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ASSESSMENT

Assessing Student Knowledge and Incorporation of Smart Technology Into Daily Physical Activity

Nicole J. Martin and Ayla M. Schmick

Abstract

This study describes high school students' use of smart technology to enhance leisure-time physical activity. Participants included 109 students who completed an informational survey comprised of questions examining non-school sport and physical activity hours, daily video game hours, and use of Kinect active video games and smartphone apps. Students engage in 1.99 hr/week of physical activity (SD = 1.13), play video games an average of .46 hr/day (SD = .69), and use 1.21 active video games (SD = 1.43) and .52 smartphone apps (SD = .75). Results show that students are minimally familiar with active video games and smartphone apps, but fail to meet physical activity recommendations set by the American College of Sports Medicine. Additionally, students can benefit immensely from structured instruction on health benefits and incorporation of such technology. Recommendations for application include explicit classroom instruction, teacher encouragement, and reinforcement throughout coursework.

The long-term health consequences of youth physical inactivity serve as a significant public health concern (Tremblay, LeBlanc, Kho, Saunders, & Larouche, 2011). As the prevalence of obesity in America has reached epidemic proportions, 33% of youth are now considered to be either overweight or obese (Centers for Disease Control and Prevention, 2012). For positive health outcomes, it is recommended they get at least 150 min/week of moderate-intensity

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exercise. This can be met through 30–60 min of moderate-intensity exercise 5 days/week or 20–60 min of vigorous-intensity exercise 3 days/week (American College of Sports Medicine [ACSM], 2011). Eighty percent of youth, however, do not meet these recommendations (Hallal, Anderson, Bull, Guthold, & Haskell, 2012). Inadequate energy expenditure is just one contributing factor, but can lead to increased risk for obesity, cardiovascular disease, diabetes, and varying forms of cancer (Bassett, Wyatt, Thompson, Peters, & Hill, 2010; Friedenreich, Neilson, & Lynch, 2010; Pinto-Pereira, Ki, & Power, 2012), which thus represent significant concerns relative to morbidity and early mortality.

Although physical activity (PA) and exercise decline dramatically during adolescence (Troiano, Berrigan, Dodd, Masse, & Tilert, 2008), today's youth spend more than 7 hr/day (Marshall, Gorely, & Biddle, 2006) using some form of media (e.g., televisions, video games, computers, tablets, smartphones, and iPods). It is no surprise that technology plays a significant role in the daily life of adolescents (Rideout, Foehr, & Roberts, 2010). However, those engaging in more than 4 hr/day of screen-based activities exercise less than the national recommendations (Bowman, 2006). In fact, a positive correlation exists between increased hours in front of screen-based media and sedentary lifestyles (Ford, Kohl, Mokdad, & Ajani, 2005; Ford et al., 2010; Foster, Gore, & West, 2006; Hu, 2003). Even more, it has been projected that screen time for youth will only continue to rise (Marshall et al., 2006).

Although the damaging health effects of physical inactivity within this age group are difficult to demonstrate in the short term (Gorely, Marshall, Biddle, & Cameron, 2007), the need to understand more about the role of smart technology on the lifestyles of youth has been broadly acknowledged (Gordon-Larsen, McMurray, & Popkin, 2000). Several studies have shown a negative association between age and PA during adolescence (Borraccino, Lemma, & Iannotti, 2009; Taveras, Field, & Berkey, 2005). As age increases, PA decreases; coincidently, at the same time screen media exerts a greater sedentary influence on their daily lives (Strasburger, Jordan, & Donnerstein, 2010; Tremblay, Colley, Saunders, Healy, & Owen, 2010). Additionally, previous research has shown that high levels of habitual sedentary time, especially screen-based activities, are

associated with poorer measures of body composition, decreased fitness, lower self-esteem, and reduced pro-social behavior (Tremblay et al., 2011). For these reasons, better strategies that improve PA levels among youth need to be developed, and incorporating activities using smart technology may be an effective way (Matherson, Bryant, Wright, Inman, & Wilson, 2008). Providing fun or enjoyable experiences is one of the most effective strategies for increasing PA levels in adolescents (Weiss, 2000), and with today's youth, discovering activities that are "fun" often includes involving those utilizing smart technology.

This study describes high school students' use of smart technology to enhance leisure-time PA. Two hypotheses were developed: (a) students would use at least one smartphone app or Kinect active video game (AVG) regularly to enhance their PA, but (b) fail to meet the ACSM daily PA recommendations.

Method

Participants

Participants in this study included 109 high school (68 male, 41 female) students enrolled in four basic conditioning physical education classes at a large suburban high school. Participants ranged in grade level from ninth (freshman) to 11th (junior), with 50 freshman, 43 sophomore, and 16 junior students. The conditioning physical education class at this high school serves as the introductory course for the programming principles of cardiovascular, muscular strength, and endurance training. Each course met twice weekly for 55 min over 12 weeks (quarter system).

Research Design

The university institutional review board approved this research. Before data collection, parental consent was obtained, followed by participant assent. One hundred twenty high school students were recruited for this study, 11 of whose parents chose not to provide consent. All 109 of the remaining students elected to participate in the study. Participants were asked to complete a survey specifically designed for this study, which was comprised of questions examining (a) the type and average number of weekly hours of leisure-time

PA, (b) daily hours of video game play, and (c) use of Kinect AVGs and smartphone apps. The AVGs evaluated in this study included *Wii Fit*, *Nike Training*, and *Zumba Fitness Rush,* and the three smartphone apps were MapMyRun, Nike Training, and Adidas MiCoach. Immediately following survey completion, participants were debriefed. All participants were instructed to download, were provided direct classroom instruction, and received supervised practice with each of the Kinect games and smartphone apps included in the survey.

Research Survey

The survey used for this research was designed specifically for this study and consisted of eight questions seeking demographic information (gender and year in school), PA patterns, and use of innovative technology (smartphone apps and Kinect AVGs) from participants. Survey questions were "check the appropriate box" or list format and can be found the Appendix. For the fifth survey question, the categories were developed from current PA recommendations (e.g., 0 = sedentary, 1–3 = low–moderate PA, 4–6 vigorous PA, and 6+ = highly vigorous PA), whereas categories for the sixth survey question were designed to negatively correlate to items in the fifth question. For instance, it was assumed that if a student reported 0 weekly PA hours, he or she would likely report higher daily video game hours (i.e., 4 or more), whereas a student who reported higher weekly PA hours (i.e., 6 or more) would report lower daily video game hours (e.g., 0).

Results

Data were analyzed using SPSS version 22. Descriptive statistics revealed that students engaged in 1.99 hr/week of leisure-time PA (SD = 1.13). Further, students played an average of .46 (SD = .69) daily video game hours, used 1.21 Kinect AVGs (SD = 1.43) to increase PA, and used .52 smartphone apps (SD = .75) to enhance the physical activities they engage in each week.

Discussion

Results from this study supported both hypotheses. First, students used at least one Kinect AVG to increase PA on a regular basis.

Although this does not seem significant, a large body of research suggests that sedentary screen-based activities (i.e., video games) negatively influence overall PA levels and energy expenditure of youth (Goldfield, Kenny, & Hadjiyannakis, 2011; Schneider, Dunton, & Cooper, 2007). More recently, however, studies have examined the influence of AVGs on youth PA, and findings reveal that for youth who would otherwise be involved in sedentary leisure-time activity, AVGs positively influence PA patterns (Gao, Chen, Pasco, & Pope, 2015; Smallwood, Morris, Fallows, & Buckley, 2012). Thus, if students find even just one game they find enjoyable and spend their leisure-time hours engaging in such, overall activity can be increased in those who would otherwise be sedentary. Ideally, however, students would find more than one game of interest, as variety has been found to maintain interest and enjoyment longer and, as such, has the potential to stimulate long-term behavior change more significantly. Furthermore, for youth who become interested in increasing PA through the use of AVGs, the goal would be a move toward traditional forms of activity over time (e.g., jogging, muscular endurance, and strength training). Initially, students may be motivated to beat others through multiplayer competition or from social media reinforcement, but as physical competence increases and students learn skills in a comfortable environment (at home or in a classroom), motivation to participate would ideally transition from extrinsic to intrinsic with increased hours spent engaging in more active lifestyles that include traditional forms of PA (e.g., walking, jogging, recreational sport, spontaneous play).

