel or support possible reasons for the lack of inclusion of disability announcements on websites. Research should assess how many golf courses are accessible, should seek to understand perceptions of undue burden held by golf course managers, should understand potential revenue generated from the active-aging community, and should compare disability listings from golf courses with listings from other sport and recreation facilities, to see if the disparity is only held by golf courses.

Conclusion

In conclusion, this study should serve as a catalyst for additional investigation into ADA compliance in golf course management. Of

the 268 nonprivate golf courses in Indiana, only two listed accessibility on their websites. This proportion pales in comparison with commercial facilities. This finding could be due to a number of potential reasons including the perceptions of accessibility as an undue burden, the belief that golf should not accommodate people with disabilities, a lack of priority and importance placed on serving customers with disabilities, or failure and lack of know-how in providing comprehensive information on course websites. It is also possible that even after the 2010 ADA guidelines update, these golf courses do not provide accommodations for patrons with disabilities. Further research uncovering why so few Indiana golf course websites include accommodation announcements may also uncover additional issues surrounding inclusion of people with disabilities at golf courses.

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The Physical Educator Vol. 75 • pp. 835–849 • 2018
https://doi.org/10.18666/TPE-2018-V75-I5-7739

PEDAGOGY

Improving Teacher Effectiveness in Physical Education Teacher Education Through Field-Based Supervision

Kason O'Neil and Barbara Ann Boyce

Abstract

A large amount of research on teacher effectiveness in physical education teacher education has identified clear benchmarks that contribute to effective teaching. The benchmarks most often identified in the literature are (a) establishing an appropriate learning environment through classroom management, (b) providing several opportunities for students to practice skills, and (c) ensuring student practice leads to success. Thus, the groundwork for educating preservice physical educators on these benchmarks must be established early in a teacher education program. This manuscript explores the implementation of a systematic framework for developing preservice physical educators, with the support of cooperating teachers and university supervisors, in field-based practica that emphasizes clear components of teacher effectiveness.

Teachers who continue to improve their pedagogical skills over time are true teaching professionals and can be identified as having achieved expertise (Graber & Templin, 2009). Initially, the reflective and evaluative practices that can advance a teacher's teaching skills are learned in professional licensure programs, though these practices cannot be enhanced or refined without quality field

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experiences. Field experiences not only are a critical part of teacher education training, but also provide an invaluable opportunity for preservice teachers (PSTs) to pair content and pedagogical knowledge in authentic environments (Spooner, Flowers, Lambert, & Algozzine, 2008; Zahorik, 1998). Thus, groundwork must be laid in the early training years and a framework must be applied, both of which help ensure the direct pairing of pedagogical development of PSTs with quality field-based supervision. The framework for the ongoing improvement of PSTs' pedagogical skills depends upon (a) a clear articulation and understanding of the components that contribute to the teacher effectiveness of PSTs, (b) an understanding of and buy-in to those same components by cooperating teachers (CTs) in PK–12 school settings, (c) a systematic data collection strategy linked to these teacher effectiveness components, (d) continuous feedback from university supervisors (US) and CTs on PSTs' progress, and (e) supervision relationship and guidelines of USs (Graber & Templin, 2009; Rink, 1996; Spooner et al., 2008). This manuscript uses this framework for improving PST teacher effectiveness to show the impact that systematic observation of field experiences can have on physical education teacher education (PETE) programming and student development.

Defining the Components of Teacher Effectiveness for Preservice Teachers

Teacher educators must succinctly define effective teaching and identify the pedagogical components that support this definition. Graber and Templin (2009) stated that effective teachers construct environments in which all students learn. The long-standing research on teacher effectiveness has identified a series of components that contribute to effective teaching (Berliner, 1984; Gage, 1984; Graber & Templin, 2009; Medley, 1977; Rink, 1996; Rosenshine, 1983; Siedentop & Tannehill, 2000). Three primary components addressed in this article are (a) establishing an appropriate learning environment through class management, (b) providing many opportunities for student practice of skills and participation in fitness activities, and (c) ensuring successful practice for all learners (Boyce, 2003; Graber & Templin, 2009; Rink, 1996).

First, the consensus is that teaching cannot proceed until an appropriate learning environment has been established (Doyle, 1979; Rink, 1993; Siedentop & Tannehill, 2000; Soar & Soar, 1979). In essence, this environment consists of the establishment of rules and procedures for appropriate student behavior (aka classroom management), and it is a key initial ingredient for the development of effective teaching skills.

Second, the practice of motor skills, sport skills, and lifetime physical activities is essential for student learning to occur. The practice of skills is the most important variable controlling the learning of motor skills (Schmidt & Wrisberg, 2000). In addition, students cannot become physically fit unless they participate in fitness activities at proper levels of intensity, frequency, and duration (U.S. Department of Health and Human Services, 1996).

The third pedagogical component addresses student learning in terms of successful practice or successful participation in fitness activities. Siedentop (1991) noted that tasks that are set at the appropriate level of difficulty should produce about an 80% level of success. The primary way that student success can be achieved is through differentiation of learning tasks (e.g., through the use of task extensions, refinements, and applications) based on students' varying skill and fitness levels (Graham, Holt/Hale, & Parker, 2010; Rink, 2002). Student success is the hallmark of an effective teacher and the standard for judging a teacher's true effectiveness.

Based on these primary components of teacher effectiveness, a PETE program axiom of "practice, practice with success in a structured learning environment" directly aligns with the fundamental building blocks of teacher education. From a hierarchical order perspective, the first component focuses on the structured learning environment, the second focuses on practice, and with all of these, teachers can ensure the learning of all students. Howey and Zimpher (1989) emphasized the importance of a clearly articulated program goal (axiom) with the components of the axiom running throughout the curriculum in pedagogy courses and field practica.

Collaboration With Cooperating Teachers

The importance of getting the CT on board as an integral part of the supervision triad (CT, US, and PST) is paramount to the success of any field-based supervision model (Veal & Rikard, 1998). In fact, research has supported the notion that the CT plays a critical role in the mentoring of the PST (Tsui, Lopez-Real, Law, Tang, & Shum, 2001). Additionally, the role of the US as one who eases the transition between university pedagogy classes and teaching in the PK–12 arena is important (Fernandez & Erbilgin, 2009). The ability of the US to elicit the experience and help of the CT in preparing the PST will either make or break the PST's teaching experience in the field.

For many PETE programs, CTs provide input on a variety of teaching topics regarding PSTs' teaching performances (e.g., lesson skill progression, use of different teaching styles and the efficacy of those styles, individualizing instruction). In addition to the other pedagogical topics, CTs collect information using observational tools to assess the three pedagogical components previously identified (Zahorik, 1998). This information on these components can form the basis for substantive and reflective discussions.

Systematic Data Collection on the Components of Teacher Effectiveness

Linking specific observational tasks (e.g., lag time, management time, PLACHECK, student success) to the three components (establishing structure, practicing, and practicing with success) of teacher effectiveness through the use of systematic data collection is one way of improving teacher effectiveness (Boyce, 2003; see Table 1).

PSTs experience a wide array of feedback opportunities throughout their field practicum experiences. Quantitative feedback and additional qualitative notes should be recorded and communicated to PSTs using the hierarchical framework of (a) establishing structure, (b) practicing, and (c) practicing with success. As Table 2 shows, the systematic data collected were based on the three components of teacher effectiveness; these are further subdivided into 14 observational tools or instruments (Boyce, 2003). Table 2 supports this, showing that the CT and US collect information using the specific observational tasks on the PST's behaviors. These observational

Table 1
Pedagogical Components Aligned With Observational Tools and Instruments

Pedagogical component	Observational Tasks
Establishing Appropriate Student Behavior	• Attending to inappropriate student behavior • Lag time • PLACHECK (on-task behavior) • Keeping back to the wall • Teacher interactions with students • Time spent on class management
Student Practice	• Feedback to students (types and RPM) • Teacher talk time • Time spent on student waiting • Time spent on student practice/ participating in fitness activities

Practice With Success	• Evidence of differentiation (skill, fitness, and individual with disability)
	  • In lesson plan
	  • In actual lesson taught
	• Number of practice trials with success
	• Student impact data – evaluation of skills through critical elements

Note. Adapted from *Improving Your Teaching Skills: A Guide for Student Teachers and Practitioners*, by B. A. Boyce, 2003, St. Louis, MO: McGraw-Hill.

instruments collect data that encompass three types of systematic observation (frequency, duration, and group time sampling).

The first field practicum that specifically addresses teaching physical education should be at the elementary field-practicum level. The feedback and observational instruments used by the US and CT are specifically targeted to look at designated "teacher" behaviors (e.g., keeping back to the wall, percentage of time spent in class management, teacher talk and opportunity for student practice, type and rate of feedback; see Table 2). In addition to the focus on teacher

behaviors, initial information should be collected on the efficacy of the PSTs' classroom management (established structure) via specific observational tasks (e.g., lag time, PLACHECK, percentage of time spent in class management, amount of corrective behavioral feedback given). While the CT and US collect information on the two foci (i.e., specific teacher behaviors and classroom management), the CT tends to collect this information in more of a descriptive and qualitative in nature. Information collected on the PST's ability to control his or her own teacher behaviors, as well as his or her ability to manage a classroom successfully, prepares the PST for the next steps of (1) maximizing student practice time and (2) ensuring student success in future practicum experiences (Boyce, 2003).

During the second field practicum (secondary field experience), the observational focus shifts to information on student behavior (e.g., percentage of time spent in student practice, percentage of time spent in student waiting, number of skill or fitness-related attempts, number of successful student skill or fitness-related attempts). Some information on selected teacher behaviors (e.g., talk time, feedback rate, and type) is still recorded. The data collected by the US on student behavior (e.g., percentage of time spent in student practice, percentage of time spent managing student behavior) indicate the PST's ability to manage classroom behavior effectively (see Table 2). While the CT and US collect information on PSTs' student behaviors, the CT tends to collect information that is more descriptive and qualitative in nature. However, during this field practicum, CTs collect data more systematically, which is a quantitative method (Boyce, 2003).

When the PSTs engage in the two-part student teaching experience (elementary and secondary levels), USs and CTs should emphasize student outcome behaviors, as well as continue monitoring PSTs' developing classroom management skills. Student outcome (practice trials and success, impact of the PSTs on student learning) should be evaluated as a part of this emphasis (Boyce, 2003).

The observations instruments used to provide feedback to the PST can measure the PST's classroom management skills based on (1) stated criteria specified by the US or (2) goals generated by the PST and CT (see Table 2). Table 3 lists the stated criterion for selected observational tasks based on what is appropriate for beginning PSTs. These stated criteria have been drawn from the work of Medley (1977) and Siedentop (1991; see Table 3).

Table 2
Continuous Feedback Opportunities With Descriptions

		Type of behavior				When does this take place?				How is achievement measured?	
Pedagogical component	**Observational tool or instrument**	**Teacher**	**Student**	**Who collects the data?**	**Type of systematic observation system used**	**Elementary practicum**	**Secondary practicum**	**Student teaching: Elementary**	**Student teaching: Secondary**	**Stated criteria**	**Stated goal by preservice teacher**
Establishing Appropriate Student Behavior/ Classroom Management	Attending to Inappropriate Student Behavior (Choice Item)		✓	CT on PST	FREQ			✓	✓		✓
	Lag Time		✓	US/CT on PST	DUR	✓		✓			✓
	PLACHECK (on- or off-task behavior)		✓	US/CT on PST	GTS	✓		✓			✓
	Keeping Back to the Wall	✓		US on PST	FREQ	✓	✓	✓	✓		✓
	Teacher Interactions With Students (Choice Item)	✓	✓	CT on PST	FREQ			✓	✓		✓
	Time Spent on Class Management	✓	✓	US/CT on PST	DUR	✓		✓		✓	
Student Practice	Feedback to Students: Rate and Type	✓		US/CT on PST	FREQ	✓	✓	✓	✓	✓	
	Teacher Talk Time	✓		US/CT on PST	DUR	✓	✓	✓	✓	✓	
	Time Spent on Student Waiting		✓	US/CT on PST	DUR		✓	✓	✓	✓	
	Time Spent on Student Practice		✓	US/CT on PST	DUR	✓	✓	✓	✓	✓	

Table 2 (cont.)

Pedagogical component	Observational tool or instrument	Type of behavior: Teacher	Type of behavior: Student	Who collects the data?	Type of systematic observation system used	When does this take place?: Elementary practicum	When does this take place?: Secondary practicum	When does this take place?: Student teaching: Elementary	When does this take place?: Student teaching: Secondary	How is achievement measured?: Stated criteria	How is achievement measured?: Stated goal by preservice teacher
Practice With Success	Evidence of Differentiation (Skill, Fitness, and Individual With Disabilities) in Lesson Plan Through Extensions, Challenges, and Refinements	✓		US/CT/PST	FREQ	✓	✓	✓	✓		✓
	Evidence of Differentiation (Skill, Fitness, and Individual With Disabilities) in Actual Taught Lesson Through Extensions, Challenges, and Refinements	✓	✓	US/CT on PST	FREQ			✓	✓		✓
	Number of Practice Trials With Success		✓	US on PST	FREQ		✓		✓	✓	
	PST's Impact on S Achievement (Data)		✓	PST on S	FREQ			✓	✓		✓

Note. CT = cooperating teacher; PST = preservice teacher; US = university supervisor; S = students; FREQ = frequency; DUR = duration; GTS = group time sampling.

Table 3
Criterion for Beginning Level PSTs

Behavior	Percent criterion
Teacher talk time	15–20%
Opportunity for student practice	50% or above
Feedback	3–16%
	75% specific skill or fitness-related
Management time	20% or less
Student wait time	20% or less
Student management time	10% or less
Student practice time	50% or above
Students receive instruction	15–20%
Student success	80% or above

Note. These criteria are based on *Teacher Competence and Teacher Effectiveness*, by D. Medley, 1977, Washington, DC: American Association for Colleges of Teacher Education, and *Developing Teaching Skills in Physical Education* (3rd ed.), by D. Siedentop, 1991, Palo Alto, CA: Mayfield.

In addition to the field visits completed by the US, the CT can systematically collect ongoing information on selected teacher pedagogy behaviors, as well as teacher-student interactions. This practice (CT collecting systematic observation information on the PST) is often heavily applied during student teaching experiences. The PSTs and their respective CTs select from a menu of tasks (see Table 1) and complete evaluations. The choice of pedagogical tasks by the PST and CT ensures individualization based on the PST's areas of needed improvement (e.g., attending to inappropriate behavior, interactions with students).

Supervision Relationships and Guidelines for University Supervisors

Many issues contribute to the successful practice of supervision. These factors can be broken down into the relationship among the triad, planning for the field-based visit, and actual visit and follow-up.

A healthy relationship among the triad can best be described as one that is collaborative and where power is shared (Veal & Rikard,

1998). For example, a PST may contribute to the experience of student teaching by providing a novel culminating activity or lead-up game that the CT can add to his or her teaching repertoire. In concert with PSTs' contributions, the CT can contribute to the practicum experience by providing a wealth of information on school context and practical pedagogical knowledge (Veal & Rikard, 1998). The US, as a facilitator, may contribute to the overall discussion of lessons observed and plan for any needed remediation measure and for future visits. While role expectations for these individuals should be clearly delineated, they should remain flexible. Finally, the US's relationship with the CT is long term, and therefore, the US must make every effort to solidify this collegial arrangement, especially when the CT is a great teacher and valued colleague. The US must realize that the teacher education program cannot exist without CTs and the practical experiences that they provide PSTs.

Supervision guidelines for dealing with supervision from a US perspective can be divided into the categories of (a) selection of CTs, (b) training of CTs, (c) general responsibilities of the US, (d) planning the field visit, (e) actual visit, and (f) follow-up practices. Table 4 summarizes the guidelines for supervision from a US perspective.

Impact on the PETE Program

The ongoing feedback embedded within the observational framework can lead to a plethora of positive outcomes within a PETE program (Spooner et al., 2008). Since many of the standards for performance are clearly stated (e.g., teacher talk time under 20%; feedback at least 2/min with 75% of the feedback falling under the category of specific skill-related feedback; Medley, 1977; Siedentop, 1991), PSTs can continually gauge their own progress toward these standards. They can also express feedback of the performance criteria, which provide them with a heightened awareness of their teaching behaviors and clearly state any expectations. Additionally, the tasks for which PSTs set their own standards (goals) are helpful in terms of development of effective pedagogical skills. This goal-setting technique is helpful in terms of development of effective pedagogical skills through a metacognitive approach (Medley, 1977; Siedentop, 1991).

Table 4
Guidelines for Successful Supervision From the Perspective of the University Supervisor

Selection of CTs 1. Selection based on the CT's teaching ability 2. Selection based on agreement with the curriculum and instruction offered at the university (there should be a match between what the university pedagogist is teaching and what the CT is doing in the PK–12 classrooms)
Training of CTs 1. If CTs are expected to help collect data on teacher effectiveness instruments and tools, then they must receive training from the US 2. In addition to the initial training, handouts with complete instruction are provided 3. PSTs are also trained to use the instruments so that they can assist the CTs
General Responsibilities of USs 1. US must be accessible and open to CT's questions and concerns 2. US must address questions and concerns (e.g., alter the day and time of the field visit to adjust to the PK–12 school's schedule; make sure PSTs do not burden CTs with requirements that are the PST's responsibility) 3. Adjust university pedagogy coursework where needed to fill in gaps where deficiencies are found during field practica (e.g., more emphasis needed on classroom management strategies) 4. Act as a facilitator between CT and PST
Planning the Field Visit 1. Do your homework: review the PST's past performance 2. Based on this review, implement a supervision plan that focuses on previous "trouble spots" 3. Plan to observe new and emerging teaching skills that may have developed in the interim period between the last and upcoming visits 4. Touching base between visits can help the US to formulate a game plan for the upcoming visit

Table 4 (cont.)

Actual Field Visit

1. Arrive early to school and complete all required check-in procedures
2. Pre-conference with CT and PST should accomplish the following tasks:
   a. Gather information on the context of the class and its students
   b. Communicate the purpose or focus of the observation (e.g., today we will look at student success and see if students of different skill levels receive the same amount of practice)
   c. Previews the lesson plan
   d. Check in with the CT to see if there are any issues of concern
3. Actual observation
   a. Collect information on the topic or focus of the observation
   b. Make field notes as needed
   c. Record any questions needed for post-conference
4. Post-conference interview
   a. Ask questions related to how the PST thought the lesson went
      i. Identify strengths and weaknesses of lesson
   b. Share on the outcome of the data collected on the lesson topic(s) related to components of teacher effectiveness
   c. Ask for PST's input
   d. Ask for CT's input
5. Plan for needed adjustment by the PST, which should include:
   a. Identification of the problem (e.g., not attending quickly enough to inappropriate student behavior)
   b. Strategies on how to solve the problem (e.g., scan the gym constantly to immediately spot students who are acting out)
   c. Strategies on how to solve the problem (e.g., scan the gym constantly to immediately spot students who are acting out)
   d. Data collection on problem to help PST see if he or she is making progress (e.g., CT records names of students who are acting out and records the time that it took the PST to correct the student)
   e. Interpreting data collected to gauge the PST progress

Follow-up practices involve:

1. An e-mail to the PST to check on progress made
2. Phone call to the CT to check on the PST progress
3. Follow-up visit by the US

Note. CT = cooperating teacher; US = university supervisor; PST = pre-service teacher.

Feedback from CTs has also been informative and positive. For example, one of the tasks on which PSTs have consistently fallen short is the delivery of 75% specific skill or fitness-related feedback (Kahan, 2002). USs in the pedagogy classes and field practica provide strategies that help PSTs deliver more of this type of feedback. This dual observational exercise (CT and PST) can lead to greater quality of the feedback on specific teaching tasks (e.g., attending to inappropriate behavior, interactions with students [teacher climate], back to the wall). Throughout the use of the observation framework during student teaching, both CTs and PSTs should select from a menu of tasks tailored to the needs of the PST.

This layered observational framework is also the foundation for establishing a valuable support system for PSTs. Formal and informal discussions linking quantitative and qualitative feedback help establish a rapport that is critical to the development of the PST. The feedback and discussions between the CT and US with the PST should stimulate growth and reflection on the appropriate practices of a developing teacher. The CT and US use the performance criteria, paired with their pedagogical knowledge, to show the PST that maturation as a new teacher is a process that requires ongoing evaluation, patience, practice, and reflection.

Almost all individuals within this observational model can achieve, and in many instances surpass, the stated criteria for beginning teachers. These criteria should be clearly communicated in the elementary and secondary methods classes and then reinforced throughout the field placements by the US and CT (see Table 3). There is a lot to be said for sending a clear and consistent message related to PSTs' performance and then holding them accountable.

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The Physical Educator Vol. 75 • pp. 850–879 • 2018
https://doi.org/10.18666/TPE-2018-V75-I5-8283

PEDAGOGY

Interrogating Assumptions of a Curriculum: Queensland Senior Physical Education Syllabus

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Abstract

This study analyzes the 2004 Queensland Physical Education (PE) Senior Syllabus to ascertain to what extent it is developing physically educated students. The 2004 QSPES is a fundamental document relevant to the teaching of PE (in Years 11 and 12 of high school) in the Australian state of Queensland. Kirk's (1988) notion of a physically educated person being an intelligent performer guides the research and frames the discussion. The 2004 QSPES syllabus was examined via content inquiry. The 2004 QSPES included concepts such as intelligent performance and complex environments, and it suggested teaching styles to meet these concept developments. It was found that the development of physically educated students was ill-defined, contradictory, and questionable. It is likely that teachers will have trouble applying, teaching, and assessing the concept of intelligent performance.

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This study undertook a document analysis of the 2004 Queensland Physical Education (PE) Senior Syllabus—from this point referred to as the QSPES (Queensland Studies Authority [QSA], 2004)—to ascertain to what extent it was providing guidance in developing physically educated students. The syllabus was of great interest to Health and Physical Education (HPE) in Queensland, as it was innovative and transformational in the way that it viewed and suggested that content be delivered. Some (Penney & Kirk, 1998) even argued that there were few better physical education documents in the English-speaking world. Kirk's (1988) notion of a *physically educated* person, as a pivotal underpinning of the syllabus, being an *intelligent performer* guides the research and frames the discussion. The QSPES is a fundamental document relevant to the teaching of PE in the Australian state of Queensland. While viewed historically as positive by some (Kirk & O'Flaherty, 2004; Macdonald & Brooker, 1997a, 1997b), Hay (2008) suggested that little research about its claims, ambitions, and implementation at the classroom level had occurred.

Prior to 1964, HPE did not exist as a subject that contributed toward a score for entry to university in Queensland state secondary schools. The Watson Report in 1961 was a major factor in change and provided a "secondary curriculum comprising compulsory and elective subjects over a 5 year period" (Reddan, 2000, p. 6). In 1964, an HPE course was developed and began for Years 8 to 10. In 1966, the PE branch of the Queensland Education Department published a syllabus for HPE for secondary schools.

The Radford Report of 1970 (which investigated the positives and negatives of public examinations) led to a major reorientation of HPE. In May 1973, a new syllabus in HPE for Years 8 to 12 was submitted to the Board of Senior Secondary School Studies (BSSSS)—the government organization responsible for syllabus development and implementation. Trials began in several schools in 1974, with a review panel appointed to report on these trials. The subject quickly grew in popularity, and this showed in participation rates. In 1975, 112 Year 12 students participated in HPE, and by 1992 the number of students studying HPE had grown to 10,700 students (Reddan, 2000). This figure represented nearly a third of the students enrolled in Year 12 that year in the state of Queensland.

In 1981, the subject advisory committees for all subjects (including HPE) were requested to define the objectives for their subject and to redraft syllabi (Edwards, 1989). The second redraft in 1982 produced major changes, specifically the element "Health Science" was changed to "Health Education." Allen and Thompson (1984) (as cited in Reddan, 2000) argued that this change indicated a general consensus advocating the separation of a theoretical Health Education from a practical Physical Education. The seeds of the 2004 QSPES were not sown for another decade.

Although the HPE subject grew in popularity among students and teachers, discontent and questioning also grew. The question that started to be asked was, "What does it mean to be physically educated?" (Macdonald & Brooker, 1997b, p. 164). Although this question had been asked before, Macdonald and Brooker (1997b) felt that this was one of the major shortcomings of the Senior HPE syllabus—the fact that it did not seem to clearly articulate this point. Some academics (Arnold, 1985; Kirk, 1988, 1989) sought their own answers to this question, arguing that for a student to be physically educated, "their experiences need to be grounded in movement itself" (Reddan, 2000, p. 112). Others felt that the Senior HPE syllabus had "unintentionally devalued the importance of movement and divided worthwhile knowledge in Physical Education into theoretical and practical understanding" (MacDonald & Brooker, 1997b, p.164). The Queensland Senior HPE syllabus also had a strong emphasis on performance (Macdonald & Brooker, 1997b), and therefore, Kirk's (1988) notion of a physically educated person being an intelligent performer was underdeveloped in the old Senior HPE syllabus. This concept of *intelligent performance* will be explored in detail later. The concept of intelligent performance should be seen in the context of a revisionist look at earlier syllabi because these notions were not ever part of the view at the time—people seemingly knew what HPE was at this point.

During July 2002, the BSSSS merged with the Queensland School Curriculum Council and the Tertiary Entrance Procedures Authority to form the Queensland Studies Authority (QSA). The QSA has had a further name change and is now the Queensland Curriculum and Assessment Authority (QCAA). This organization was responsible for syllabus development, and according to its website, it

> is a statutory body of the Queensland Government. The Queensland Studies Authority's (known as the QSA) peak decision-making mechanism is the governing body, whose members represent teacher, parent, union and higher education groups, and the State, Catholic and Independent school sectors. (QSA, n.d., para. 1)

The BSSSS appeared to be moving in a direction that valued academic excellence (more than physical excellence on its own) in terms of a subject that contributed to university entrance. Macdonald and Brooker (1997b) suggested that the policy whereby the lowest result (also known as the "at least" model) across three criteria determined the final level of achievement was an attempt to transfer the subject toward a more academic emphasis. The three criteria, or *general objectives,* used for assessment were *content, process,* and *skill.* The first two of the general objectives referred to theoretical components of knowledge (written work), while the last general objective referred to physical or practical performance.

Some time passed, but the Subject Advisory Committee eventually adopted a model that separated Health Education and PE and created distinct syllabi. The BSSSS desired to raise the academic status of PE. Reddan (2000) suggested,

> The concerns for academic status and educationally worthwhile knowledge were influential in the development of the senior PE syllabus, which focuses on the dimension of "learning in physical activity" and "learning about activity" derived from Arnold's model (1985). (p. 115)

From an evaluation of the pilot syllabus in 1998, conclusions were drawn that "there is very little else currently underway in the English speaking world to match developments in Queensland" (Penney & Kirk, 1998, p. 43). With such lofty claims, it is important that key aspects of the 2004 QSPES such as terms, concepts, and teaching styles are examined and that their role in assisting teachers to create physically educated students is ascertained. This paper adopts a similar process to syllabus analysis as that employed by Boss and Drabinski (2013):

1. Gather the artifacts.
2. Develop a set of content questions to guide the document analysis.
3. Author 1 to undertake a calibration conversation with Author 2 about the questions.
4. Application of the analysis questions to the artifacts. This process will be outlined further in the Method section.

Method

The first step in this syllabus analysis involved gathering the artifacts. This involved the researchers reading and interacting with the 2004 QSPES. One of the researchers, being both a full-time high school teacher and a PhD student at the time of the research, had extensive knowledge of the 2004 QSPES. The next step involved the development of content questions that would allow conclusions to be drawn about the research hypothesis. In undertaking a critical content inquiry of the 2004 PE syllabus and its intentions, claims, and outcomes, the researchers formed a research hypothesis: To what extent are the terms, concepts, and teaching styles outlined in the Senior PE syllabus articulated clearly and relevant to, clearly understood by, and appropriately implemented by teachers of Senior PE in Queensland schools?

This hypothesis and content question was developed after the authors, as both teachers and researchers, read and interacted with the 2004 QSPES, using critical content inquiry. Content inquiry is "the process of organising information into categories related to the central questions of the research" (Bowen, 2009, p. 32). The analysis of document content involves interpreting recorded material as a way of learning about human behavior or influences on human behavior (Ary, Jacobs, & Sorenson, 2010). In this research, the document content from the 2004 QSPES in large part created the research questions. For example, the 2004 QSPES included concepts such as intelligent performance and complex environments, and it suggested teaching styles to meet these aims. When these terms, concepts, and teaching styles were identified, the researchers further critically reviewed the syllabus to identify where these terms, concepts, and teaching styles were outlined again—in what context and in which parts of the document. This action allowed for further understanding of these terms, concepts, and teaching styles based

on the syllabus. The critical analysis was also looking for alignment and consistency (or inconsistency) with the use of terminology and concepts such as intelligent performance, complex performance environments, and assessment techniques. The researchers took the meaning of terminology as literally as possible and used research on these concepts and terms to further understand and draw conclusions about what would be seen if observations were conducted of Senior PE classes. This method has similarities with constructivist grounded theory in that the researcher's presence was not the focus of the critique or analysis, so it is neither neutral nor undesirable (Mruck & Breuer, 2003). Some literature has suggested that the researcher's voice should be acknowledged explicitly because it shows and talks about the researched area (Charmaz & Mitchell, 1996; Clarke, 2005). Ramalho, Adams, Huggard, and Hoare (2015) suggested that in constructivist grounded theory, the researcher will sometimes review literature first and that this reading "will be the one that guides the choice of the area to be researched and the method to be used" (5. Ensuring Groundedness section, para. 2). This method was used as the researchers read the syllabus (as the literature), and it guided questions that the researchers were asking: "Is this happening?", "What does literature say about this concept/idea?", or "How can that be achieved"? These questions guided the researchers' inquiry of the 2004 QSPES.