Students in this study, however, reported using less than one smartphone app to enhance the physical activities they engage in. These findings were not as expected, as we hypothesized students would use smartphone apps on a regular basis. The app used most widely was MapMyRun, whereas the one used least regularly was Nike Training. Both apps are free and compatible with both iOS and Android, but it makes sense that students used MapMyRun significantly more than other apps. The MapMyRun app has been advertised as the number one running app since its development. Furthermore, it does not require training equipment, can be used while engaging in a simple and low-cost activity (i.e., running), and requires little data entry. Nike Training Club, on the other hand,

assumes some knowledge of varying types of training (cardiovascular, muscular strength, and endurance) or the motivation to learn new skills. It also it requires equipment or access to a gym and is much more complex to use (data entry and tracking). Given that the participants of this study were high school students, it cannot be assumed that all had motivation to learn new workout programs. Furthermore, we examined app use in relation to leisure-time PA. If students did not have a gym membership or home workout equipment, this may have inhibited their ability to complete workouts designed by the Nike Training Club app. Additionally, the app contains a lot of instructional information, explicit demonstrations, and several platforms to sync data for tracking, but it may contain too much information in which high school students are not interested, therefore, hindering its use.

Our results also show that high school students do not meet the recommended daily PA guidelines. The current recommendation is for youth to get at least 150 min/week of moderate-intensity exercise, which can be met through either (a) 30–60 min of moderate-intensity exercise 5 days/week or (b) 20–60 min of vigorous-intensity exercise 3 days/week (ACSM, 2011). It may be assumed that students get an adequate amount of PA through physical education during the school day, but research has shown the opposite (Dudley, Goodyear, & Baxter, 2016). Physical education provides a vehicle to obtain optimal levels of moderate to vigorous PA during school for adolescents. Less than 8% of public schools in the United States, however, offer daily physical education (Lee, Burgeson, Fulton, & Spain, 2007). Additionally, it is noted that students should spend 50% of class time in moderate to vigorous PA (Centers for Disease Control and Prevention, 2009). For numerous reasons, few students meet these recommended levels (Nader, 2003), and thus, the amount of PA youth obtain during leisure-time hours is much more significant. Our results show that students are familiar with AVGs, but lack knowledge in using smartphone apps appropriately to facilitate and enhance PA. Furthermore, our findings suggest that students can benefit immensely from structured instruction on benefits and proper incorporation of such technology to be used outside of school hours. We recommend (a) explicit classroom instruction, (b) teacher encouragement, and (c) reinforcement throughout coursework.

Recommendations for Explicit Classroom Incorporation

A variety of strategies can be used for implementing AVGs and smartphone apps into the academic curriculum. First, teachers who have access to multiple Kinect sensors can incorporate AVGs into classrooms lessons in several ways including (a) timed station work, and (b) large group simulations.

First, lessons can be designed so that small groups of students interact directly with the Kinect sensor and others follow along in simulation exercises (Martin, Ameluxen-Coleman, & Heinrichs, 2015). In this format, the target student, or group of students in party mode, would interact directly with the Kinect sensor and receive performance feedback while the rest of the class would indirectly follow. Every few minutes, students would rotate so that all have the opportunity to challenge themselves with the Kinect sensor, and as a result, all students have the opportunity to master skills, whether the focus is health or skill fitness components. The advantage of this pedagogical strategy is that all students have the opportunity to meet the goals of MVPA and they receive direct performance feedback (Trout & Christie, 2007).

Second, timed station work could be organized so that each would focus on specific fitness components, and students would work in small groups and then rotate as directed (Martin et al., 2015). An advantage of this learning format is that teachers organize groups so that all students practice specific aspects of fitness during designated class periods or for specified durations in each class.

Smartphone apps can be incorporated into daily lessons in several ways. First, teachers can display apps through an HDMI input or wireless connection to a projector within a classroom or gym to lead the class through lessons. Apps can then be used as an instructional tool for demonstration and active practice with verbal cues for students to follow on screen. An advantage of this format is that the teacher has the ability to provide modifications for students who benefit most.

Teachers can also implement smartphone apps into classroom lessons by providing small groups of students with timed sessions to work together in an active manner through dance sessions, exercise routines, and other active games. Groups could be tasked with beating previous "best" times while learning to cooperate, and thus,

increase motivation in a fun and action-oriented environment (Martin et al., 2015). The teacher would serve as facilitator in this format by incorporating and reinforcing short activity periods into classes throughout the academic year.

Teachers can also incorporate smartphone apps into classrooms by dividing students into small groups that are instructed through lessons and then provided problem-solving practice. For example, for specific apps, groups can be assigned problem-solving tasks that focus on behavior modification, goal assignment, and progress evaluation.

Meeting Specific Developmental Needs

Based on previous research investigating the developmental needs of youth for PA, we recommend instruction be focused on skill development, fitness, and success (Weinberg & Gould, 2015). In-class strategies for skill development should utilize contingent feedback, demonstration, and individual practice. Specifically, the focus should be on teaching and practicing skills while offering developmentally appropriate modifications as needed. When teachers provide feedback, a positive approach and instruction emphasizing what students have done correctly is most effective. When teachers focus on catching students doing things right, provide plenty of encouragement, and reward correct technique, student motivation for learning new skills and long-term commitment increases. For fitness, we recommend that teachers focus on teaching students how to monitor their own fitness effectively. Purposeful lessons designed to increase fitness are most effective. For example, teachers should implement units that define varying components of fitness and teach proper methods for measuring and monitoring. In terms of the developmental need for success, teachers should incorporate in-class strategies that help students define winning with a mastery orientation, such achieving one's own goals and standards for improvement. Additionally, teachers can create environments that help reduce fear of trying new skills, by using encouragement and reinforcement through coursework.

Recommendations for Teacher Encouragement and Reinforcement Through Coursework

The type of feedback provided strongly influences whether students will be motivated to try new skills. Research indicates that social support, regular performance feedback, and positive reinforcement influence motivation (Cress et al., 2005). Social support from others, specifically teachers and peers within an academic setting, is associated with long-term adherence. Examples include exercising in groups or with friends and regular follow-ups that evaluate progress toward goals. In an academic setting, assignments developed as supplemental, home-based activity sessions for which students report physical activities in class would provide opportunities for students to evaluate progress and for teachers to provide individualized goal-oriented feedback throughout the curriculum. Individualized feedback is more meaningful and is based on the current ability and goals of each student. Additionally, goal-oriented feedback helps facilitate long-term maintenance and intrinsic motivation by helping students develop realistic expectations of their own progress. By providing such feedback throughout the academic year, teachers would reinforce a well-established principle for increasing intrinsic motivation, but deliver feedback through a mode that is more relevant to the high school population and thus may be more significant.

Conclusion

The goal of our research was to describe high school students' use of smart technology relative to leisure-time PA. We developed two hypotheses and found support for both. First, we found that students use AVGs to increase PA. Students have limited experience using smartphone apps to enhance their PA, however, and lack specific knowledge as to how to use the technology effectively. Second, students continue to fall short of meeting the recommended hours for daily PA set by the ACSM. Our recommendations are focused on increasing student leisure-time PA, with an emphasis on applying knowledge within the academic curriculum. We recommend explicit classroom instruction, teacher encouragement, and reinforcement throughout coursework.

This article adds support to the notion that smart technology can be used creatively as a way of enhancing PA of youth. We conclude, however, that if youth are to increase leisure-time PA, principles of training and appropriate uses of technology must be taught within the academic curriculum and directly reinforced by teachers during the school day.

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Appendix
Research Survey

1. What is your gender?

   _____ female _____ male

2. What year in school are you?

   _____ freshman _____ sophomore

   _____ junior _____ senior

3. List **all sports** you participate in (club and/or recreational):

4. List **all types of physical activity and exercise** you participate in (after school):

5. How many **hours each week** do you participate in physical activity, exercise, or sport outside of school hours:

   _____ 0 _____ 1–3 _____ 4–6 _____ more than 6

6. How many **hours each day** do you play video games:

   _____ 0 _____ 1–3 _____ 4 _____ more than 4

7. Have you played the following video games to increase your physical activity? **Check all that apply and the number of days per week for each.**

   _____ *Wii Fit* _____ *Nike Training Kinect*

   _____ *Zumba Fitness Rush* _____ Other: write them in here:

8. Have you used the following apps? **Check all that apply and the number of days per week for each.**

   _____ MapMyRun _____ Adidas MiCoach

   _____ Nike Training _____ other: write them in here:

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ASSESSMENT

Systematic Observation of Formal Assessment of Students by Teachers (SOFAST)

Hans van der Mars, Gay Timken, Jeff McNamee

Abstract

Assessment is a central function of the teaching–learning cycle and a key performance standard for beginning and experienced teachers. Especially in today's school climate of high-stakes teacher evaluation, physical education will continue to be at risk unless programs can begin to provide evidence of student learning. The Systematic Observation of Formal Assessment of Students by Teachers (SOFAST) instrument was developed for the purpose of collecting process data on various dimensions of teachers' formal and informal assessment practices. SOFAST is a three-level observation system that allows users to collect data on teachers' primary teaching functions (including formal and informal assessment), the focus of their assessment, and common contextual dimensions of lessons. Seven secondary-level licensed physical education teachers were observed over three regular lessons. Percentages were calculated for each SOFAST category. Individual and group means and standard deviations were calculated. Secondary physical education teachers employ mostly informal assessment strategies and limit their formal assessment to student efforts on managerial aspects of performance.

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Assessment for learning (also referred to as formative assessment and learning-oriented assessment; López-Pastor et al., 2013) in physical education is part of a larger educational and assessment movement toward promoting the use of standards-based assessment in the context of standards-based instruction (Lund & Veal, 2013). Increasingly, schools are required to demonstrate that their students are meeting state and national content standards in academic subjects such as science and math. Along with national physical education content standards, the Society of Health and Physical Educators (SHAPE America) has invested heavily in designing assessment resources and tools that evaluate student attainment of these standards (e.g., Lambert, 2007; Lund, 2000; Mitchell & Oslin, 1999; SHAPE America, 2015a, 2015b).

According to SHAPE America (2016), only about 76% of U.S. states require high school physical education to be provided for graduation, and since 2012 the percentage of U.S. junior high and middle schools requiring physical education has decreased (from 84% to 76%). Moreover, less than a third of states require student assessment that is related directly to state physical education standards (SHAPE America, 2016). Coupled with the recognition that their school's administration, school district, and state government have no explicit expectations for student learning in physical education, physical educators are less likely to assess student learning and performance formally compared to their classroom colleagues in other subjects (e.g., Tousignant & Siedentop, 1983).

However, the emergence of high-stakes teacher evaluation schemes in the form of value-added models makes assessment of student outcomes in physical education an even more critical teaching function. School district teacher evaluation models generally include the components of (a) teaching process evaluation, (b) student achievement data, and (c) years of experience, of which the first two make up the largest percentage of the teacher evaluation. Typically, school administrators in districts using value-added models evaluate the teaching process using generic teacher evaluation tools (e.g., Danielson, 2007; Marzano Research Laboratory, 2013). Despite documented inherent problems associated with high-stakes teacher evaluation (e.g., American Educational Research Association, 2015; Berliner, 2014; Lavigne, 2014), as of 2015, 43 states now

require objective measures of student achievement to be included in teacher evaluations, and student growth is the preponderant criterion in teacher evaluations in 16 states (National Council on Teacher Quality, 2015).

Within this culture of high-stakes teacher evaluation, Rink (2007) argued that more than ever it is imperative that physical education programs can (a) clearly articulate the intended program outcomes and (b) provide evidence to parents, school administrators, and policy makers that students are learning something substantive. Logically, this places ongoing formative and formal assessment of student performance and learning squarely as a central teaching function for physical educators. Throughout this paper, the terms *learning*, *outcomes*, and *performance* are used interchangeably, as learning is an ongoing process that occurs throughout units of instruction, as opposed to a single performance event as demonstrated during traditional end-of-unit skill or knowledge tests.

A significant body of professional literature has been dedicated to promoting formal-formative and informal assessment and serves as evidence of the paradigm shift advocated by physical education teacher educators (e.g., Brands, 1996; Cleland & Stevenson, 1997; Lund & Veal, 2013; Melograno, 2000; Siedentop, 1994; Siedentop, Hastie, & van der Mars, 2011; Smith & Cestaro, 1998; van der Mars & Harvey, 2010; Weinberg, 1996; Wood, 2003). This shift points to the need for aligning or integrating assessment with curriculum and instruction (Guskey, 2003; Lund & Tannehill, 2014; Lund & Veal, 2008; Veal, 1992, 1995). Guskey (2003) noted the importance of teachers coming to view ". . . their assessments as an integral part of the instruction process and as crucial for helping students learn" (p. 6). Formative assessment occurs throughout the course of instruction and can offer a more immediate indication of student progress.

The importance of formal-formative assessment to document learning outcomes and its potential to support and motivate students has been widely accepted in the assessment, pedagogy, and teacher education literature (e.g., Black & Wiliam, 1998a, 1998b; Greenwood & Maheady, 1997; Pryor & Akwesi, 1998; SHAPE America, 2014; Wood, 2003). Reviews of research on how classroom teachers' use of formative assessment affects student learning outcomes produced effect sizes ranging from .20 to .70 standard deviation units

(depending on the meta-analysis protocols used; Black & Wiliam, 1998a; Briggs, Ruiz-Primo, Furtak, Shepard, & Yin, 2012; Dunn & Mulvenon, 2009). Within the limitations of the research, classroom teachers' use of formative assessment positively affects students' use of (meta-)cognitive strategies, and student outcomes to varying degrees (e.g., Baas, Castelijns, Vermeulen, Martens, & Segers, 2015; Furtak et al., 2016; Veldhuis & van den Heuvel-Panhuizen, 2014).

According to Pryor and Akwesi (1998), teachers tend to dislike summative (i.e., end-of-unit) assessments because of the lack of timely information on student learning. If one agrees that the quality and quantity of student engagement in learning tasks is a reflection of their learning, it stands to reason that developing records of student progress in this process is essential. Thus, formally assessing student performance should not be limited to end-of-unit (i.e., summative) assessments, such as a skill or written test. As well, assessment of student learning is a key performance standard for beginning and experienced physical educators (National Association for Sport and Physical Education, 2010; National Board for Professional Teaching Standards, 2014).

Physical Educators' Assessment Practices: The Evidence

Most evidence on physical educators' assessment practices dates from the 1980s–1990s. Data on such practices were collected mostly via surveys, interviews, or document analysis (e.g., Hensley, Lambert, Baumgartner, & Stillwell, 1987; Imwold, Rider, & Johnson, 1982; Kneer, 1986; Lund & Veal, 2008). Physical educators frequently employ informal assessment strategies in the form of (non-)verbal feedback, praise, and/or encouragement (e.g., Graber, 2004; Rink & Mitchell, 2003; Tannehill, van der Mars, & MacPhail, 2015). However, they have also shown reticence toward using formal assessment of any kind, whether for supporting student learning or determining students' grades (e.g., Tannehill et al., 2015; Tousignant & Siedentop, 1983). More recently, Leirhaug and MacPhail (2015) found that Norwegian physical educators' " . . . understanding and enactment of AfL [Assessment for Learning] key strategies was somewhat constricted" (p. 637).

Although physical educators generally perceive assessment as important, they also see it as too time consuming, find little value in it, do not think it necessary, and/or lack the requisite knowledge (e.g.,

Kneer, 1986; Matanin & Tannehill, 1994; Veal, 1988). Historically, physical educators have typically employed subjective judgment of student attitude, participation, sportsmanship, and effort as primary performance indicators (e.g., Hensley et al., 1987; Imwold et al., 1982; López-Pastor et al., 2013; Matanin & Tannehill, 1994). Especially in secondary school physical education programs, students' course grades are based mostly on features of management including attendance, on-time behavior, general conduct, and dress (Tousignant & Siedentop, 1983; Veal, 1988). Such expectations for students are generally the most explicit and most closely monitored compared to student learning outcomes on subject-matter-related tasks. Furthermore, although (formal) assessment of learning outcomes is widely accepted as a central teaching function, evidence suggests that few teachers integrate it into their day-to-day teaching (Shepard, 2001). This supports Veal's (1988) claim of a gap between the theory and practice of assessment in physical education programs. Finally, Lund and Veal (2008) found that preservice physical education teachers have great difficulty planning for assessment.

An ample amount of literature reports on why and how physical educators should employ formal and formative assessment on learning outcomes. However, less is known about their assessment practices. With few exceptions, much of the research on physical educators' assessment practices is dated and focuses primarily on their perceptions and opinions. Today's changing context for physical education programs warrants new research on the assessment practices of physical educators. The Systematic Observation of Formal Assessment of Students by Teachers (SOFAST) instrument was developed as a tool for collecting process data on various dimensions of teachers' formal and informal assessment efforts specific to student learning outcomes. This paper (a) provides an overview of the key features of SOFAST including the various coding levels, category definitions, and observation tactics and procedures and (b) presents an initial descriptive data set based on observations of secondary school physical educators through the use of SOFAST.