In the third step of this syllabus analysis, the researchers had calibration conversations about the questions, discussing whether the developed questions would allow a conclusion to be drawn about the research hypothesis. After agreeing that the questions would, the authors proceeded to explore the 2004 QSPES, using a narrative analysis relying on evaluation, judgment, and language skills to synthesize the document content and provide a summary of the evidence (Lyle, 2014). In adopting this approach, the authors recognize that "evidence" in this context consists of a "persuasive argument" (Lyle, 2014).

The final step began with the application of analysis questions to the artifact. Through this analysis of the document, certain identified categories or themes emerged. In many respects, the process undertaken bears some of the hallmarks of a concurrent triangulation whereby the researcher collects quantitative and qualitative data to determine convergence, differences, or a combination (Creswell,

2013). In this study, the researchers were, in some cases, triangulating and, in other cases, comparing against other places in the document the various ideas and concepts in the 2004 QSPES and then analyzing the document for congruence or contradictions. As can be observed, the researchers used some, but not all, aspects of grounded theory. According to some opinions, this is common, as "many authors label their work 'grounded theory' but do not follow the basics of the methodology" (Sbaraini, Carter, Evans, & Blinkhorn, 2011, p. 1).

Discussion

The *rationale* of the 2004 QSPES states that PE "involves the study of physical activity and engages students as intelligent performers learning in, about and through physical activity" (QSA, 2004, p. 1). The terms (*in*, *through* and *about*) are based on Arnold's (1979) three dimensions of movement, and the QSPES acknowledges that the dimensions "are not mutually exclusive but overlap and interrelate with each other" (QSA, 2004, p. 1). The QSPES suggests that integrating the three dimensions is "central to the construction of learning experiences in physical education" (QSA, 2004, p. 1). These integrated learning experiences are expected to generate intelligent performers capable of "rational and creative thought at a high level of cognitive functioning" (QSA, 2004, p. 5) and to involve "students as decision makers engaged in the active construction of meaning through processing information" (QSA, 2004, p. 5).

Intelligent Performance

The QSPES continues by describing the notion of intelligent performance as movement that will "involve rational and creative thought at a high level of cognitive functioning" (QSA, 2004, p. 1) and engage students as not only performers but also analysts, planners, and critics "in, about and through physical activity" (QSA, 2004, p. 1). The 2010 QSPES—a revised and current version of the 2004 QSPES—still includes, in the Rationale section, the concept of "learning in, about and through physical activity" (QSA, 2010c, p. 1). However, the revision does not include the longer and more detailed explanation of intelligent performance. Instead, what once had definitions and examples has been reduced to one line containing no reference to the notion of *creativity*. Later, this document,

under the General Objectives heading, states that "intelligent performance is characterised by high levels of cognitive functioning, using both rational and creative thought" (QSA, 2010c, p. 3). Kirk (1983) explained the concept of intelligent performance, suggesting that PE needs a "means of conceptualizing physical performance in sports contexts which allows us to begin to reveal with a high degree of adequacy and relevance, the nature of sports performance" (p. 40). Kirk (1983) developed this point further, suggesting numerous characteristics of an intelligent performer such as intention with actions, the ability to read a skill into an appropriate context, knowledge of facts about performance, and the ability to go beyond these facts to "forge connections between propositions and actual instances of their occurrence" (Kirk, 1983, p. 42). Kirk's (1983) concept of the intelligent performer takes PE students beyond a subject that can deliver numerous health benefits or purely a recreational pursuit. He suggested that the concept may conflate the mind and body dichotomy and represent

> the sports performer, not as I believe he has been misrepresented and misunderstood in some circles as a mindless agent reacting to external stimulation, but rather as an holistic being who within pre-determined and agreed constraints acts on his environment and responds to its challenges creatively and intelligently. (Kirk, 1983, p. 43)

Kirk (1983) seemed aware that his concept may face some opposition. For example, he clearly explained that his concept was not intended to make claims "for the educational status of physical education as a school 'subject'" (p. 40). Nor was he proposing "that sports performance is an intellectual pursuit, but rather, that such performance can be usefully and aptly described as 'intelligent'" (Kirk, 1983, p. 40). In other words, sport may not require superior intellect to take part in it, but it may require thinking behavior or, at times, a quick mind.

For students of the 2004 QSPES to receive an *A* or *B* standard overall, they need to achieve an *A* or *B* standard in the general objective of *evaluating,* despite equal marks weighting for all three of the general objectives—this determination regarding evaluating is a distortion of the weighting attributed to each general objective. To

achieve these levels of achievement, students need to be able to solve problems or make decisions in "new or unrehearsed contexts within complex environments" (QSA, 2004, p. 55). These descriptors reflect that the 2004 QSPES values and grades students on this concept of creative thought (i.e., producing new ideas or thoughts). These requirements mean that students who achieve either an *A* or *B* for this descriptor have performed motor programs (skills) in a situation or environment unknown to them. This descriptor, highlighting new or unrehearsed contexts, requires that students not have had the opportunity to practice or rehearse the performance at all; otherwise, it would not be "new," but would be recall.

When Glasby (1999) compared the 2004 QSPES, the Queensland Health Education Syllabus, and the P–10 Physical Education Syllabus (1999), she suggested

> that, regardless of the differences in either curriculum model, syllabus structure or language, all three documents have drawn on aspects of Bloom's Taxonomy of Educational Objectives (1956) and/or the information processing theory (Gagné 1985) as a "shorthand" for expressing what is expected of students cognitively (p. 6).

The assumption that students develop complex thinking skills because they participate in physical activity is vague and unconvincing. Participation in a learning experience with any of the learning objectives does not ensure that the learner develops complex thinking skills. The claim that students will learn complex thinking skills such as evaluating or creativity because they participate in sport or a physical activity, without a clearly stated objective and learning experience based on this objective, is questionable. As noted, the general objective of evaluating is at the apex of intelligent performance in the 2004 QSPES framework and a final grade of *A* or *B* is only possible when a grade of *A* or *B* is achieved in evaluating (QSA, 2004).

A few assumptions can be made about thinking as a complex skills. Thinking is similar to any complex skill in PE; it requires intensive physical conditioning or repetitive practice for the student to reach a high level and specific practice for the student to maintain this level. If the individual does not practice, it is unlikely that he or she will develop the skill to an extent at which he or she can

perform it with maximal certainty and maximal efficiency. In the case of thinking, intensive mental conditioning or practice of the specific cognitive skill or operation enables an individual to reach a high level. Nickerson, Perkins, and Smith (1985) suggested that "high level thinking skills can be improved by training, and it is not safe to assume that such skills will emerge automatically as a matter of development or maturation" (p. 59). This point, that training or practice can improve high-level thinking skills, starts to challenge the notion of an *A* or *B* overall achievement grade only being assigned to evaluating that occurs in a new or unrehearsed environment or involves creativity. If a student has practiced something, it is no longer new or unrehearsed, but recall.

Another confusing aspect of the 2004 QSPES is its suggestion for teachers to use Bloom's Taxonomy to specifically teach thinking skills—the 2004 QSPES condensed Bloom's six educational objectives of knowledge, comprehension, application, analysis, synthesis, and evaluation into the categories of *acquiring*, *applying,* and *evaluating,* with an additional category of *appreciation* not assessed. See Figure 1.

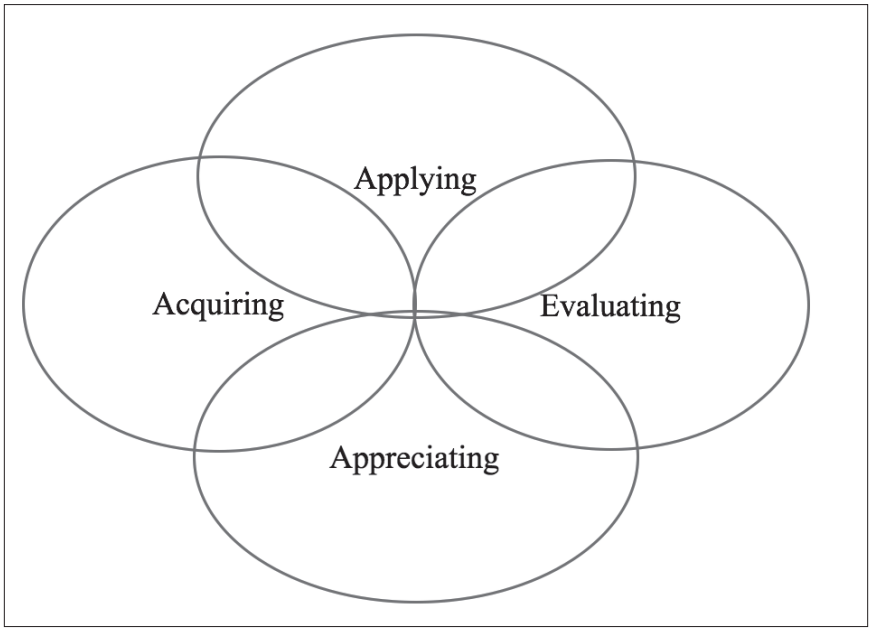

Figure 1. The 2004 QSPES categories.

But with the imprecision of the 2004 QSPES, it is confusing how teachers are supposed to apply Bloom's Taxonomy. The 2004 QSPES does not stipulate when, how, or which learning objectives teachers should use. This is one criticism of Bloom's Taxonomy in general. Further, it has sometimes been described as "too broad, vague and overlapping to provide a foundation for focused instruction in thinking" (Swartz & Perkins, 1990, p. 56), and it does not provide specific information about how to reach higher order thinking levels. Often verbs are provided about what is done at these levels (e.g., *arrange, appraise, predict,* and *validate*), yet "a thinking skills program that only aims at asking higher order questions . . . is not grappling with the real challenge of developing students' thinking" (Swartz & Perkins, 1990, p. 56). An example of this is evident in the 2004 QSPES in the General Objectives section. The section attempts to outline or define each of the general objectives. For evaluating, the 2004 QSPES lists a string of verbs to assist teachers in assessing evaluating or to help teachers know what evaluating looks like. The 2004 QSPES suggests that "evaluating is achieved through processes such as problem solving, hypothesising, synthesising, justifying and appraising information from sources such as books, journals, videos, databases and websites, engagement in physical activity and observation of performance in physical activity" (QSA, 2004, p. 6). Remember that the 2004 QSPES is not a thinking skills program, but it does suggest that Bloom's Taxonomy be used to teach the "thinking skills required to allow students to achieve the four general objectives" (QSA, 2004, p. 27). The Taxonomy may be helpful for having a common assessment language for teachers so there is some sense of certainty regarding what two or more people are speaking about. The use of Bloom's Taxonomy in this way provides that common language. However, prescribing Bloom's Taxonomy as a method to teach thinking skills and not providing guidance about how or when it is to be used is questionable.

Regarding the general objective of applying, the 2004 QSPES states that "applying refers to the ability to apply knowledge, understanding, values, attitudes, capacities and skills in, about and through physical activity" (p. 5). Bloom's Taxonomy lists a similar thinking skill category in the Taxonomy: *application*. This category thoroughly highlights the difference between comprehension and application,

suggesting that "a problem in the comprehension category requires the student to know an abstraction well enough that he can correctly demonstrate its use when specifically asked to do so" (Anderson & Sosniak, 1994, p. 20). Application, however, requires a step beyond this. For example, if "given a problem new to a student, he will apply the appropriate abstraction without having to be prompted as to which abstraction is correct or without having to be shown how to use it in that situation" (Anderson & Sosniak, 1994, pp. 20–21). It may be suggested that what Bloom refers to as application goes beyond what the 2004 QSPES defines it as. For instance, Anderson and Sosniak's concept of application refers to a new problem. Based on the 2004 QSPES exit criteria, this would mean evaluating at an *A* or *B* standard, as the problem is new or unrehearsed. It is not surprising that differences exist in definitions between Bloom's Taxonomy and the 2004 QSPES. Some of these differences are not helped by poorly articulated definitions in the 2004 QSPES and may create confusion for teachers of Senior PE. The differences between Bloom's definition of application and 2004 QSPES general objective of application have occurred because the two categories of Bloom's Taxonomy have been combined. Because Bloom's definition resembles in some ways the general objective of evaluating more than application, imagining such confusion among readers is not difficult. Because teachers use these general objective descriptors to make judgments about students' achievements levels, it is imperative that these descriptors are clear and not ambiguous.

The 2004 QSPES defines the third general objective of evaluating as "the ability to evaluate knowledge, understandings, values, attitudes, capacities and skills in, about and through physical activity" (QSA, 2004, p. 6). In contrast, Bloom defines it

> as the making of judgments about the value, for some purpose, of ideas, works, solutions, methods, materials, etc. It involves the use of criteria as well as standards for appraising the extent to which particulars are accurate, effective, economical or satisfying. The judgments may be either quantitative or qualitative, and the criteria may be either those determined by the student or those which are given to him. (Anderson & Sosniak, 1994, p. 25)

That there are differences between definitions between the two documents is not so unusual. Other definitions of evaluation have been developed over the years. These have attempted to explain the functions that take place when a person attempts to evaluate. For example, Halpern (1996) noted that "evaluation is also a creative act because the problem solver must be able to recognise when a good solution has been obtained" (p. 372). At other times, evaluation has been closely linked to critical thinking. Again, Halpern (1996) posited,

> When we think critically, we are evaluating the outcomes of our thought processes—how good a decision is or how well a problem has been solved. Critical thinking also involves evaluating the thinking process—the reasoning that went into the conclusion we've arrived at or the kinds of factors considered in making a decision. (p. 5)

Once again, another discrepancy between cognitive definitions of evaluating emerges. This definition does not refer to creativity, but rather more to *memory*, as the thinker or student does this thinking after the event. Others have also suggested this concept or definition of evaluation as requiring creativity or original thought. For example, Maier "used the terms reasoning or productive behaviour in contrast with learned behaviour and reproductive behaviour" (as cited in in Lewis & Smith, 1993, p. 132). He believes that learned behavior comes from "contiguous experiences with previous repetitions of the relationships involved in the learned behaviour pattern" (as cited in in Lewis & Smith, 1993, pp. 132–133). In contrast, reasoning or productive behavior is behavior integrations made up of two or more isolated experiences that are qualitatively different; "they arise without previous repetition and consequently are new. This constitutes reasoning" (Lewis & Smith, 1993, p. 133). Newman (1990) also clearly distinguished between lower and higher order thinking, defining lower order thinking as "only routine or mechanical application of previously acquired information such as listing information previously memorised and inserting numbers into previously learned formulas" (Lewis & Smith, 1993, p. 133). Higher order thinking is different in that it "challenges the student to interpret, analyse, or manipulate information" (Lewis & Smith, 1993,

p. 133). Newman (1990) posited an interesting point, suggesting that "higher order thinking is relative—a task requiring higher order thinking by one individual may require only lower order thinking by someone else" (as cited in in Lewis & Smith, 1993, p. 134). Lewis and Smith (1993) extended on this point:

> Whether or not an activity requires higher order thinking will depend upon the intellectual history of the learner. If it is possible for a learner to achieve his or her purpose through recall of information and without the need to interrelate or rearrange this information, then higher order thinking does not occur. (p. 136)

The QSPES does not distinguish between points such as whether the knowledge is new or original for the student in its definition of evaluating (QSA, 2004, p. 6) or if the learner has had previous intellectual history with the task. However, the exit criteria sheet (which outlines the requirements of achievement at different levels) introduces the concept of new or unrehearsed contexts (QSA, 2004, pp. 54–55). A point worthy of note is that the exit criteria sheet only applies this concept to the Physical Performance and not the written work or Focus Areas. Table 1 outlines the components of Physical Performance and Focus Areas.