SOFAST System Description

SOFAST is a three-level observation system that includes the use of partial interval recording and momentary time sampling (van

der Mars, 1989). In sequence, observers code teachers' teaching functions, the focus of teachers' assessment activities, and the lesson context. The Appendix includes a copy of the coding form.

Level 1: Teaching Functions

At the Teaching Functions coding level, the observer measures teachers' distribution of time across Assessment, Instruction, and Management functions, using partial interval recording with alternating 10-s "observe" and 10-s "record" intervals. The assessment can be either informal or formal (relative to whether a permanent record is created). Formal assessment (coded F) occurs when teachers record information on either paper or an electronic device about their students' performance of physical education content learning tasks, managerial tasks, and general social behavior. Informal assessment (coded I) occurs when teachers provide students with (non-) verbal feedback and encouragement on learning tasks, managerial tasks, and general social behavior.

The Instruction function is encompassed in two codes: the teacher's time spent Participating (or demonstrating; P) with students and his/her time spent sharing Knowledge (K) about physical education content (e.g., how to serve in volleyball). It reflects attention to how and when teachers communicate information about learning tasks. Code K oftentimes occurs when students are inactive (e.g., listening to instruction), but it may also occur when students are engaged in an activity (e.g., 3-v-3 modified volleyball games on four courts) and the teacher is monitoring the activity. If or when the teacher stops one of the games to discuss technical or tactical aspects of game play, the observer would code this as K.

The Managerial function (M) reflects time allocated to organizational activities, such as how and where equipment is to be placed, taking attendance, forming groups, and discussions regarding students' overall class conduct (i.e., personal and social behavior). If the teacher is silently observing the class for the entire interval, the observer would mark this as O.

Level 2: Teacher Assessment Focus

The second level of the decision sequence involves coding for the focus of teachers' assessment efforts, using partial interval recording with alternating 10-s observe and 10-s record intervals. The choice

is fourfold. If, at the first coding level, the teacher was coded as not engaged in either formal or informal assessment, the observer would enter a 0 (i.e., zero). If the teacher was coded as engaging in either formal and/or informal assessment, the observer would code the focus of the assessment.

If the teacher assesses student actions within a physical education motor- or knowledge-related learning task, the observer would code this as C (for Content). If the teacher assesses student performance on managerial tasks (e.g., getting grouped quickly, freezing quickly, or starting a task quickly), the observer would code this as M (for Management). The S (Social Behavior) code would be marked if the teacher focuses the assessment on students' social or personal conduct.

Level 3: Lesson Context

The third and final decision level targets the context of the lesson, with a focus on the activity of the whole class. The observer uses momentary time sampling, taking the sample every 20 s upon the record cue. Observers need to decide between whether lesson time is allocated for management activities (M) or for lesson or unit content. The coding of lesson content might include a decision to determine whether the focus is on knowledge (K) or motor (physical activity) content. If the activity reflects the latter, the observer must decide if the context reflects a focus on fitness (F), skill or technique practice (S), game play (G), or other (O).

SOFAST Data Collection Protocol

SOFAST data are collected using a combination of partial interval recording and momentary time sampling at 20-s intervals using a 10-s observe/10-s record format, for three observation samples per minute. For the Teaching Functions level and Teacher Assessment Focus level, the observer has 10 s to observe and determine the behavior pattern and then 10 s to record that decision. Upon the record cue, the observer also samples the lesson context at that time (i.e., momentary time sampling). Observers use observe and record prompts via prerecorded digital MP3 files.

Level 1: Teaching Functions Category Definitions

The observer uses a coding hierarchy to code the teaching functions. For example, during observe intervals in which multiple behaviors occur (e.g., Formal assessment and Knowledge), the observer codes the one that is listed further left in the Level 1 category order (i.e., F, I, P, K, M, and O). Furthermore, given the variability in the natural duration of the teaching functions, the observer uses partial interval recording. That is, a behavior need not occur for the entire duration of the interval (McKenzie & van der Mars, 2015; van der Mars, 1989).

Formal assessment (F). Using either paper and pen or an electronic data collection device (e.g., tablet), the teacher records information about student performance on tasks that are related to physical education content, management or organization, or personal or social conduct.

Informal assessment (I). The teacher provides (non-)verbal feedback to students about performance on tasks related to physical education content, management or organization, or personal or social conduct, but does not collect data. This would include teachers' responses (either positive or corrective) to students' answers to questions (e.g., checking for understanding).

If formal and informal assessment occur during one observe interval (regardless of the order), the observer would mark both coding symbols in the column for Teaching Functions behaviors. Such instances would be direct examples of teachers' effort at employing formal assessment to communicate to students the progress they are making while learning.

Participates or demonstrates (P). The teacher participates with students in physical education content tasks during activity episodes (e.g., fitness routines, 5-v-5 Ultimate Frisbee) and/or demonstrates a skill or technique at times students are to observe the demonstration. This may also include live demonstrations performed by students and/or the showing of a short video clip.

Knowledge (K). The teacher instructs or communicates verbally, including verbal prompts, about physical education content (e.g., technique execution, tactical features of game play, rules, history, officiating, coaching, scorekeeping, judging a dance routine,

heart rate checks). This might include the use of a whiteboard, video, and/or printed graphics.

Management (M). Time spent by the teacher on organizational tasks (that are or can be "routines") unrelated to lesson content in the form of general directions, including prompts. This refers to the explanation and practice of tasks such as moving equipment on or off the field or floor, forming small student groups, dispersing students to activity stations, gathering students together, and moving students from one area to another, such as from the gym to an outdoor field. It also includes time spent on recognizing positive or inappropriate negative student conduct (e.g., treatment of equipment, facilities, talking during class-wide instruction, safety-related behavior).

Silent observation (O). The teacher monitors student performance without interacting with them during periods of subject-matter activity. Silent observation may also include talking to oneself, unintelligible statements (e.g., incomplete sentences), and engaging in conversation with a person who is not part of the class activities (e.g., student intern, principal, other teachers).

Level 2: Teacher Assessment Focus Category Definitions

As was the case with the Teaching Functions level, the observer uses partial interval recording to code the assessment focus. Teachers may assess multiple dimensions of student performance (e.g., Content and Management) during one observe interval. In this case, the observer would record the focus that lasted the longest during that interval.

0 (zero). No informal or formal assessment of student learning outcomes occurred. This would be coded if the Teaching Functions behavior code for that interval was Participation, Knowledge, Management, or Silent Observation.

Content—Motor and knowledge focus (C). Formal or informal assessment by teachers that targets learners' performance on physical education knowledge and/or motor content tasks. Examples include performance in fundamental motor skills, health or fitness activities, the technical execution of exercises in strength conditioning, sport-related techniques and tactics, choreography of dance steps, quality of team play, and/or knowledge of an activity (e.g., a correct student response to a teacher's question about a rule, tactic, strategy, historic event, famous athletes). Assessment pertaining to

non-playing student roles in Sport Education (e.g., Game Official, Coach, Judge, Scorekeeper, Fitness Trainer, Sport Board Member; Siedentop et al., 2011) would also be coded as being focused on content.

Management focus (M). Formal or informal assessment by teachers that targets learners' managerial and organizational task (i.e., routines) performance. Examples include assessment of students' grouping, gathering and dispersing of students and equipment, students' quick or slow start to a learning task, students' responses to freeze signals, hustles, compliance with attendance procedures, being on time, and being dressed correctly for class. Teachers' assessment comments about students' general class safety behaviors would also be coded as having a management focus.

Social and personal behavior focus (S). Formal or informal assessment by teachers of students' social and/or personal conduct in class. Examples include assessment of how students cooperate with each other or with the teacher, how they interact and treat each other, how they include peers in an activity, and how they assist peers who experience difficulty with a task or activity.

The social and personal behavior focus would also include assessment of students being attentive during class-wide instruction, making supportive comments to others, and demonstrating a liking for an activity or showing that they value an activity.

Recognizing aspects such as hard work, perceived effort, and/or persistence (e.g., during fitness activities) would be coded with S. The observer would mark this code when teachers give feedback to students about taunting, swearing, bullying, (mis-)treating equipment and/or facility, and so forth. Assessment during lessons that have a direct and clear focus on individual or social skill development in students (e.g., team-building content) would also be coded as S.

Level 3: Lesson Context (adapted from McKenzie, 2015)

For the Lesson Context level, observers use momentary time sampling. That is, the observer records the predominant activity that the class as a whole is engaged in upon the record cue. Thus, given the 20-s interval length, this produces three observation samples per minute.