Table 1
Physical Performance and Focus Areas of the 2004 QSPES

Physical Performance	1. Direct Interceptive 2. Indirect Interceptive 3. Performance Activities 4. Aesthetic Activities
Focus Areas	1. Learning Physical Activities 2. Processes and effects of training and exercise 3. Sport, physical activity, and exercise in the context of Australian society

The Focus Area is sometimes referred to as the *theory* work. A key aspect of the syllabus is the integration of the Focus Area and Physical Performance while allowing these aspects to have

components taught or undertaken separately. Exploring the extent and success of this intent is difficult, as is exploring aspects associated with guidelines and consistency in the provision of a grade for physical activity performance—and despite a moderation process for results.

An essential feature of Queensland syllabi is school-based internal assessments to be monitored at district-level moderation meetings—a process that presents challenges in interpreting assessment guidelines and comparability between schools. The 2004 QSPES does not explain this difference in the assessment of evaluating. It is contradictory that a new or unrehearsed environment is important for achieving an *A* or *B* standard in performing a motor program (Physical Performance) yet not when evaluating an application of principles or facts not relevant in another (Focus Area). This difference suggests that, regarding the Focus Area, evaluating involves recall of known information or the evaluation of known facts or concepts and is, by definition, a task that requires memory. The 2004 QSPES does not justify or explain this. Neither of these words was mentioned in the descriptors for an *A* or *B* standard for evaluating, in the 2004 QSPES exit criteria, which were examined for assessing the Focus Area. It can also be suggested that having these two assessment criteria for the same cognitive process or general objective contradicts the concept of the intelligent performer and that the concept of using a cognitive taxonomy descriptor for a motor-learning behavior cannot be done. The point has previously been made that higher order thinking (including evaluating) is contextual and, if the evaluating of a situation has been done previously, and if the student is asked to perform such a task repeatedly, it becomes recall. If evaluating has been performed as described in the syllabus, then it has become a memory or reproduction task and is not a new task. Therefore, evaluating (and other higher order thinking skills) can be done as reproduction and as production thinking.

In summary to this point, based on the concept of the intelligent performer and the criteria for assessing students, the Focus Area (or theory) and the Physical Performance (or practical) are assessed in different ways. No explanation is given for this, but it seems that some literature (Halpern, 1996; Lewis & Smith, 1993) supports how the physical performance is assessed (with evaluating as a higher order thinking skill requiring a creative or an original thought and

not recall or a memory task) and how the 2004 QSPES views evaluating. Regarding how the Focus Area is assessed and the descriptors that teachers are asked to use, some literature indicates that the use of previously known information for evaluating is appropriate and that evaluating does not have to create new knowledge. The contradiction that emerges here with the 2004 QSPES is a difference between how the two (Focus Area and Physical Performance) are assessed, yet the 2004 QSPES stresses that integrating the Physical Performance and Focus Area assessments (the practical and the theoretical) is central to the construction of meaning in PE (see Figure 2).

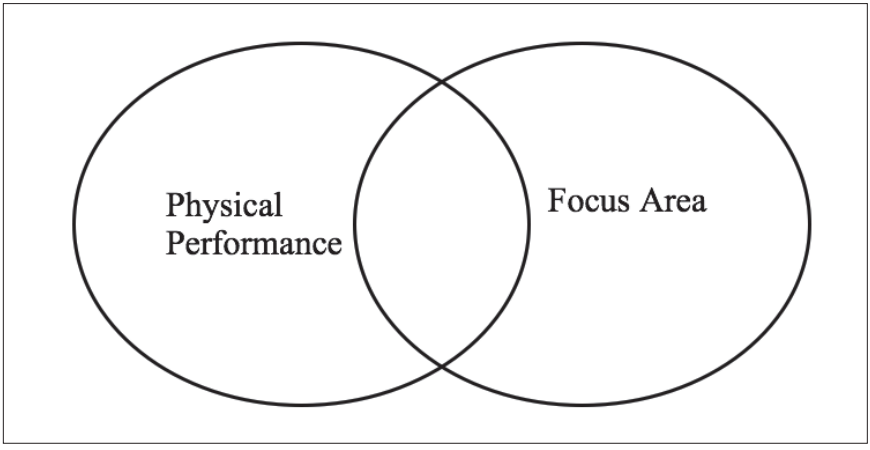

Figure 2. Focus Area and Physical Performance integration.

The phrase "new or unrehearsed" (QSA, 2004, p. 55) is not included in the statements that describe the standard for awarding a grade of *A* or *B* in the assessment of the Focus Area. Regarding definitions of general objectives, there also seems to be some incongruence between the 2004 QSPES definitions and Bloom's Taxonomy. Unless these general objectives are clear and concise, there are going to be difficulties with assessment, difficulties creating learning experiences to teach the general objectives, and difficulties creating assessments to measure the general objectives. The ambiguity of terms and definitions and the general objectives being assessed as the 2004 QSPES suggests would add some confusion for those who use the syllabus.

The Intelligent Performer: A Questionable Concept

The syllabus suggests that a student should "demonstrate the ability to select and use information in order to evaluate and enhance learning in, about and through physical activities" and "demonstrate the application and evaluation of movement concepts and principles to performance in physical activities" (QSA, 2004, p. 4).

This reference to using information and the application of movement means the student must already have this knowledge to use or apply it. Consequently, this indicates that the student will recall this knowledge from memory. Presuming this is a memory task, then it is not higher order thinking as defined by the 2004 QSPES. The alternative concept to accept is that the earlier definition is not correct and evaluating can be a memory task and a creative task done in a new environment.

This ambiguity of terms must be questioned, as these two assumptions perhaps cannot be accurately assessed via the 2004 QSPES criteria. An examination of literature from the field of cognitive psychology can shed more light on this seemingly contradictory terminology within the 2004 QSPES. For example, Masters, Poolton, Maxwell, and Raab (2008) taught two novice groups a table-tennis shot explicitly or implicitly. Explicit training involved step-by-step instruction about movement patterns, while implicit training involved analogical instruction (e.g., "swing your racquet in an arc"). The researchers found two interesting results that seem to contradict what it means to be physically educated in 2004 QSPES terms.

First, when participants were asked to perform in a time-constrained environment (i.e., little time to perform a skill and make a decision), those who had been instructed implicitly showed "characteristics that normally are not evident in perception—action behaviour until the performer is much farther along the road to expertise" (Masters et al., 2008, p. 78). The second interesting result was that "analogy learning resulted in less movement-related knowledge than did explicit learning, suggesting that a smaller amount of movement information was accessible to working memory for online control of movement" (Masters et al., 2008, p. 76). Put simply, learners taught with an analogy did better than learners taught explicitly in performing a table-tennis skill and decision making at the same time. Yet they knew less about explicit knowledge "relevant

to the mechanics of the movements" (Masters et al., 2008, p. 76). While the implicit or analogy group performed better, they knew less about the mechanics of their movements. Ironically, if a teacher assessed these students based on the QSPES, they would be termed to be less physically educated, because they would not be able to "use information in order to evaluate and enhance learning in, about and through physical activities" (QSA, 2004, p. 4).

This phenomenon, known as implicit learning, has been researched in other areas besides physical activity related to sport. For example, Berry and Broadbent (1984) asked participants to learn a complex task that involved a sugar production factory keeping a specified level of sugar output. The participants learned and performed the task efficiently, but could not explain the principle underlying their performance.

Similarly, Howard and Howard (1992) required participants to observe a screen divided into four equal sections. An asterisk would appear in one of the sections on the screen. Under each of these four equal sections was a key. The task required the participant to press the key corresponding to the position of the asterisk as quickly as possible. The position of the asterisk was following a complex pattern. The participants showed evidence of learning the pattern, as their response speed improved over time. However, when they were asked to predict where the asterisk would appear next, their performance was not indicative of knowing explicitly.

From this research, it appears that some students in PE classes can learn and perform skills, yet be unable to explain concepts or lack the ability to speak about the knowledge they used to perform a skill. This phenomenon clearly contradicts and questions the concept of the intelligent performer being "analysts, planners and critics in, about and through physical activity" (QSA, 2004, p. 1). While this type of performance by 2004 QSPES standards may not be considered intelligent performance, the problem could arise when it comes time for awarding grades or levels of achievement. If the above phenomenon occurred, where Student A outperformed Student B, yet knew less about his or her performance, then by 2004 QSPES definitions, the teacher would have to assign a lower grade to Student A than Student B, who in fact performed the skills at a lower standard.

Teaching Styles

The 2004 QSPES stipulated that "learning experiences should draw on a range of pedagogical approaches" (p. 30) such as guided discovery, inquiry, cooperative learning, individualized instruction, games for understanding, and sport education. It is assumed that the 2004 QSPES decided to mention these six teaching styles because they would be helpful and integral in meeting the syllabus objectives and aims. One problem, though, is that the 2004 QSPES seems to have made many assumptions. First, it does not suggest when or for which of the general objectives these teaching styles would be appropriate. Although it does say that "learning experiences should not be related to a specific objective but, where possible, should encompass all objectives" (QSA, 2004, p. 30). It offers no guidance for teachers or definitions of what guided discovery, an inquiry approach, or cooperative learning are or how to do them. The assumption of the 2004 QSPES is that teachers will know what these styles mean and how and when to apply them to assist in creating learning experiences that meet the general objectives. The 2004 QSPES also mentions Multiple Intelligence Theory and Bloom's Taxonomy, yet neither of these are models or descriptions of teaching styles. The fact that the 2004 QSPES mentions such a variety of teaching styles would mean that it would be expected a variety of teaching styles would be used in learning episodes that allow students to achieve the general objectives. While the 2004 QSPES suggests a variety of teaching styles to be used and some models that can assist in the direct teaching of thinking skills, it does not offer logistics of how or when this might occur. One aim of this research was to ascertain if the 2004 QSPES provided Senior PE teachers with enough guidance to use the suggested teaching styles effectively. In the lack of guidance, teachers could use Mosston and Ashworth's (2008) Spectrum of Teaching Styles to judge which of the suggested teaching styles are appropriate to use.

The first teaching style that the 2004 QSPES suggests teachers should use is Guided Discovery. Whether this is Mosston and Ashworth's (2008) Guided Discovery style is not specified (though not likely), and this lack of clarity is a recurring theme in parts of the 2004 QSPES. According to Mosston and Ashworth (2008), Guided Discovery is a style characterized by the logical and sequential design

of questions that lead the student to discover a predetermined concept, principle, or relationship. It is the first style from the *production* cluster, meaning that it is the first time that the learner or student will be producing knowledge that is new to the learner. From these characteristics (producing new knowledge), it can be concluded that this style would be appropriate for teachers who are designing learning experiences that allow the student to demonstrate behavior or thinking that fall under the general objective descriptors for evaluating in the 2004 QSPES. Although the 2004 QSPES has not drawn on this information, it seems that Mosston and Ashworth's (2008) definition highlights that guided discovery is not appropriate for reproducing knowledge and therefore not appropriate for the 2004 QSPES general objective of acquiring.

Inquiry is the next teaching style that the 2004 QSPES suggests for creating appropriate learning experiences. As with many of the other teaching styles, the 2004 QSPES does not define inquiry, suggest when to use it, or suggest the general objectives for which it would be appropriate—any information would need to be sourced from elsewhere. However, the 2004 QSPES presumes that teachers know what it is and have a shared understanding of it. This ambiguous use of the term *inquiry* is common, according to Mosston and Ashworth (2008), who suggest that

> this pedagogical term is inconsistently used in the literature and the classroom. Some examples of inquiry teaching (based on the decision and content design) represent the Practice style (guided practice), while others are examples of a divergent process representing either the Practice style or the next style—Divergent Production. Since the general term *inquiry* does not indicate a specific cognitive operation, it could apply to many different teaching-learning behaviours. (p. 222)

Cuevas, Lee, Hart, and Deaktor (2005) suggested, with regard to inquiry learning, that giving a commonly accepted definition is difficult if not impossible. Considering this, it seems unlikely that teachers of 2004 QSPES would have their own common definition and understanding of inquiry learning and how to implement it.

The 2004 QSPES also suggests that learning experiences should draw on the pedagogical approach known as *cooperative learning*. As with many teaching styles, cooperative learning is difficult to define in a consistent way. For example, Johnson and Johnson (2001) defined cooperative learning as "the instructional use of small groups so that students work together to maximise their own and each other's learning" (p. 455). Similarly, Shoval (2011) suggested that it is children in small groups being "asked to perform external interactive activities, such as performing experiments, demonstrating ideas to their peers, helping each other and talking to each other" (p. 453). As with the mentioned teaching styles, this teaching style lacks clear definition in the 2004 QSPES, which gives no explanation and does not suggest with which general objective it can be used. Mosston and Ashworth (2008) offered their thoughts on the use of this term when they suggested that "the label 'cooperative learning' does not carry a fixed decision structure; therefore, the decision within the group situations must be determined before learning conclusions can be made" (p. 111). Again, it appears that the 2004 QSPES presumes a shared common definition and understanding of teachers' knowledge about when to use such styles, how to use them, and for which general objectives they are appropriate. Clearly, clarity of definitions is needed, but unfortunately this is lacking.

Literature relating to earlier mentioned educational theories and models (Marzano's Dimensions of Learning and Gardiner's Multiple Intelligences) will not be examined in greater detail, as this is not one of the aims of this research. However, the 2004 QSPES proposes that teachers can use aspects of Marzano's Dimensions of Learning, Gardner's Multiple Intelligences, and Bloom's Taxonomy to teach the thinking skills required to meet the four general objectives. Note that Gardiner's Multiple Intelligences (sometimes referred to as MI theory) was not developed as a thinking skills project or a way to teach. In fact, Armstrong (2000) states that "it is a tempting project to want to relate MI theory to any number of learning style theories" (p. 10), but this is difficult because MI theory has a "different type of underlying structure than many of the most current learning-style theories" (p. 10). Armstrong goes further, saying that MI theory is a "cognitive model that seeks to describe how individuals use their intelligences to solve problems and fashion products" (p. 10) and

that it is not "process oriented" (p. 10). On the other hand, Marzano's Dimensions of Learning is a thinking skills program that is process oriented and, at least, designed to teach thinking skills.

The 2010 QSPES

A new, and still current, Senior PE syllabus for Queensland was published (QSA, 2010c) and with it, some noticeable changes. First, the exit criteria were renamed as *dimensions*. However, the three assessed dimensions remain as acquiring, applying, evaluating (and appreciating), and the exit criteria from the 2004 QSPES of appreciate become *attitudes and values* (QSA, 2010c). Many of the issues identified as being of concern, including many found in this research, were addressed in some capacity—to the credit of the QSA (now Queensland Curriculum and Assessment Authority, QCAA). Most noticeable is that the terminology *new or unrehearsed performance environments* has been removed from the standards matrix and from the 2010 QSPES. Gone also is a section explaining what constitutes a *complex performance environment*. The removal of the terminology *new or unrehearsed* means that *discovery* and *creativity* are no longer necessary to be used as the conscious thought process within the exit criteria (in the 2010 QSPES now known as dimensions) of evaluating.

Similarly, the exit standards (previously exit criteria) reflect this new focus by describing the standards associated with an *A* level in evaluating:

> The student work has the following characteristics:
> - consistent and discerning reflection and decision making that enhances physical responses and outcomes in or about authentic performance contexts
> - consistent and effective initiation of change or modification of personal and/or team strategies to solve problems in or about authentic performance contexts. (QSA, 2010c, p. 31)

The term *complex performance environments* has be removed and appears to have been replaced with the terminology "authentic performance contexts" (QSA, 2010c, p. 31). These are defined as "contexts that are applicable to the performance of that activity" (QSA, 2010c, p. 35). The way that evaluating is defined remains

largely unchanged from the 2004 QSPES. This definition is congruent with recognizing the cognitive operation of evaluating can be completed with memory as the conscious thought process. These changes make the 2010 QSPES definitions regarding evaluating more congruent than the 2004 QSPES definitions.

Unfortunately, shadows of the inconsistencies in terminology remain regarding evaluating and the 2004 QSPES need for discovery and creativity to be used or assessed. The Physical Performance section of the 2010 QSPES suggests that "performances involve the creative input of students and the application of technical skill in solving a problem or providing a solution" (QSA, 2010c, p. 25). Similarly, in a sample assessment unit for Year 11 Aerobics provided by the QSA, the task asks the students to

> Create a 90 second Sport Aerobics routine to your selection of one Sport Aerobics music track of 152–155 beats/minute. The complete performance should reproduce the compulsory elements (high kicks, push-ups and jumping jacks) and skill elements (static strength, power, flexibility and dynamic strength) within the time and space (7×7m) constraints of a Sport Aerobics routine. (QSA, 2010b, p. 1)

The criteria for this task do not allow creativity (in the sense of the word meaning new to the student) to be assessed. Equally, the task asks for reproduction (second line of task) to be used, which clearly necessitates memory as the conscious thought process. Clearly, there is still some confusion with cognitive terminology or intent. All of this is of no consequence though if the *exit standards* no longer define evaluating as the 2004 QSPES did.

One final aspect of the 2010 QSPES is not in the document but provided as support material. The document is titled *Physical Education (2010): Advice for Teachers—Highlighted Standards October 2010*. The document has been produced to "help teachers implement the syllabus in their school setting. The tables that are included in this document highlight:

- different aspects in the standards
- how these aspects vary across the different standards" (QSA, 2010a, p. 2).

The *quality* words and the *cognitive* words have been highlighted in these tables. In some cases, the highlighting of cognitive terms has been done correctly; however, the highlighting of words such as *combination, initiate,* and *choice* is questionable. In this case, identifying the cognitive intent of these words in these situations is difficult. The purpose of this article was not to examine and critique the 2010 QSPES and its clarity, but it is further evidence of syllabi with unclear terminology and information for teachers to understand.

Regarding the suggested teaching styles (i.e., guided discovery, inquiry, cooperative learning, individualized instruction, games for understanding, and sport education) in the 2004 QSPES, a cursory examination of teaching practice in Queensland schools by the authors, as teachers and researchers, suggests that few, if any, of the teaching styles suggested were implemented in schools. Certainly, any that were implemented were often not conducted in a manner that typified an effective approach. There are many reasons for this ranging from a preoccupation with known or existing teaching direct styles to a lack of information about teaching styles and their implementation. The syllabus indirectly suggests that the range of suggested teaching styles can help students to develop appropriate thinking skills and be more successful in achieving the general objectives at high levels. However, the suggested teaching styles listed in the syllabus were not particularly helpful or supportive to teaching practice. The 2010 QSPES does not suggest any of these teaching styles, and the syllabus now instructs the teacher to see the QSA website for examples of learning experiences. This move was applied to Queensland syllabi for most teaching areas. All syllabi, it is hoped, evolve over time and perhaps during the development of the 2010 QSPES, it was realized that these concepts were no longer relevant to assisting teachers in implementing the syllabus. This may be the case, but all teachers, irrelevant of subject matter, will use a teaching style to implement syllabi. In this case, it appears that the QCAA has concluded that teachers need no help with this matter, while some research (SueSee, 2012) suggests otherwise with evidence demonstrating that teachers self-reported using a range of teaching styles, yet when they were observed they were not.

With the 2010 QSPES published, and with a further review of this Senior PE syllabus for Queensland students under consideration, it

will be interesting to see if a document emerges that lacks ambiguity. Writers of any new PE syllabi, in Queensland or any other Australian state, need to base their documents on research, not assumption or yet-to-be-proven theories or concepts. They also need to be written with consultation of PE teachers and include relevant professional development. The ability to assess the concept of the intelligent performer evaluating in a complex environment (see new or unrehearsed) as defined by the 2004 QSPES has been strongly questioned using Mosston and Ashworth's (2008) *Teaching Physical Education* and other research from the field of motor learning and cognitive psychology. The 2004 QSPES, as an example of what may typify many syllabi, provides clear examples of terms, concepts, and teaching styles that were not explained well. At the least, doubts were cast about whether the intelligent performer concept holds or can be assessed in the way the 2004 QSPES suggests. Queensland is not alone in its attempts to have integrated PE, but if other states or countries are facing similar challenges to the ones exposed in an examination of the 2004 QSPES, let us look at how they are addressing them with clarity and foresight (based on innovative best practice).

Conclusion

As an example of a syllabus that was inadequate in providing the necessary guidance and understanding for teachers, the 2004 QSPES was built around three points that appear questionable, contradictory, and vague. The situation where a student can only achieve an *A* or *B* grade under the learning objective of evaluating if movement is performed in new or unrehearsed contexts within complex environments (i.e., if evaluating only uses creativity or involves the production of knowledge) is the first point that is questionable. Evaluating can use creativity and produce knowledge, but it can also use memory and involve the reproduction of knowledge.

Another questionable cornerstone around which the 2004 QSPES was built was the concept of intelligent performance. Some of the literature (Berry & Broadbent, 1984; Howard & Howard, 1992; Masters et al., 2008) questions the concept of intelligent performance. It seems likely that there can be (and are) students who are the most skillful yet experience difficulty verbalizing or communicating what

they are doing. Yet they seem to be able to apply this information to improve their performance and take it to a high level. Ironically, if assessed by the 2004 QSPES, they would not attain a high mark, as they have not displayed intelligent performance. In both of these cases, it appeared as if a presumption had been made that teachers had sufficient knowledge to be able to implement vaguely outlined concepts, learning experiences, and teaching styles for which little useful information was given. Any syllabus built around such foundations will most likely find difficulty in its application, teaching, implementation, and assessment. It can be argued that if these three principles are cornerstones of the 2004 QSPES, and if they are ill-defined, contradictory, and questionable, then teachers will likely have trouble applying, teaching, and assessing it. If a syllabus is not clear about what it aims to do, how to do it, and how to assess its educational objectives, then its outcomes will not be what it originally desired. This research was not designed to specifically outline solutions to the concerns raised, although some broad suggestions have been given. It does highlight how a syllabus was written with some conflicting messages, structures, and assessment rubrics, which, when critically examined and compared to research, proved to be questionable and ultimately led to a document that perhaps failed to meet its own expectations.

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The Physical Educator Vol. 75 • pp. 880–900 • 2018
https://doi.org/10.18666/TPE-2018-V75-I5-8292

PEDAGOGY

Physical Education Teachers' Use of Mosston and Ashworth's Teaching Styles: A Literature Review

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Abstract

This systematic review explored the use of Mosston and Ashworth's teaching styles from an international perspective. I searched all relevant peer-reviewed journals listed in ERIC, SPORTDiscus, and ISI Web of Science. This search yielded 15 potentially relevant studies published from 2000 to December 2016. Thirteen of these studies met the inclusion criteria established for this review and involved 3,465 participants from 15 countries. The results indicated that the reproduction teaching styles were used more often than the production teaching styles. The use of the command, practice, and inclusion styles dominated in the classrooms across 15 countries. Of the six production teaching styles, only the guided discovery and the convergent discovery styles were sometimes used, while the remaining four were seldom used. The results are discussed in light of Spectrum theory and with respect to the physical education teacher preparation programs of those countries.

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The Spectrum of Teaching Styles is a conceptual framework that describes and organizes the process involved in teaching (Goldberger, Ashworth, & Byra, 2012). The Spectrum has been a guiding tool in teaching and research in physical education (PE) for 50 years. Even today some scholars consider it as a viable instructional approach for delivering instruction at schools and for eliciting student learning (Graham, Holt/Hale, & Parker, 2010; Harrison, Blakemore, & Buck, 2007; Rink, 2010).

According to Mosston and Ashworth (2008), the Spectrum consists of a continuum of 11 landmark styles, each of which emerges as decisions shift between teacher and learner. The transition from one landmark style to another represents certain decisions organized into three mutually exclusive sets: (a) the preimpact set (planning and preparation decisions), (b) the impact set (decisions made during the teaching–learning transaction that defines the action), and (c) the postimpact set (feedback and assessment decisions).

The 11 styles are clustered as either reproduction styles (command style, practice style, reciprocal style, self-check style, and inclusion style) or production styles (guided discovery style, convergent discovery style, divergent discovery style, learner-designed individual program, learner-initiated style, and self-teaching style). In reproduction styles, the purpose of the instruction is the replication of specific known skills and knowledge. The teacher specifies the subject matter of the lessons, indicates the learning conditions by identifying the teaching style, and defines the criteria for correct task completion. The class climate is one of performing the model, repeating the task, and reducing errors. Feedback is specific, often corrective, and there is an acceptable way of performing the selected task (Mosston & Ashworth, 2008).

In production styles, the teacher invites the students to discover new information that may be new to the teacher. The production styles require students' engagement in cognitive operations, such as problem solving, inventing, comparing, contrasting, and synthesizing. The class climate favors patience and tolerance and individual cognitive and emotional differences. In these styles, feedback refers to the production of new ideas (Mosston & Ashworth, 2008).

The Spectrum still provides a concrete model for the systematic generation of research questions and as an organized repository for

research results (Chatoupis, 2009). Two narrative reviews (Byra, 2000b; Chatoupis, 2009) and a content analysis (Chatoupis, 2010) on research that explores the influence of Spectrum teaching styles on student-learning variables have been published so far. The large number of relevant studies reveals that Spectrum research has grown and prospered over the past four decades.

The Spectrum as a model for teaching styles has enjoyed great popularity over the years. However, up to 2000, no research had been conducted on the use and implementation of the teaching styles by PE teachers around the world. During that period, some renowned researchers speculated that the Spectrum is utilized in the classroom internationally (e.g., Byra, 2000a; Franks, 1992; Gerney & Dort, 1992; Goldberger, 1992; Krug, 1999; Metzler, 1983).

Over the last 16 years (i.e., 2000–2016), however, a number of research studies have been conducted and published in peer-reviewed journals, which supports that the 11 teaching styles have indeed been implemented by PE teachers of varying age groups, experience, and cultural backgrounds in K–12 contexts across the globe (see Table 1). Some of those studies failed to attribute the use of teaching styles to environmental factors (rural, urban), political factors (e.g., curricular imperatives), teachers' preparation, and years of teaching experience (Curtner-Smith, Hasty, & Kerr, 2001; Curtner-Smith, Todorovich, McCaughtry, & Lacon, 2001; Parker & Curtner-Smith, 2012; Salvara & Birone, 2002; Syrmpas, Digelidis, & Watt, 2016). On the contrary, Jaakkola and Watt (2011) found that not only teaching experience but also teachers' age and perceived ability to use teaching styles influence the implementation of the teaching styles. Also, educational level (undergraduate–graduate) seemed to influence teachers' practices (Zeng, 2016), while teachers' beliefs about the styles (Cothran et al., 2005) or teachers' motivation (Hein et al., 2012) were related to their use.

Despite a growing body of literature on this topic, no one has attempted to provide a review of research on teachers' use of reproduction and production teaching styles from an international perspective. Thus, this systematic review aimed to synthesize the evidence from relevant research studies and draw conclusions about which teaching styles are being used and to what extent they are implemented internationally.

The importance of conducting a systematic literature review on this topic is evident. First, Spectrum theory has a prominent position in PE literature and is widely included in teacher education programs (Byra, Sanchez, & Wallhead, 2014). It is essential for researchers to know about the implementation of each teaching style internationally, because this information will help them to reach conclusions about the spread and use of Spectrum knowledge internationally.

Second, this review aims to provide teacher educators with the full scope of recent research (since 2000) on how and why PE teachers use the 11 teaching styles, so that teacher educators can integrate it into teacher education programs. Doing so allows teacher educators to provide prospective or in-service teachers with stronger professional development that supports learning opportunities from Command to Discovery (Ashworth, 2009). For example, the results of this review can inform undergraduate or in-service teacher education programs about promoting efficient use of common teaching styles or can help teachers to add new teaching styles.

Third, knowing the differences and similarities in the implementation of the various teaching styles across countries provides a deeper understanding of teaching and learning and allows countries to learn from others about the implementation of the Spectrum.

Method

Identifying Research

I undertook a thorough literature search using valid electronic databases (ERIC, SPORTDiscus, and ISI Web of Science). I searched specific keywords (*Mosston's Spectrum*, *teaching styles,* and *teachers' use/implementation of teaching styles*) and their combinations to identify all relevant data-based Spectrum research.

The literature search focused only on studies investigating teachers' use/implementation of Spectrum teaching styles or students' reflections on their teachers' use of styles. Also, I considered only studies published in journals, because the publication of research in a journal includes a peer-review process, and that suggests a more unbiased, professional investigation and presentation. Therefore, dissertations and research papers published in books and conference proceedings were excluded. After the completion of the search,

I checked the reference lists of the identified papers for additional relevant studies. This search led to 15 relevant published studies.

Inclusion Criteria

Published studies were included in the review if they (a) targeted PE student teachers and in-service teachers teaching PE in a K–12 context and (b) employed a preexisting questionnaire that was either adopted or adapted, systematic observation, or both to collect data. In two studies, researchers had PE student teachers (Syrmpas & Digelidis, 2014) or college students (Cothran, Kulinna, & Ward, 2000) reflect on memories of K–12 to answer questions. Although the use of students' self-report is not without problems, these two studies were included in the review because students were in a position to report their thoughts with sufficient accuracy (Lee, 1997). Studies were excluded only if they were written in a language other than English (Sirinkan & Gundogdu, 2011) or if they did not assess the reliability and validity of the measuring instrument (Aktop & Karahan, 2012).