Management (M). Refers to lesson time when students are not intended to be involved in physical education content, including transition, management, and break times. This includes time allocated to managerial and organizational activities such as taking attendance, discussing students' conduct, team or group formation, changing or moving equipment, moving from one space to another (e.g., from gym to weight room or from gym to outdoor facility), changing stations (e.g., going from a basketball activity to a pickleball area), and changing activities within a lesson.

This includes teachers' explanations or demonstrations of organizational or managerial arrangements, as well as students' execution of such managerial tasks. If such episodes are followed by physical-education-content-related activities, the management episode ends when the first student starts engaging in the content-related task.

Transitions that occur naturally as part of an activity would be coded as part of that activity rather than as Management (M). For example, time spent moving from one fitness circuit station to the next would be coded as Fitness (F), and changing sides of the court during a volleyball game would be coded as Game (G). However, if or when an activity is halted for more than 10 s, the observer would enter a new code (most likely M or Kn).

Knowledge (Kn). Lesson time in which the primary focus is on student knowledge acquisition related to physical education content and/or cognitive activities such as writing tasks (e.g., journaling); math-related tasks (e.g., entering pedometer step counts); or student groups discussing how to develop a dance, jump rope, or gymnastics routine. Knowledge is related to conveying information about (a) health-related physical activity and fitness content (e.g., physical activity or physical fitness concepts, including endurance, critical elements for executing a bench press, differences between static and ballistic stretching, taking a heart rate, and discussions about making consumer choices regarding fitness products) and (b) skill-related content, such as dance, sport, and outdoor pursuits (e.g., skill cues and common errors for the track and field baton exchange, tactical aspects of game play, how to set a screen in basketball, how to use a compass in orienteering, historic events in sport, using game rules

effectively, etiquette). This knowledge may be conveyed by teachers, other students, guest speakers, video, and computers, among others.

Fitness (F). Class time allocated to activities with a major purpose of altering the physical state of individuals in terms of cardiovascular endurance, strength, and/or flexibility. Examples include aerobic dance, calisthenics, distance running, strength conditioning, agility training, fitness testing, and warm-up and cooldown activities. Relays conducted with three or more students per team would be coded as Game (G).

Skill or technique (S). Class time devoted to students practicing the execution of techniques with the primary goal of technique development (e.g., basketball layup, dance steps, or balance beam skills).

Game (G). Class time devoted to applying techniques, tactics, and strategy in a game form or competitive setting. Game contexts could include either parent versions of sport games (e.g., 5-v-5 basketball on full court with standard rules) or games that include modifications to either primary or secondary rules (e.g., 2-v-2 volleyball; 3-v-3 soccer; altered rules, court size, net height, etc.). Combative challenges (e.g., in wrestling) would be coded as Game (G). Team-building and icebreaker activities, tag games, and judged performances such as gymnastics and dance routines that are part of a class competition would also be coded as G.

Other (O). Refers to free playtime during which physical education instruction is not intended (e.g., time when students choose their own activities and make their own decisions about rules). This time resembles recess, during which students may select to participate or not.

As noted, much of the previous research on teachers' assessment practices was based on either surveys or interviews. The following section presents initial data from observations of secondary school physical educators that were made using SOFAST.

Method

Participants and Settings

Four female and three male certified physical education teachers served as participants. Their teaching experience ranged from 4 to 15

Table 1
Demographics of Participating Schools

Participating school	MS 1	MS 2	MS 3	MS 4	HS
Grades	6–8	6–8	6–8	6–8	9–12
Enrollment (*n*)	1,042	570	1,389	574	1,327
Economic Disadvantage (%)[a]	32	28	12	43	31
Students With Disabilities (%)	14	8	10	12	10
English Language Learners (%)	21	8	20	12	< 5
Ethnicity (%)					
American Indian/Alaska Native	0	1	0	0	1
Asian	9	9	40	1	1
Black/African American	3	1	2	1	1
Hispanic/Latino	20	8	7	19	12
Multi-Racial	6	8	6	6	4
Native Hawaiian/Pacific Islander	1	0	0	0	0
White	60	73	46	74	81
Curricular Focus	Multiactivity	Multiactivity	Multiactivity	Multiactivity	Fitness for Life/Sport Education

Note. Data from State's Department of Education Annual Report Cards. MS = middle school; HS = high school.
[a]Students eligible for free or reduced meals.

years. Teachers were employed at middle schools (n = 6) and a high school (n = 1). Teaching contexts were varied. One middle school was located in an affluent neighborhood of a suburban community that serves as a bedroom community for a large metropolitan city. One middle school was located in a suburban middle-class neighborhood. The remaining two middle schools and one high school were located in more rural communities. Table 1 presents additional school demographic information. Several teachers had a sustained record of professional development, presenting at state and regional conferences and professional organizations. Two participating teachers had earned state-level teacher of the year awards.

The programs in which teachers taught were varied in curricular orientation. In three of the middle school programs, teachers employed the Dynamic physical education framework (Darst & Pangrazi, 2006). Because of space limitations, teachers in the fourth middle school grouped their three classes together (class sizes range: 33 to 45) in one gym for a common fitness activity. After that, students were free to select between multiple activities (typically at least three options) in various parts of campus and switch between them on a daily basis. The high school teacher's curricular focus represented a blend of Fitness for Life (Corbin & Lindsey, 2005) and Sport Education (Siedentop et al., 2011).

Lesson length for all middle schools was 50 min (including dress time), and classes met daily, except for one school, which employed an A-B schedule (i.e., physical education met every other school day). The high school employed an A-B block schedule (i.e., five lessons per 10 school days) with lessons scheduled for 90 min.

Data Collection and Analysis

Each participant was observed teaching three regular physical education lessons. Trained observers used SOFAST. Well-defined behavior categories of systematic observation instruments provide low-inference descriptions of observable behaviors and events. As such, they have strong internal (or face) validity (McKenzie, 2010; McKenzie & van der Mars, 2015). The use of six external reviewers asssessing face validity ensured that the SOFAST category definitions in the first two decision levels (Teaching Functions and Assessment Focus) were defined clearly and allowed for clear discriminations between categories. Reviewers were selected based on their expertise

in the use of systematic observation tactics. Based on reviewer suggestions, minor adjustments were made in three category definitions. Lesson Context definition categories were not checked for validity as they were drawn from well known and extensively used systematic observation systems (e.g., System for Observing Fitness Instruction Time [SOFIT], McKenzie, Sallis, & Nader, 1991; Academic Learning Time-Physical Education [ALT-PE], Parker, 1989).

Percentages were calculated for each SOFAST category. Means and standard deviations were calculated for each teacher across the three observed lessons. These means were then averaged, resulting in group means and standard deviations.

Observer Reliability

Observer reliability was established through interobserver agreement (IOA) checks for at least one of the three observed lessons with each participating teacher, by a second trained and independent observer. IOA percentages were calculated with the total interval method (van der Mars, 1989). As shown in Table 2, IOA percentages for Teaching Functions (including formal and informal assessment), Assessment Focus, and Lesson Context data were at acceptable levels across teachers. Of the 105 individual category IOA percentages, 13% were in the 80–90% range, which were all the result of being low-occurrence behaviors or episodes. All others were at or above 90%. Based on the IOA results, the observers were deemed reliable.

Results

Class Context Data

Figure 1 includes means and standard deviations for the various class activities. Teachers allocated 57.4% (SD = 13.52) of the class time in some form of physical activity. Fitness-related content was the most prominent type of physical activity (M = 25.7, SD = 19.85). This was followed by Game (M = 17.1, SD = 9.31) and Skill Practice (M = 15.5, SD = 11.85), respectively. Time spent in class-wide instruction (coded as Knowledge) averaged at 15.9% (SD = 6.58) of the available class time, whereas managerial activities took up an average of 26.7% (SD = 9.38) of the class time.

Table 2
Total Interval (T-I) Inter-observer Agreement (IOA) Percentages Across Participants.

	Teacher						
Level and category	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Teaching Functions							
Formal Assessment	97.50	100.00	93.75	91.60	98.00	100.00	97.40
Informal Assessment	92.30	88.00	90.15	94.50	90.30	94.70	92.90
Participation/Demonstration	100.00	91.00	95.50	100.00	88.90	90.00	96.10
Knowledge	80.00	68.00	82.00	100.00	96.80	91.60	99.00
Management	90.30	94.00	92.15	98.70	99.00	100.00	100.00
Silent Observation	94.40	98.00	63.70	90.30	93.70	100.00	92.30
Teaching Functions Average	92.42	89.83	86.21	95.85	94.45	96.05	96.28
Assessment Focus							
Content	100.00	86.00	93.00	96.30	90.20	98.70	98.40
Management	100.00	100.00	100.00	95.00	97.90	81.80	90.50
Social Behavior	96.00	100.00	89.00	100.00	93.40	100.00	100.00
Assessment Focus Average	98.67	95.33	94.00	97.10	93.83	93.83	96.30
Class Context							
Management	90.20	94.00	92.10	97.60	94.00	86.30	98.10
Knowledge	100.00	94.00	97.00	94.90	90.60	90.50	93.90
Fitness	100.00	100.00	100.00	100.00	100.00	100.00	95.50
Skill Practice	97.80	96.00	96.90	98.90	98.90	100.00	100.00
Game	96.60	100.00	98.30	92.90	92.90	100.00	94.50
Other	100.00	100.00	100.00	100.00	98.00	100.00	93.90
Class Context Average	97.43	97.33	97.38	97.38	95.73	96.13	95.98

Teaching Functions Data

Figure 2 shows group means and standard deviations on the SOFAST Teaching Functions categories, with the most prominent being Management (M = 30.5%, SD = 6.37) and Instruction (M = 29.1%, SD = 8.34). Instruction was broken down by the percentage of class time spent in Knowledge and Participation/Demonstration, which averaged 22.9% (SD = 5.74) and 6.2% (SD = 5.68), respectively. Teachers engaged in various types of assessment an average of 36.0% (SD = 13.86) of the class time. Teachers allocated an average of 3.9% (SD = 3.64), 20.7% (SD = 15.80), and 0.2% (SD = . 44) of the class time to Formal, Informal, and simultaneous Formal and Informal assessment, respectively. Finally, teachers spent an average of 14.5% (SD = 9.79) of the class time in Silent Observation of students.

Teacher Assessment Focus

Figure 3 includes data on the focus of teachers' assessment. Two thirds of the teachers' assessment effort targeted physical-education-content-related motor and knowledge performance (M = 67.5%, SD = 15.86). The next most common focus of teachers' assessment was student performance on Management-related tasks (M = 25.8%, SD = 15.43). Finally, teachers' assessment of students' Social Behavior made up 6.7% (SD = 9.28) of the assessment.

Teachers' Assessment Patterns

Figure 4 includes a breakdown of teachers' assessment relative to type and focus. When formally assessing students, teachers focused mostly on their managerial task performance (M = 57.4%, SD = 35.79). The remaining formal assessment was split between students' Content-related task performance (M = 8.6%, SD = 19.22) and social or personal behavior (M = 0.7%, SD = 1.80). Most informal assessment was directed to students' Content task performance (M = 79.5%, SD = 15.37). Student performance on Management tasks was assessed informally an average of 13.5% (SD = 9.06) of the informal assessment, whereas the remaining 7.0% (SD = 9.79) targeted students' social or personal conduct.

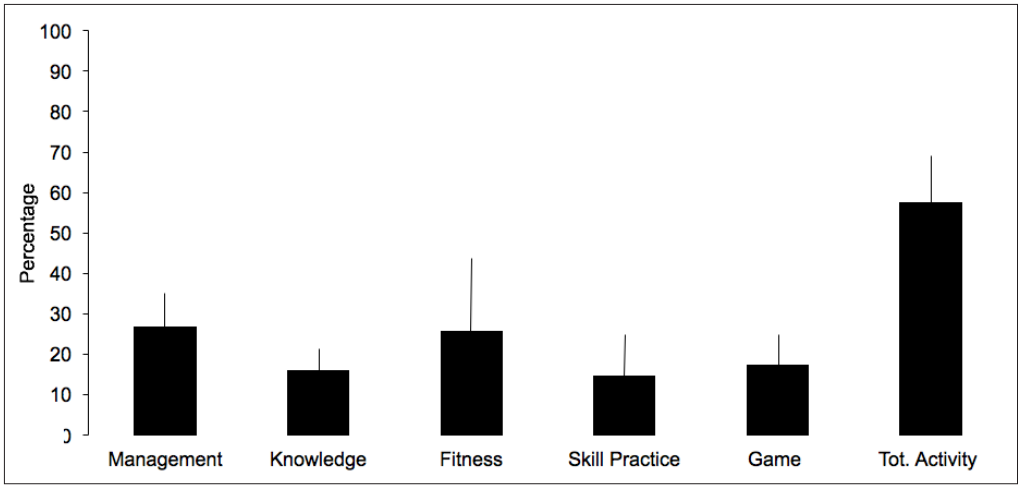

Figure 1. Mean percent of class time for lesson context categories

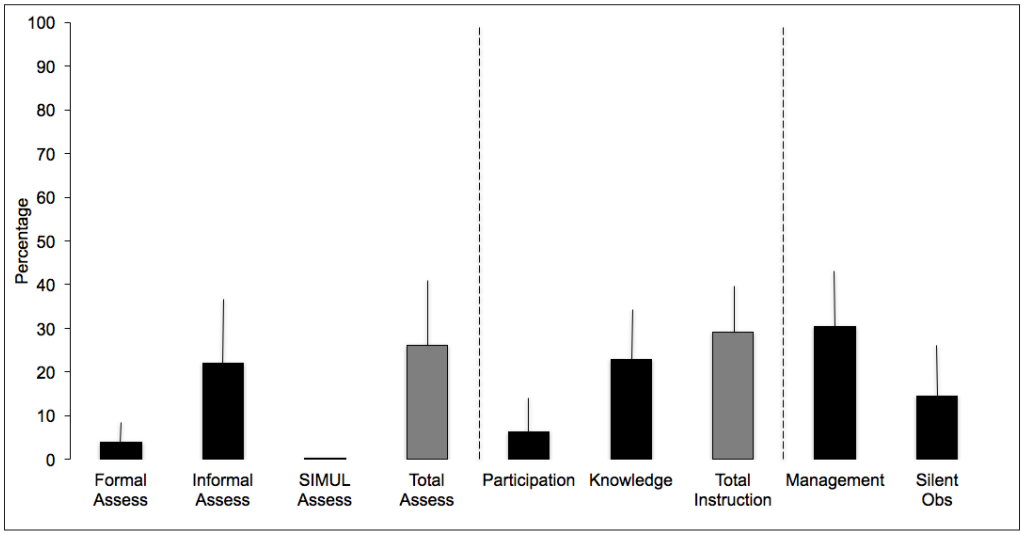

Figure 2. Mean percent of class time across teaching functions.

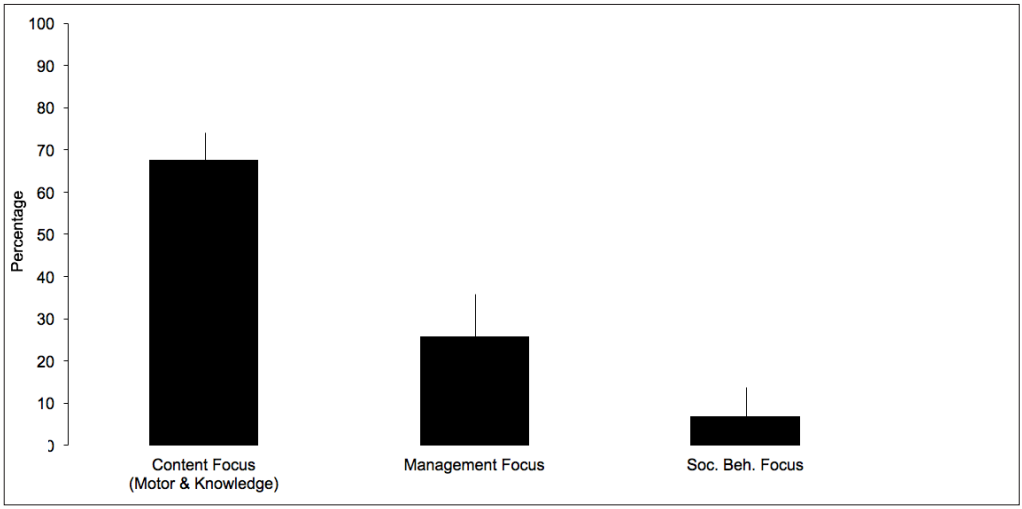

Figure 3. Percent of total assessment by focus.