Selection Strategy

Initially, I read the titles of all identified studies to determine their gross relevance to the review. Then I read the abstracts to decide which studies met the inclusion criteria. In some cases, I could not make an inclusion decision by reading the abstract, so I then read the full paper. Based on the above criteria, 13 of the 15 original research articles were included in the review (see Table 1).

Data Analysis

I initially intended to create total mean scores for each teaching style from the 13 reviewed studies to compare the 15 countries regarding the implementation of the teaching styles. However, this proved to be problematic because of the varied methodologies and data collection techniques employed in the reviewed studies. Some of the studies included observation of actual behavior (Parker & Curtner-Smith, 2012; Salvara & Birone, 2002), but they used different forms that cannot be equated. Also, in studies that used a questionnaire to collect data, the scales were different. For example, Zeng (2016) used a nine-style inventory, whereas the other studies used an 11-style inventory.

Table 1
Characteristics of Included Studies (N = 13)

Study	Country	Participants	*n*	Level	Sampling method	Pilot study	Method	Observer[a]	Instrument		
									Validity	Reliability	Scale
Cothran et al. (2000)	USA	College students	438	K–12	Conventional	Yes	Questionnaire	NA	Yes (construct)	Yes (Cronbach's α)	5-point
Curtner-Smith, Hasty, & Kerr (2000)	UK	PE teachers	16	Secondary	Conventional	NA	Systematic Observation	Yes	Yes (construct)	NA	% intervals
Curtner-Smith, Todorovich, McCaughtry, & Lacon (2000)	UK	PE teachers	18	Secondary	Conventional	NA	Systematic Observation	Yes	Yes (construct)	NA	% intervals
Kulinna & Cothran (2002)	USA	PE teachers	212	Primary, secondary	Conventional	Yes	Questionnaire	NA	Yes (construct)	Yes (Cronbach's α)	5-point
Salvara & Birone (2002)	Greece, Hungary	PE teachers	84	Primary	Conventional	NA	Systematic Observation	Yes	Yes (construct)	NA	% intervals
Cothran et al. (2005)	USA, Korea, Australia, France, England, Portugal, Canada, UK	PE teachers	1,436	Primary, secondary, high school	Systematic	Yes	Questionnaire	NA	Yes (construct)	Yes (Cronbach's α)	% teachers

Table 1 (cont.)

Study	Country	Participants	*n*	Level	Sampling method	Pilot study	Method	Observer[a]	Instrument		
									Validity	Reliability	Scale
Jaakkola & Watt (2011)	Finland	PE teachers	294	Primary, secondary, vocational	Conventional	Yes	Questionnaire	NA	Yes (construct)	Yes (Cronbach's α)	5-point
Parker & Curtner-Smith (2012)	USA	Student teachers	2	Secondary	Conventional	NA	Systematic Observation	Yes	Yes (construct)	NA	% intervals
Nathan & Ratnavadivel (2012)	Malaysia	Student teachers	100	Secondary	Conventional	Yes	Questionnaire	NA	Yes (construct)	Yes (Cronbach's α)	% teachers
Hein et al. (2012)	Estonia, Hungary, Latvia, Lithuania, Spain	PE teachers	176	Secondary and high school	Conventional	NM	Questionnaire	NA	Yes	Yes (Cronbach's α)	5-point
Syrmpas & Digelidis (2014)	Greece	Student teachers	288	Primary, secondary, high school	Conventional	NM	Questionnaire	NA	Yes (construct)	Yes (Cronbach's α)	5-point
Syrmpas et al. (2016)	Greece	PE teachers	219	Primary, secondary, high school	Conventional	NM	Questionnaire	NA	Yes (construct)	Yes	5-point
Zeng (2016)	USA	Student teachers	142	NM	Conventional	Yes	Questionnaire	NA	Yes (construct)	Yes (test–retest)	5-point

Note. NA = not applicable; NM = not mentioned. 5-point scale: 1 = *never*, 2 = *seldom*, 3 = *sometimes*, 4 = *often*, 5 = *always*. Percentage of intervals: % of times each style was used within intervals of 20 s/lesson duration as an average of all lessons taught in each trial (40–45 min).

[a]Observer training was undertaken and interobserver reliability was estimated.

Therefore, I categorized each study based on the following dimensions to provide summary information: (a) teaching style used and (b) order of use of teaching styles. Statistical analysis provided frequencies, and SPSS was used for all calculations. The dimension of country was not included, because in some cases (see Table 1) the same countries were examined more than once (Greece in three studies, the United Kingdom in three studies, and the United States in five studies), which resulted in conflicting frequency values for these countries.

Results

Characteristics of the Included Studies

The included studies ($N = 13$) were published between 2000 and 2016 and examined the use/implementation of teaching styles by teachers from three continents and 15 countries, namely, Australia/Oceania (Australia), North America (Canada and United States), Europe (United Kingdom, Portugal, France, Greece, Hungary, Estonia, Latvia, Lithuania, Spain, Finland), and Asia (Malaysia and Korea). The majority of these studies were conducted in Europe, while similar studies conducted in Africa and South America were lacking. Three of the 13 studies represented a cross-cultural investigation of the use of teaching styles (Cothran et al., 2005; Hein et al., 2012; Salvara & Birone, 2002), whereas the remainder focused on only one country.

As Table 1 shows, sample sizes ranged from two to a maximum of 1,436 participants. The total number of participants was 3,425. Four studies employed PE student teachers doing their teaching practice at schools. In one study, the level at which the participants taught is not mentioned (Zeng, 2016). Participants were recruited via convenience sampling in all studies except in Cothran et al. (2005), which employed systematic sampling.

Measuring instruments. The majority of the studies ($n = 9$) included with each of the 11 teaching styles a descriptive scenario that was put in a survey instrument. Participants rated their use of the teaching styles on a 5-point Likert-type scale of 1 = *never*, 2 = *seldom*, 3 = *sometimes*, 4 = *often*, 5 = *always* (see Cothran et al., 2000, for a full description). Each study either adopted or adapted a survey instrument and then tested it for validity and reliability. Six

studies undertook a pilot study. However, for the remaining three, I was uncertain if they used a pilot study (see Table 1). The remaining four studies employed systematic observation to collect data using interval recording and they estimated observer reliability.

Teachers' Use of Teaching Styles

The descriptive results shown in Table 2 indicate that with the exception of the self-check style, the reproduction styles are used more often than the production styles. Also, Table 2 shows that the teaching style that is used the most internationally is the practice style (17),[1] followed by the command style (12) and the inclusion style (11). The least used teaching style is the self-teaching style (6). The self-teaching style (6), the learner-initiated style (6), the learner-designed individual program (6), and the self-check style (4) are the least used teaching styles.

Discussion

Characteristics of the Included Studies

It is apparent from the review that between 2000 and 2016, 13 studies from 15 countries across four continents (North America, Europe, Asia, and Australia/Oceania) investigated the use of teaching styles in K–12 teachers. This finding implies that the Spectrum of Teaching Styles is used in the classroom learning process in quite a few countries around the globe. This is in line with the scholarship's contention that the Spectrum is a solid model for teaching PE at all school levels (Goldberger, 1992; Goldberger et al., 2012).

The premise that the Spectrum is a universal theory is reinforced by the fact that several countries have adopted this framework in the classroom. This universal use of the theory is encouraging and promising for its future and its viability as a teaching tool. According to Sara Ashworth, the founder and director of the Spectrum Institute for Teaching and Learning, many Spectrum colleagues from several parts of the world teach the Spectrum (Spectrum of Teaching Styles, 2012). Unfortunately, at the moment, few studies offer empirical support of such worldwide collegial use.

[1]The numbers in parentheses represent the total number of times a particular style appears as first, second, third, and so on on all reviewed studies (see also Table 2).

Table 2

Frequency of Teachers' Use of the Reproduction and Production Teaching Styles Across 15 Countries

	f										
Rank	**Command**	**Practice**	**Reciprocal**	**Self-check**	**Inclusion**	**Guided-discovery**	**Convergent-discovery**	**Divergent-discovery**	**Learner-designed**	**Learner-initiated**	**Self-teaching**
1	9	**17**	1	0	0	0	0	0	0	0	0
2	**12**	9	1	0	2	0	0	0	0	0	0
3	2	0	7	1	**11**	4	0	4	0	0	0
4	1	0	8	3	3	4	0	5	2	0	0
5	1	1	5	1	2	2	9	7	1	0	1
6	0	0	2	5	0	6	3	3	5	0	1
7	0	0	0	5	2	4	4	6	2	0	0
8	0	0	0	4	1	0	1	0	3	2	1
9	0	0	0	1	0	0	0	0	**6**	1	2
10	0	0	0	1	0	0	0	0	2	**6**	2
11	0	0	0	1	0	0	0	0	0	2	**6**

Note. The numbers in the far left column (1–11) denote the order of use of the teaching styles: e.g., 1 = the most often used, 2 = the second most often used, etc. Numbers in bold show the first three most and least frequently used teaching styles internationally.

All studies but one (Cothran et al., 2005) used purposive or convenience sampling techniques, which makes generalization of the results from the sample to the population almost impossible (Gall, Borg, & Gall, 1996). Research that is real world or field oriented does not allow for random sampling of individuals (Robson, 1996; Thomas & Nelson, 2001). Also, random samples are expensive and difficult to acquire (Kerlinger, 1992).

Three studies did not specify undertaking a pilot study. Pilot testing plays a critical role in improving data collection routines, trying scored techniques, revising locally developed measures, and checking the appropriateness of standard measures (Gall et al., 1996). This practice may apply to not only new but also adapted and adopted questionnaires (Kouvelioti & Vagenas, 2015), as was the case in these three studies.

Checking the reliability and validity of a questionnaire represents good practice for conducting survey studies and protects the credibility of the findings (Kelley, Clark, Brown, & Sitzia, 2003). In this review, all studies checked the reliability and validity of the questionnaire, therefore securing trustworthy results. Also, in studies that collected data by systematic observation, the observers underwent training and interobserver reliability was checked. Researchers can ensure that data collection is reliable by having observers take sufficient training (van der Mars, 1989).

Teachers' Use of Teaching Styles

The key finding from this review is that the pattern of teaching style employed by the teachers across the 15 countries was similar, with reproduction teaching styles used more often than production teaching styles (see Table 2). In particular, the use of the command, practice, and inclusion styles dominated in the classrooms internationally, whereas only two (guided discovery and convergent discovery) of the six production teaching styles were sometimes used, with the remaining four seldom used (see Table 2).

Of all the teaching styles, the self-teaching style was the least used. In seven studies, teachers reported that they made use of that style, which raises doubts about their understanding of this style (Cothran et al., 2005; Cothran et al., 2000; Jaakkola & Watt, 2011; Kulinna & Cothran, 2002; Salvara & Birone, 2002; Syrmpas & Digelidis, 2014;

Syrmpas et al., 2016) . Mosston and Ashworth (2008) argue that this style does not exist in the classroom. Self-teaching may not function well in situations that bring people, social mores, and traditions together. Similarly, in studies that used questionnaires as a method of data collection, teachers reported implementing most or all teaching styles, which is consistent with previous findings of cross-cultural studies (Cothran et al., 2005; Hein et al., 2012). This result should be viewed with caution because teachers tend to overestimate their teaching behaviors (Good & Brophy, 2008).

Several potential reasons may explain the pattern of teaching style use. Development of motor skills and refinement of sport-specific skills are aims of PE curricula worldwide (Dudley, Okely, Pearson, & Cotton, 2011; Hardman, 2008; United Nations Educational, Scientific, and Cultural Organization [UNESCO], 2014). PE teachers were perhaps concerned with developing students' motor skill proficiency and teaching competitive sport activities. Therefore, they heavily used two teaching styles that are designed to help students develop the correct technique (command style) and provide the maximum amount of practice time (practice style; Chatoupis & Vagenas, 2017; Goldberger, 1984, 1992).

Second, because the command and practice styles maximize teachers' control over the classroom (Goldberger, 1984), use of these styles is the safer option so that the teacher can avoid discipline problems. Perhaps this explains why (especially in Malaysia, Hungary, Greece, the United Kingdom, the United States, and Finland) teachers in all 15 countries did not make extensive use of teaching styles that allowed students, who are prone to misbehavior, to make many decisions (especially the production teaching styles; see the corresponding reviewed studies for the mean scores reported).

Third, the inclusion style belongs to pedagogical practices that facilitate equal opportunities for all children (Byra, 2006). According to Hardman (2008), legal mandates and agendas in many countries have attempted to enforce inclusion; countries such as England, Sweden, Canada, Australia, Finland, and Israel have put in place specific inclusive programs that are making progress and are beginning to cater to a more diverse group of children. Similarly, some countries have brought about change in inclusion and disability policy and practice, epitomized in policies related to entitlement to PE,

inclusion, integration, employment of support assistants, differentiated teaching methods, and use of adapted equipment (UNESCO, 2014). This may explain why internationally the third most used teaching style is the inclusion style.

Fourth, when they were students, the PE teachers of the sample might have experienced only reproduction teaching styles, especially the most representative forms of direct instruction, the command and the practice styles. Also, during their initial teacher education, they might not have experienced and practiced all 11 teaching styles, which could have prevented them from building confidence in using them. In countries such as the United States, Finland, and Greece, the Spectrum is taught at some physical education teacher education programs. However, with a few exceptions (especially in the United States), this preparation does not seem to be rigorous (Jaakkola & Watt, 2011; Parker & Curtner-Smith, 2012; Syrmpas et al., 2016; White, 1998). Also, in many countries, the adequacy of teacher preparation for PE is arguable, and initial training presents a problem even in developed countries (Hardman, 2007; UNESCO, 2014).

Fifth, the national curriculum of most countries included in this review encourages teachers to adopt a variety of pedagogical approaches (including the production teaching styles). Also, it reflects educational objectives associated with the cognitive (e.g., critical thinking skills) and social domains that necessitate the use of such approaches (Byra, 2006; Cothran et al., 2005; Curtner-Smith, Hasty, & Kerr, 2001; Jaakkola & Watt, 2011; Nathan & Ratnavadivel, 2012; Salvara & Birone, 2002; SueSee, 2012; Syrmpas et al., 2016). It is possible that national curricula may not have a considerable influence on PE teachers' teaching practices, as the production teaching styles were not used as much as the reproduction styles (see Table 2, as well as Curtner-Smith, Hasty, & Kerr, 2001).

Sixth, what teachers believe about the strengths of teaching styles and their self-ability to use them influences the implementation of these styles (Cothran et al., 2005; Jaakkola & Watt, 2011; Syrmpas et al., 2016). Therefore, it can be hypothesized that the pattern of teaching style use, as shown in Table 2, is caused by teachers' beliefs or perceptions about the reproduction and production teaching styles or about their ability to use them.

Seventh, a noteworthy result was the low mean values of teachers' use of reproduction styles and the even lower values for the production styles in the United States and some European countries (especially Greece and Hungary; Cothran et al., 2005; Hein et al., 2012; Salvara & Birone, 2002; Syrmpas & Digelidis, 2014). This may be due to the large class sizes, time allocation, inadequacies in facilities, and financial considerations that have been documented in these countries (Hardman, 2007). As it has been suggested, teachers from the United States and United Kingdom do not use production styles, because of class time and class size (Pierce, 2010) or because of teachers' work (over) load (Macfadyen & Campbell, 2005) and lack of time to experiment with alternative teaching styles (Curtner-Smith & Hasty, 1997).

Implications for Teacher Education Programs

It is commonly accepted within the PE teaching and research community that focusing solely on direct instruction teaching strategies (e.g., the reproduction styles) could be problematic when teachers seek (a) to develop wider learning skills and independent learning (Dudley et al., 2011), (b) to teach activities that dictate the employment of a specific approach to instruction (Rink, 2010), and (c) to cope with the diversity of the student population (Goldberger, 2011; Mosston & Ashworth, 2008).

However, as this review revealed, the use of the production styles was much lower than the use of the reproduction styles across the 15 countries. Therefore, because teacher education can be a decisive agent of change in quality education in schools (Tsangaridou, 2009) and teacher quality (MacPhail & Tannehill, 2012), the professionals who teach in physical education teacher education programs should encourage and challenge undergraduate students and in-service teachers alike to explore and use a broad range of teaching styles. In particular, these programs should help PE teachers to develop more comfort and confidence with the production teaching styles, as well as with the less used reproduction teaching styles, and to learn to use them in the school context with trust and success.

Joyce et al. (2014) proposed certain procedures that can be incorporated in a physical education teacher education program for the successful implementation of a newly acquired teaching strategy

(i.e., a combination of lecture, discussion, observation of demonstrations, practice, and feedback in protected conditions, as well as in real school settings). The physical education teacher education program at the University of Wyoming (Byra, 2000a) is a good example of a carefully constructed series of courses that enable student teachers to develop comfort and confidence with the Spectrum of Teaching Styles.

Conclusions, Limitations, and Recommendations

This literature review marks the first attempt at synthesizing the results of studies related to how PE teachers across 15 countries use the Spectrum of Teaching Styles. The results suggest that reproduction styles dominate in school settings around the world; in particular, practice, command, and inclusion styles are used most often.

A few limitations of the reviewed studies and recommendations for future research should be mentioned. A small number of studies failed to undertake pilot testing, while most of the studies employed poor sampling techniques (i.e., convenience sampling). Future investigations on teachers' use of teaching styles should address these two methodological problems. Also, only English-language journals were searched, and this may have resulted in relevant research being missed.

The effect of this systematic review is limited by the small number of countries included in the reviewed studies. Africa, as well as countries with large populations such as China and India, is not represented in this line of research. Also, only three cross-cultural studies have been conducted so far, thus limiting understanding of various aspects of teaching and learning across countries. Future research should include other countries and should focus on differences or similarities in the use of the Spectrum between or among different cultures.

In the majority of the reviewed studies, teachers were asked to report which styles they used during their teaching. This method of data collection can be misleading and rather limited because, as research has shown, PE teachers do not use the teaching styles that they believe they use (SueSee & Edwards, 2011). Generally, there are differences between what people use and what they say they do (Lawson & Stroot, 1993). Future studies should employ direct

observation of teachers' instruction to provide a more reliable picture of the implementation of teaching styles.

The majority of the studies did not consider factors that may influence teachers' practice such as the subject matter taught, students' level of experience with the teaching styles, and quality of initial teacher education. Future studies should employ qualitative methods to elaborate why teachers implement certain teaching styles more often than other styles or to explain differences in the use of the Spectrum among countries from a historical, sociological, and psychological perspective.

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The Physical Educator Vol. 75 • pp. 901–916 • 2018
https://doi.org/10.18666/TPE-2018-V75-I5-8166

PEDAGOGY

What's Going on Out There? An Exploration of K–12 PE Curricular Models and Content Taught in Public Schools

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Abstract

Little is known about which curricular models and activity units are being taught in public schools. This exploratory study examined the K–12 physical education (PE) content and curricular models being implemented. Supervisors of PE recruited from one northeastern state participated in a 25-item questionnaire. Descriptive statistics and frequencies were calculated. Sixty-nine of 92 questionnaires were usable and included in the data analysis. Findings suggest that few districts were using a curricular model at the elementary (K–5) level (27%). Another common response of adopted curricular models at the elementary level was Movement Education (17.6%). At the secondary level, No Model (35%) and Fitness Education (25.6%) were common responses. Specific units such as volleyball, basketball, and weight training yielded the highest responses, while field hockey, golf, archery, lacrosse, and tennis yielded the fewest responses. The findings suggest that K–12 PE curricula may not reflect current trends and mandates. The key determinants could be a lack of curricular model use and heavy reliance upon activities known to present challenges toward standards-based education

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(i.e., softball). Perhaps K–12 PE and PE preparation programs can connect to effectively articulate a curriculum, and adopt and train on curricular approaches aiming to increase teacher effectiveness and reach national standards.

Curriculum has been described as a socially constructed, continuous process where matters such as content knowledge are continually formed, altered, and implemented (Penny, 2006). Historical markers confirm K–12 public school physical education (PE) curricula has endured a seemingly endless shift in content focus. During the late 19th century, PE was established as a meaningful subject area in private and public school curricula. Spikes in immigrant populations from Germany, England, and Sweden propelled this emphasis on human movement.

A significant breakthrough for PE occurred in 1866, when California became the first state to pass legislation requiring twice-a-day PE in public schools. The major focus of instruction at this time was physical health, through German or Swedish gymnastic exercises (Pfister, 2003). By the early 20th century, another shift occurred, bridging John Dewey's suggestion that education focus on the promotion of health and worthy use of leisure time (Darst, Pangrazi, Brusseau, & Erwin, 2015). As a result, PE teachers started to include sport and game content (e.g., baseball, basketball, track and field) in their daily instruction. Further, Williams (1927) championed sportspersonship and teamwork to be infused into the PE curricula, which resulted in the spawn of social development theory.

Sometime in the 1950s, PE curricula shifted back toward physical fitness, when Kraus and Hirschland (1954) found American youth to be much less fit than their European counterparts. Subsequently, the creation of the President's Council of Physical Fitness succeeded. Yet the rapid expansion of sport in latter-20th-century American culture led to sport, once again, serving as a central curriculum focus in PE. Instructional units of basketball, football, baseball (softball), and soccer were commonly incorporated in the program. To assume sport is the only matter of content focus fails to acknowledge the vastness of curricular influence within this subject area. For example, the passage of Title IX in 1972 altered gender-related curriculum decisions and subsequent sport (content) participation (Darst et al., 2015), and the Healthy People 2000 initiative (National

Center for Health Statistics, 2001) found children to be drastically inactive, with an increase in childhood obesity and obesity-related health problems. Once again, public school PE curriculum designers were alerted to health-related physical fitness and activity initiatives due to the subject area's expansive role in public health (Sallis et al., 2012).

Federal and national policy decisions have also guided PE curricula. More recently, federal mandates such as the No Child Left Behind (NCLB) Act of 2001 have spurred initiatives to emphasize "core" subject areas, while indirectly deemphasizing and marginalizing "noncore" subjects (e.g., PE). Reports of reducing PE programs for additional core curricula time were commonplace in the decade following NCLB's passing. This lack of relevance and support at the federal level raises questions about the level of accountability extended to noncore subjects, such as PE. Do states and districts follow through, holding schools accountable for implementing current trends in PE content knowledge and curricula?

Recent efforts by PE's national association, the Society of Health and Physical Educators (SHAPE America), and the inclusion of grade-level benchmarks have led to the development of standards all teachers should use as a foundation and aid toward formal instruction. The overarching goal for benchmarks is to develop physically literate individuals who have the knowledge, skills, and confidence to live a lifetime of activity (SHAPE America, 2013). There is, however, no guarantee that schools and districts adhere to these benchmarks. Moreover, SHAPE America has not offered or recommended a national curricula, leaving many PE administrators on their own to determine the appropriate balance of content knowledge and curricular models to deliver to their students.

Unfortunately, even with these identified national themes and directions for PE, PE teacher education (PETE) programs know little about the content being delivered in public schools. Fostered relationships between the K–12 public school PE program and neighboring PETE program are a logical approach for helping university faculty stay up to date with curricular offerings. This forms a symbiotic relationship between two entities equally reliant upon each other's efforts. Yet achieving this solution can prove difficult. Siedentop and Locke (1997) used terms such as *gridlock* and *systemic*

failure to describe the poor collaboration efforts. They attributed lack of change or improvement to minimal collaborative efforts between public school and PETE programs. Therefore, effective instruction, or success, will be achieved only if practitioners and programs work together. Indeed, literature has confirmed the effectiveness of collaborative efforts (Pennington, Prusak, & Wilkinson, 2014; Prusak, Pennington, Graser, Beighle, & Morgan, 2010). However, only one program appears to have achieved Siedentop and Locke's (1997) level of systematic success (Prusak et al., 2010).

Some researchers (Petray & Hill, 2009) believe the PETE professors are responsible for developing and maintaining relationships with public schools. This may improve PETE preparation of teacher candidates and better align content and curricular models with trends or the interests of student in K–12 schools. However, the unknown in terms of which models and activities are being taught may directly affect the success of PETE programs. For example, teacher candidates may be less marketable when asked specifically about content needing to be taught in a district or about an approach that is misaligned with the district's curriculum. One study examined PETE programs and found only 50% of programs surveyed emphasized one or more curricular models in their coursework (Ayers & Houser, 2008). This can be concerning as researchers have identified an increase in overall teacher effectiveness for those who teach with a curricular model based on research and standards (Metzler, 2005). More commonly used models such as Children Moving (Graham, Holt/Hale, & Parker, 2012), Dynamic Physical Education (Pangrazi & Beighle, 2015), Tactical Games Approach (Mitchell, Oslin, & Griffin, 2013), and Sport Education (Siedentop, Hastie, & van der Mars, 2011) have been emphasized in several PE and PETE programs. Nevertheless, understanding current trends, issues, and which models are successful in surrounding public schools is valuable information for PETE programs and would significantly improve training of teacher candidates.

This study provides a descriptive analysis of the current K–12 public school PE curriculum offerings within one U.S. state. It elicited content knowledge offerings of K–12 PE programs, to provide stakeholders from PETE and K–12 programs with the curricular trends and patterns. Further, its aim was to better understand content trends and curriculum model tendencies of today's PE programs.

Method

Participants

Supervisors of Health/PE from one state in the northeastern United States were recruited. This state employed supervisor positions for each school subject area and defined the position as an educator in possession of a supervisor standard certificate that requires a master's degree (with specific course completion), state instructional certification, and 3 years of teaching experience. This state did not maintain a list of supervisors of Health/PE. All participants (N = 69) self-reported to be supervisors of PE in their school district. Supervisors indicated their gender as male (78.25%) and female (21.75%), along with ethnicity as Caucasian (95.71%), Arab American (1.43%), African American (1.43%), and multiracial (1.43%). Teaching experience ranged from 3 to 21 years, with 12.8 (SD = 6.4) mean years of experience teaching PE against 13.8 (SD = 5.8) mean years of overall teaching experience. Supervisors with current and/or past PE certification (65.2%) outnumbered those without (34.8%). The majority of supervisors achieved a master's degree (76.8%), with 59.4% obtaining a master's related to PE. Table 1 describes characteristics of the participants' school district, including geographic location, socioeconomic status, and populous.

Questionnaires

The 25-item questionnaire employed in this study was designed to access descriptive information on public K–12 PE curricular and content decisions. An institutional review board statement letter requesting agreement to participate, approved by the lead author's university, was provided on the first page. The descriptive nature of the questionnaire was organized by K–12 curricular models being used (two questions) and K–12 PE units being employed (four questions). The questions pertaining to adopted curricular models asked participants to "Please select the current adopted curriculum at your elementary schools" and "Please select the current adopted curriculum at your secondary schools." Respondents could select from (a) Fitness Education, (b) Sport Education (students come up with team names and are given roles, i.e., coach, fitness coach, photographer, etc.), (c) Movement Education/Skill Theme Approach to

Table 1
Participant and District Demographics

Personal information	
Gender	
Male	78%
Female	22%
Ethnicity	
Caucasian	96%
Arab American	1%
African American	1%
Currently Certified PE Teacher	
Yes	65%
No	35%
Years Teaching Experience	
M (*N* = 69)	13.79
SD	5.8
Min	3
Max	20+
Years Teaching PE	
M (*n* = 48)	13.33
SD	5.98
Min	1
Max	20+
Percentage with no experience	21.5%
Hold a Master's Degree	
PE or Related	49%
No Master's	18%
Administration or Related	14%
District information	
Socioeconomic Status of District	
High	33%
Average	42%
Low	25%
Geographic Location	
Urban	16%
Suburban	71%
Rural	13%
Majority of District on Free/Reduced Lunch	
Yes	27.5%
No	72.5%

Physical Education, (d) Teaching Games for Understanding (Tactical Games Approach), (e) I do not know exactly, (f) No curricular models have been adopted, and (g) Leave the selection blank.

The next four questions addressed the types of units taught in the participants' schools: (a) What net/wall-type games are offered in your PE curriculum? (please select all that apply), (b) What target/striking games are offered in your PE curriculum? (please select all that apply), (c) What invasion-type sports are offered in your PE curriculum? (please select all that apply or add at the end), and (d) What health-oriented units are offered in your PE curriculum? (please select all that apply or add at the end). Participants could also list other units in an "Other" option, which was offered at the end of each question. The net/wall games question included eight possible choices, followed by nine possible choices for target/striking games and invasion sports and 10 health-oriented unit choices (see Table 3).

Content validity was established in multiple phases. First, the questionnaire was designed by the lead author, a PETE professor with experience developing similar instruments. The questionnaire was later examined by two reviewers not associated with this study: one PETE professor and one supervisor of PE. Based on reviewer feedback, the questionnaire was modified to better collect the directed information. Because the data were strictly descriptive, additional validity steps were deemed unnecessary.

Procedures

An electronic mailing list consisting of 559 supervisors of Health/PE and athletic directors was used for recruitment of only supervisors of PE. One survey question asked participants to self-report if they were a supervisor of PE within their school district (yes/no response). Participants who indicated no were removed from this study. Purposive or expert sampling techniques were also used because all members of this list (e.g., athletic directors and retired administrators) likely did not possess direct and/or current insight to the purposes of this study. Battaglia (2008) stated that expert sampling is appropriate when sample sizes are small, when representative of restricted geographic areas, and where comparisons to the target population are not a high priority. This study defined the term *expert* as one currently employed by the state's local education agency (LEA) under the position of "supervisor of physical education."