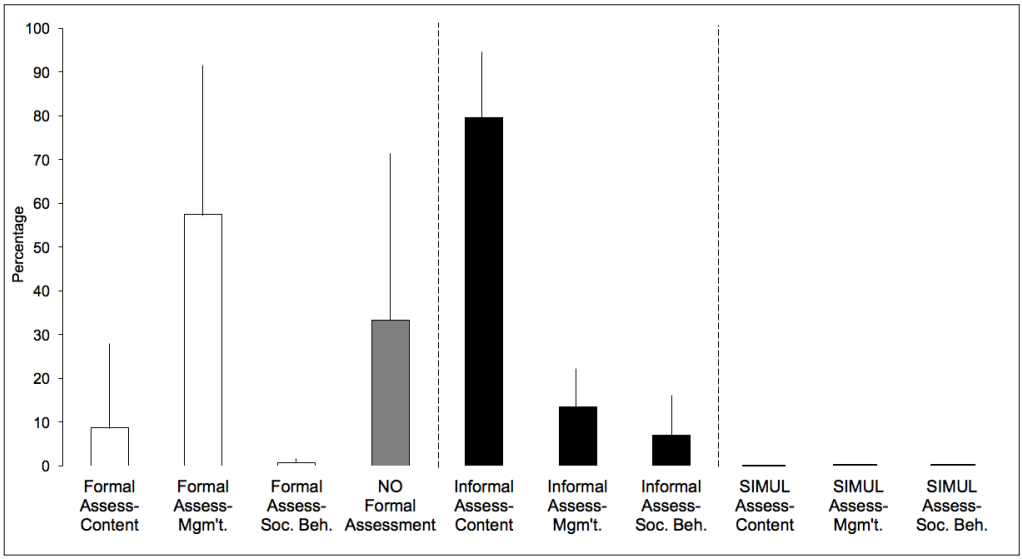

Figure 4. Mean percent of assessment by type.

Discussion

The process data on participating teachers' formal and informal assessment practices confirm findings from most previous studies that physical educators do assess their students (e.g., Graber, 2004; Rink & Mitchell, 2003; Siedentop & Tannehill, 2000). However, their assessments consisted mainly of informal assessment of student performance on content-related tasks, and formal assessment was limited to their students' performance on attendance, dress, and timely arrival to class. This reflects a lack of change in assessment practices reported previously (e.g., Graber, 2004; Rink & Mitchell, 2003; Tannehill et al., 2015; Tousignant & Siedentop, 1983).

The almost 8 min of class time that teachers spent silently observing students is somewhat below the levels reported in previous research (Siedentop, 1991; Siedentop & Tannehill, 2000). The professional physical education teacher education (PETE) literature describes this monitoring task as essential to ensuring that (a) safety is maintained in the learning environment, (b) students make progress on learning tasks, and (c) they conduct themselves appropriately. What remains largely unknown is what teachers think about, observe, and make decisions about during those bouts of silent observation. Are the observations deliberate and focused, or are the teachers using that time to "take a breather"?

Physical educators have voiced that formal assessment is too time consuming and lacks relevance (Goc-Karp & Woods, 2008; Kneer, 1986). This view may be, in part, a consequence of how they conceptualize assessment in general and formal assessment (i.e., summative: skill testing at the end of a unit) in particular. Rink, French, Lee, Solmon, and Lynn (1994) found that student teachers did not include assessment (labeled as *evaluation* in their study) in their descriptions of effective teaching. If teachers were to view formal assessment more as a day-to-day process that occurs throughout units of instruction than as something that is not important or valued, the time spent in silent observation potentially lends itself to not only focused and deliberate observations, but also the recording of data on student performance and progress.

Balancing and integrating the central teaching functions of instruction, management, and monitoring of students for the purpose of creating appropriate student learning experiences in itself

requires a strong command of teaching skills. As noted, current trends in school districts' teacher evaluation practices reflect an increased emphasis on tying teacher evaluations directly to student achievement. The recent passing of the Every Student Succeeds Act (ESSA, 2015) stipulates that states and school districts must develop and implement teacher (and principal!) evaluation systems that are based in part on evidence of student achievement. Thus, formal-formative assessment of student outcomes in physical education should figure more prominently and likely requires adjustments in how teachers attend to other core teaching functions. For example, teachers who are effective in employing managerial structures and routines and who can get students to be more self-managed (e.g., Sport Education) can carve out precious class time that can then be used for formal assessment. Likely, programs in which students largely depend on frequent teacher directions or in which the teacher's classroom management skills are less well developed will leave little if any opportunity for (formal) assessment. In addition, there have been calls in (physical) education for increasing the emphasis on assessment for learning (i.e., formative), wherein data are collected throughout the learning process (e.g., Baker & Gordon, 2014; Hay, 2006; van der Mars & Harvey, 2010), as well as for a de-emphasis of end-of-unit or end-of-year testing.

Physical educators have reported feeling ill-equipped to conduct assessment of their students (Kneer, 1986). Regardless of whether one agrees with school districts' current teacher evaluation practices, physical educators who want to strengthen their case for receiving positive evaluations must be equipped with the needed assessment skills that will help them demonstrate what their students are achieving in physical education. The historic (and continuing!) lack of focus by physical educators on authentic, formal-formative assessment of learning outcomes points to the need for in-depth and sustained professional development support (Leirhaug & MacPhail, 2015).

SHAPE America (and many individual teachers) regard development of appropriate social and personal conduct skills as central program outcomes (e.g., Goc-Karp & Woods, 2008; SHAPE America, 2014), and assessment tools specific to these outcomes are available (e.g., SHAPE America, 2015a, 2015b). In this study, teachers focused surprisingly little of their assessment on these very

dimensions of espoused student learning (i.e., less than 10% of all assessment). Formal assessment of social and personal conduct was virtually absent.

When, during a unit of instruction, teachers assess students formally (i.e., develop a permanent record) and then simultaneously communicate this to the students, this constitutes an explicit example of aligning assessment with instruction so it can support student learning. In none of the observed lessons did any of the teachers use what little formal assessment information they did collect as a springboard for providing their students with feedback or prompts to aid their students' progress, regardless of which aspect of student performance (i.e., content, management, or social or personal).

A strength of this study is that despite the variance in teaching contexts, experience, and curricular orientation among participating teachers, their assessment patterns were largely similar, as evidenced by the relatively small standard deviations in the various Teacher Assessment Focus categories. When assessing formally, teachers focused almost entirely on students' managerial performance, a pattern of assessment which has been seen in previous research (e.g., Hay, 2006; Tousignant & Siedentop, 1983).

This study was not without limitations. First, the sample of participants prevents generalization to all secondary physical educators. However, the findings from this study largely align with previously reported data. Another limitation was that because participating teachers did not focus any of their formal assessments on substantive student learning outcomes, we could not show how the use of the SOFAST observation system can discriminate between teachers who make and do not make formal assessment of student outcomes a primary focus.

The SOFAST observation instrument presented in this paper allows researchers to gain insight into physical educators' use of formal and informal assessment, its focus (i.e., student learning indicators and outcomes, and indicators of student managerial and social behavior performance), and several contextual dimensions of classes. SOFAST category definitions of behavior are low-inference and include numerous examples of behaviors and events, which thus eases the process of memorizing them. As with all systematic observation instruments, reliable and accurate use of the system depends

on the quality of observer training that precedes its use (McKenzie & van der Mars, 2015).

Implications

The presented data must be placed in the larger context of school physical education programs, which continue their struggle to maintain a viable presence in public schools and to maintain relevance and credibility in the eyes of the public. On the one hand, significant losses have occurred in the allocation of minutes per week and in graduation requirements for physical education on school campuses (e.g., Center on Education Policy, 2007; SHAPE America, 2016; U.S. Department of Health and Human Services, 2015). Yet, at the same time, federal agencies, national research bodies, and professional organizations strongly support school physical education programs, addressing the role of schools in promoting students' physical activity. Schools are widely regarded as a critical point of impact in promoting and increasing physical activity opportunities for children and adolescents (e.g., Centers for Disease Control and Prevention, 1997, 2001; Institute of Medicine, 2013; National Physical Activity Plan Alliance, 2016; Pate et al., 2006; Payne & Morrow, 2009). For example, Pate et al. (2006) recommended,

> States should hold schools accountable for delivering PE programs that meet national standards for quality and quantity (i.e., 150 minutes per week for grades K to 8 and 225 minutes per week for grades 9 to 12). Specifically, each state should include PE in its core educational accountability system and should incorporate PE into its system national standards for curriculum and instructional quality. (p. 7)

At the federal level, there have been multiple unsuccessful policy efforts to elevate physical education as a school subject to the same level as classroom "core" subjects (e.g., FIT Kids Act, 2009). In 2015, the U.S. Congress passed the Every Student Succeeds Act (ESSA) that replaced No Child Left Behind. As noted, teacher evaluation that is based in part on student achievement remains in place. However, school health and physical education are school subjects identified as part of students' "well-rounded" education. Moreover, Title IV funding associated with ESSA will flow to states, of which 20% must

fund "safe and healthy schools," and must go toward "well-rounded subject" areas.