Recruitment of participants occurred in three rounds. The first round of recruitment occurred in February 2016, with e-mail invitations sent to all members (559) on the electronic mailing list. The e-mail contained a description of the project, request for participation, and a link to SurveyMonkey, where the questionnaire could be completed. Of those contacted, 51 individuals who self-reported as a supervisor of PE responded to the initial e-mailed invitation with usable questionnaires. One month later, March 2016, a second round of recruitment occurred with another e-mail inviting participation. The second round yielded 30 participants. The last round of recruitment (April 2016) used expert sampling to recruit participants via phone calls. These calls were extended to 24 known supervisors of PE who had not yet completed the questionnaire. Messages were left and a follow-up phone call ensued a week later if no response. During phone conversation, supervisors were requested to complete the questionnaire sent to their e-mail and the first author further clarified the purpose of the study upon demand. This round resulted in 11 participants.

Invitations to participate in this study yielded 92 applicable questionnaires. According to this study's definition of expert, 23 responses were removed, resulting in an undetermined proportion of participants (supervisors of PE) from one northeastern state ($N = 69$).

Collected data were initially downloaded from SurveyMonkey into Excel and later transferred to SPSS for data analysis. Two outside reviewers verified accuracy of data prior to analysis. Descriptive statistics, percentages, and frequencies were calculated and reported.

Results

Of the completed questionnaires ($N = 69$), a descriptive analysis of public K–12 PE programs was offered. Curricular data were organized based on elementary (Grades K–5) and secondary (Grades 6–12) developmental levels and PE content by commonly occurring sport categories.

Curricular Models

Elementary. The most common response was "No curricular model has been adopted" at 27.5%. Many supervisors left the

question blank (24.6%), while 20.2% noted Movement Education (Graham et al., 2012) and 20.2% reported "I do not know, exactly."

Secondary. The most common response for secondary programs was "No curricular model has been adopted" at 34.8%. The second most common response was "Fitness Education" at 29%, followed by "Teaching Games for Understanding" at 7.2%.

Physical Education Content

Table 2 depicts the number of PE units implemented (by category) in schools as reported by participants (N = 69). The mean number of units taught by category were (a) Net/Wall-related units at 4.22 (SD = 1.72), (b) Target/Striking-related units at 4.01 (SD = 1.22), (c) Invasion-related units at 3.13 (SD = 1.42), and (d) Health-oriented units at 5.58 (SD = 1.76). Table 3 shows the results for the PE content (units) taught across elementary and secondary levels. The highest responses for sport units were Volleyball (100.0%), Basketball (95.6%), Softball (88.4%), and Badminton (87.0%). The highest responses for fitness-based units were Weight Training (88.4%), Walking/Jogging (88.4%), and Yoga (65.2%).

Table 2
Descriptive Statistics of Physical Education Content Taught by Unit Category

Unit	Total possible choices	I do not know	Range	Min	Max	*M*	*SD*
Net/Wall-related units	8	0	8	1	9	4.22	1.72
Target/Striking-related units	9	0	6	1	7	4.01	1.22
Invasion-related units	9	0	5	1	6	3.13	1.42
Health-oriented units	10	1	9	0	9	5.58	1.76

Note. N = 69.

Table 3
Units Taught in Physical Education Organized by Sport Category

	Frequency	
Sport category	***n***	**%**
Net Games		
Badminton	60	87.0
Racquetball	10	14.5
Pickleball	50	72.4
Ping pong	29	42.0
Squash	1	1.4
Speedminton	9	13.0
Tennis	48	70.0
Volleyball	69	100.0
Invasion Games		
Basketball	66	95.7
Field Hockey	14	20.3
Floor Hockey	57	82.6
Football	56	81.2
Lacrosse	27	39.1
Rugby	7	10.1
Soccer	59	85.5
Team Handball	39	56.5
Ultimate Frisbee	59	85.6
Striking and Target Games		
Archery	27	39.1
Baseball	26	37.6
Bocce	5	7.2
Bowling	14	20.3
Cricket	5	7.2
Golf	29	42.0
Kickball	41	59.4
Pool	7	10.1
Softball	61	88.4

Table 3 (cont.)

Sport category	Frequency	
	n	%
Health Club Activities		
Body Pump	3	4.3
Cardio Kickboxing	9	13.0
Cycling	9	13.0
Walking and Jogging	61	88.4
Pilates	15	21.7
Step Aerobics	30	43.5
Weight Training	61	88.4
Yoga	45	65.2
Zumba	21	30.4
Dance	37	53.6
Square dance	8	
Latin	2	
Folk	5	
Social	4	

Note. $N = 69$.

Discussion

This study describes curricular and activity unit practices across one state in the northeastern United States. The results suggest little consistency in curricular offerings with few districts adopting PE curricular models. In fact, 27.5% (elementary) and 34.8% (secondary) of respondents indicated that no curricular model was used. Sport activities are still the most common activity taught, even with a renewed emphasis on physical activity and health-related fitness. For instance, badminton, basketball, floor hockey, football, soccer, softball, and ultimate Frisbee units were implemented at over 80% frequency across reporting schools. Many of the most common activities would not be considered lifetime activities, possibly limiting their use beyond the PE class setting. Even without a clear curricular model, one would hope a greater variety of nontraditional and even greater fitness activities would be offered. Recent research has

indicated that fitness activities and invasion games provide the most physical activity opportunities for youth in PE (Brusseau, Burns, & Fu 2016). As such, the authors recommend that efforts be made by curriculum developers to sandwich traditionally lower physically active units with high physically active units. The authors further suggest a fitness component that enhances the five health-related fitness components be included in the daily lesson.

The lack of consistent curricular models contradicts the efforts of PETE programs. This disconnect is alarming, with many hours and years of training spent providing future teachers with the curricular tools for successful PE programming, only to not be used. This may be associated with a lack of district (or state) policy regarding curriculum expectations or enforcement of policy. Without these directives, many physical educators revert to teaching what and how they were taught when they were K–12 students (Blankenship & Coleman, 2009). The comfort of physical educators with sport may limit their willingness to implement nontraditional activities or models that could aid the obtainment toward one of the profession's primary goals, to help individuals acquire the "knowledge, skills, and confidence to enjoy a lifetime of healthful physical activity" (SHAPE America, 2013, p. 1). Some models are not only centered around sport (i.e., Sport Education or Tactical Games) but also provide a more holistic student experience; however, the findings suggest that most programs promote sport in a more traditional curricular approach. Subsequently, professional development opportunities targeting curricular approaches and/or improvement of communication between supervisors and PETE programs may be warranted.

Similar activity patterns may also be taught across elementary and secondary programs. When curricula is not clearly determined or properly articulated, children could be placed in long extended units, situated in play lessons rather than instruction, and/or participate in similar units every year (K–12). Further, only a few districts (20.2%) reported using an elementary school curriculum model that revolves around locomotor and skill development (i.e., Movement Education/Skill Theme Approach). It has been noted that children would benefit in developing proficiencies in these areas before proceeding to sport engagement, as they are foundational for sport as well as lifetime activity (Graham et al., 2012).

According to the findings, secondary PE may also need to shift its focus to lifetime activities, given the participatory limitations of team-oriented sports, such as football. It was surprising that the participants did not identify the Fitness for Life curricular model. This shift to lifetime activities would need to come from PETE and PE programs, and the task of coordinating how and what to offer to K–12 students is not easy. Districts could clearly identify a scope and sequence across schools (elementary through secondary) to ensure developmentally appropriate lessons and to ensure units build upon prior experiences in a logical and developmentally appropriate sequence. Unfortunately, researchers have found PE staff members have little trust in their district supervisor, describing a lack of experience and expertise in PE pedagogy (Norris et al., 2017). This may hold true in this study, as almost a quarter (21.5%) of supervisors had no years of PE teaching experience. Therefore, some supervisors may not be able to effectively articulate and reform existing curricula on their own. Nevertheless, with persistence and specific educational components established, systemic success is obtainable (Prusak et al., 2010), as long as K–12 PE and PETE programs strive to work collaboratively.

This study does not come without limitations. First, the study used subjective measures to determine qualified participants. Due to the lack of a state-provided list of active supervisors of PE, the authors felt recruitment of participants from the provided electronic mailing list was an appropriate start. Second, generalization of findings may be challenging because districts targeted in this study were from one state consisting of various geographic regions. Last, the use of open-ended questions throughout the survey makes comparisons difficult across all participants since responses varied, albeit slightly. However, this was the first attempt of attaining a detailed breakdown of content being taught in schools, and the questions produced patterns that are worthy of future research. Therefore, future studies may benefit from examining grade-level units to better understand what is being offered in the schools over time. It would also be beneficial for researchers to investigate who ultimately decides curricular and unit decisions (e.g., teachers, supervisors, district collaboration, school administrators). Results suggest that decision making occurred at the local level; however, the data were not discriminate.

Such valuable information ascertained from stakeholders could thus propel the coordination between K–12 PE and PETE programs. Last, the quality of student experiences was beyond the scope of this research, but a study of such would offer a more complete understanding of quality programs and determine if the curricula reflect student interests.

Conclusion

School districts within one northeastern state lack clear curricular direction. Although some novel and fitness activities were highlighted, the majority of unit plans revolved around traditional sport activities. Moreover, some supervisors were unaware of specific models or any model being implemented in their schools, which raises concern to the quality of supervision in schools. Ultimately, this study further highlighted the disconnect between PETE training and what is being taught in K–12 public school PE. PETE professors must take responsibility in acquiring information and assisting PE programs of surrounding school districts. PETE and PE programs will equally benefit. PETE programs would better inform and train their teacher candidates of the most up-to-date content in which K–12 students are interested, and PE programs would adopt researched-based best practices and use curricular approaches optimizing teacher effectiveness and instruction.

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The Physical Educator Vol. 75 • pp. 917–920 • 2018

YOU AND THE LAW

Baseball and Assumption of Risk

Tonya L. Sawyer

Lerman v. Little League Council of New York City INC., and West Side Little League, and Jeff Neuman Sup.Ct. N.Y.; NDEX NO. 150006/2014, 2018 N.Y. Misc. LEXIS 666; 2018 NY Slip Op 30342(U); 2/15/18

A New York state trial court has granted summary judgment to Little League Council of New York City and other defendants in a case in which they were sued by the parents of a 10-year-old child who was hit in the face while he was participating in a Little League baseball practice. The court's ruling was made pursuant to the assumption of risk.

Facts of the Case

On the date of the accident, April 9, 2010, the plaintiff, age 10, attended his first Little League baseball practice. His father had registered him to play baseball through West Side Little League (WSLL) and had signed a waiver in which he agreed that as his father he had reviewed and consented to the waiver by signing up his child to play Little League baseball with WSLL. The plaintiff had watched baseball on television and was generally familiar with the game, according to the court. He had also previously played catch with his father using a baseball mitt and with friends.

When the plaintiff arrived at his first baseball practice, the coach, Jeff Neuman, instructed the players to take various positions on the baseball field. The father spoke with Neuman and told him that his son had no prior experience and that he should be careful. Neuman told the plaintiff to take the shortstop position, while Neuman

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pitched balls to other players to hit into the field and allow the others to practice fielding the balls. The players were using an aluminum bat and standard Little League baseballs. There were two pitches before the accident. On the third pitch, the batter hit a line drive toward the plaintiff. He tried to catch the ball, and the ball struck him in the mouth, inflicting dental injuries.

Complaint

The plaintiffs argued to deny defendants' motion to dismiss based on assumption of risk.

The plaintiffs countered that the motion should be denied because a triable issue of fact exists as to whether defendants breached their duties owed to the plaintiff and whether defendants were negligent in their breach of reasonable care, supervision, control, training, instruction, direction, safety, and general coaching of the plaintiff. They further asserted that the child had never participated in any baseball activity on a baseball field before and that Neuman placed him at the "highly skilled" shortstop position, despite being warned by the boy's father that his son had never played baseball before. They also argued that the defendants failed to test his skill set before placing him on the field and also failed to teach and give him basic instructions on how to field a ball. They asserted that the child did not assume the risk, but rather that defendants created a dangerous condition that caused his injuries by their indifference as to his skill and experience level.

The defendants countered that the plaintiffs voluntarily assumed the inherent risks involved in playing baseball and that plaintiffs cannot properly assert a negligent supervision claim where the injury is due to an inherent and obvious risk associated with the game.

Court Analysis

In its analysis, the court noted that by engaging in a sport or recreational activity, a participant consents to those commonly appreciated risks that are inherent in and arise out of the nature of the sport generally and flow from such participation. Further, the court stated,

> In assessing whether a defendant has violated a duty of care within the genre of tort-sports activities and their inherent

> risks, the applicable standard should include whether the conditions caused by the defendants' negligence are unique and created a dangerous condition over and above the usual dangers that are inherent in the sport. (*Owen v. R.J.S. Safety Equip.,* 1992)

Moreover, the court stated, "If the risks of the activity are fully comprehended or perfectly obvious, plaintiff has consented to them and defendant has performed its duty" (*Turcotte v. Fell,* 1986). Finally, the court suggested that "related risks which are commonly encountered or 'inherent' in a sport, such as being struck by a ball or bat in baseball, are 'risks for which various participants are legally deemed to have accepted personal responsibility" (*Bukowski v. Clarkson Univ.,* 2012, quoting *Morgan*, 90 N.Y.2d at 484).

The court suggested,

> Logically, once a plaintiff has assumed a risk, recovery premised on injury attributable to the risk assumed is barred. Recovery may not, in such a circumstance, be had on a theory of negligent supervision. Negligent supervision remains a viable theory only insofar as the risk upon which the action is based has not been assumed. (*Roberts v. Boys & Girls Republic,* 2008)

Court's Ruling

Summarizing its position, the court wrote,

> The plaintiff engaged and participated in a baseball practice, and his parents consented to the risks inherent and associated with playing baseball. The plaintiff's parents made a voluntary choice to join WSLL and permit their son to play baseball. Common and obvious risks of the game include being struck and injured by baseballs. Prior to the accident, the plaintiff had a basic understanding of how the game was played and had briefly practiced throwing and catching a ball with his father using a baseball mitt. Thus, while the plaintiff participated in a baseball practice, he consented, through his parents, to the possibility of being struck and injured by a baseball. Neuman's decision to place the plaintiff in the

shortstop position is immaterial, as the risk of being struck by a batted baseball was present at any position on the field. Also, plaintiffs' theory of Neuman's negligent supervision fails because the risk of injury was assumed by his voluntary participation in the practice. (*Lerman v. Little League Council of New York City INC., and West Side Little League, and Jeff Neuman,* 2018)

Discussion

The organizers of youth baseball leagues, whether it be community recreation leagues, Babe Ruth, Carl Ripkin, Dixie Baseball, or Little League, must be highly conscious of safety when establishing rules and regulations governing the league. Further, it is important that all coaches have the proper training before being allowed to coach a team. Finally, the organizers must safeguard and protect the players by

- ensuring all coaches complete a coaching education program established by the national youth baseball body or the National Federation of State High School Associations (NFHS),
- providing all coaches risk management training,
- pretesting all players throughout an organized tryout,
- ranking all players by age and experience, and
- warning all players of the inherent dangers and risks in the sport of baseball.

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