Although the ultimate outcomes of such policy and legislative successes remain unknown as yet, this creates state-level opportunities for physical education to move forward. The key will be how K–12 professionals, PETE faculty, and sport pedagogy scholars respond. Both the previous research and the absence of any appreciable amount of formal assessment of student performance on subject-matter-related learning tasks in this study suggest we are not prepared. Theoretically, this lack of preparedness is at least in part a consequence of (a) the absence of state-level accountability mechanisms that require physical education programs to provide evidence that their students are meeting content standards (a notable exception being South Carolina; Rink & Mitchell, 2003); (b) the absence of not only reliable and valid, but also usable and practical assessment tools; (c) how (formal) assessment is conceptualized (Rink et al., 1994); (d) the lack of good training in using assessment of student outcomes within PETE programs (e.g., Lund & Veal, 2008) and in-service professional development opportunities for teachers; and (e) a lack of necessary skills and knowledge about effective assessment among physical educators (e.g., Kneer, 1986; Veal, 1988).

Lund and Veal (2008) noted that the inability of student teachers to (a) develop appropriate learning objectives, (b) select appropriate assessments, and (c) implement assessment of student learning is likely the result of the absence of a clear assessment culture in PETE programs and the profession at large. If school physical education is to lay legitimate claim to part of the school day, it can no longer consider itself immune from having to demonstrate that investments in their programs are warranted. From a perspective of being proactive, PETE programs and any professional development programs for already certified teachers must increase efforts in equipping current and future teachers with the skills, knowledge, and (perhaps most important!) dispositions necessary to make assessment of student learning a part of their daily work. Failure to develop a culture of assessment will likely reinforce students, parents, school administrators, and policy makers to view physical education as an easily disposable school subject and will likely perpetuate the perceived marginalization of the subject.

We have argued that there is an urgent need for new and experienced physical educators to make formal-formative assessment a more integral teaching function in their day-to-day work with students. As noted, much of the previous research on physical educators' use of assessment is dated and lacks a focus on assessment practices. Today's policy context for physical education offers potential, but may leave physical education more vulnerable because of the lack of a strong evidence base. Additional research on assessment practices (and their effect on student outcomes) is warranted. To that end, researchers can use SOFAST to objectively track physical educators' in-class assessment practices. In addition, it can be used to determine the effect of interventions aimed specifically at the development of formal-formative assessment skills. Moreover, supervisors in PETE programs can use SOFAST to track progress in developing such assessment skills among preservice PETE students. A complete description of the complete SOFAST coding manual can be obtained from the lead author.

Conclusion

The following conclusions can be drawn from the current study: First, SOFAST can provide important process data regarding physical education teachers' engagement in formal and informal assessment of student learning and performance. Second, secondary physical education teachers continue to limit their formal assessment to student efforts on managerial aspects of performance.

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Appendix

SOFAST Observation Form

Date:_____ **School:** _____ **Grade:** _____ **IOA? Y / N**

# of Females _____ **Males** _____ **Class size:** ___

Baseline Session # _____ **Intervention Session #** _____ **Start time:** _____ **Obs. Length:** ____:____ **m:s**

Teacher: _____ **M / F** **SOFAST Observer:** _____

Lesson Location: In____Out ___ **Main Lesson Content:** _____

_____

Focus of Formal Assessment: _____

Minutes	*Int.*																	
0																		
	1	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	2	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	3	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
1																		
	4	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	5	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	6	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
2																		
	7	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	8	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	9	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
3																		
	10	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	11	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	12	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
4																		
	13	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	14	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	15	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
5																		
	16	F	I	P	K	M	O	0	C	M	S	M	Kn	F	S	G	O
	P. 1 Totals																	

P. 1 F+I Total= _____ ***# of missed intervals Page 1:*** _____

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FITNESS

Physical Fitness Test Administration Practices and Students' Cognitive Understanding of Physical Fitness

Susan L. Eastham

Abstract

The purpose of this study was to examine physical education teachers' physical fitness test administration practices, specifically how physical education teachers helped their students to develop a cognitive understanding of the health-related physical fitness components before and after test administration. Ten middle school and high school physical education teachers from Central California were interviewed about their test administration practices. The teachers were asked to describe how they conducted the tests and how the students were educated about the health-related fitness components before and after test administration. The results of the study identified only three of the teachers giving specific health-related fitness instruction to their students. The teachers described various instructions given to the students before test administration about the test purposes, but none of the teachers reported discussing with their students that the purpose of the test was to promote a physically active lifestyle. Only half of the teachers reported providing the students with their test results after test administration, and if an explanation of the test results was given to the students, it was typically brief. For students to make the connection between the test results and health-related fitness, it is important for teachers to provide specific health-related fitness instruction. When

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effective test administration, instruction of health-related fitness, and interpretation of test results to the students occur, physical fitness testing can be a valuable assessment that leads students to be more likely to adopt a physically active lifestyle.

Physical fitness tests are administered regularly in the United States, and even without a national mandate, physical fitness testing is often required at the state, county, district, or school level (Cale & Harris, 2009; Morrow, Fulton, Brenner, & Kohl, 2008; National Association for Sport and Physical Education & American Heart Association, 2012). The FitnessGram is a criterion-referenced health-related physical fitness test battery and is one of the most commonly used test batteries in schools (The Cooper Institute, 2013; Lee, Burgeson, Fulton, & Spain, 2007; Morrow, Zhu, Franks, Meredith, & Spain, 2009). The primary goal of the FitnessGram is to motivate students to participate regularly in physical activity (The Cooper Institute, 2013). Regular physical activity is important because it is associated with good health and greatly reduces the risk of developing or dying from certain diseases, such as coronary artery disease, high blood pressure, high cholesterol, type 2 diabetes, and some cancers (Kahn et al., 2002; McMurray & Ondrak, 2013; U.S. Department of Health and Human Services [USDHHS], 1996). A physically active lifestyle not only reduces the risk for chronic diseases but also helps to decrease stress, improve muscle tone and strength to prevent injury, and increase self-confidence and the ability to perform various motor tasks (Roberts, 2000). Additionally, there appears to be a positive relationship between academic achievement and physical fitness (Bass, Brown, Laurson, & Coleman, 2013; California Department of Education, 2005). Students who are physically fit appear to perform better academically, are more attentive, and have fewer discipline problems (Kahn et al., 2002).

Knowing the benefits of a physically active lifestyle and the consequences of physical inactivity, too many children are still failing to engage in regular physical activity. Physical fitness testing is one means of promoting physically active lifestyles (The Cooper Institute, 2013). Although physical fitness tests have been administered in schools for many years, the topic of physical fitness testing has been debated and the value of measuring children's physical fitness levels has been questioned (Cale & Harris, 2009; Lloyd, Colley,

& Tremblay, 2010; Naughton, Carlson, & Greene, 2006). It has been argued that if the goal of physical fitness testing is to motivate children to develop a physically active lifestyle, the emphasis should be on assessing physical activity rather than physical fitness (Lloyd et al., 2010). Additionally, it is not clear that children who perform well on physical fitness tests are physically active, and children who are physically active do not always perform well on physical fitness tests (Naughton et al., 2006). It appears as if children's physical fitness test results are influenced by factors other than physical fitness. Factors such as age, maturation, heredity, and environmental conditions appear to influence the test results of children to a greater extent than they do in adults (Harris & Cale, 2006; Morrow, 2005; Naughton et al., 2006). In adults, there is a strong positive relationship between physical fitness and physical activity, but in children the relationship is unclear (Naughton et al., 2006).

Although problems of physical fitness testing do exist, there is support for physical fitness testing as a valuable and appropriate assessment tool for evaluating physical fitness and promoting a physically active lifestyle if the tests are administered correctly. When physical fitness testing is used appropriately, students are more likely to develop a physically active lifestyle (Hopple & Graham, 1995; Silverman, Keating, & Phillips, 2008). Physical fitness testing should not be conducted as an isolated event administered merely to comply with the state requirements, but used as an educational tool that helps students gain knowledge and understanding about physical fitness and the benefits of physical activity (Keating & Silverman, 2004; Lloyd et al., 2010). When physical fitness tests are used as a meaningful assessment, and students are taught about the health-related fitness components, they are more likely to understand the value of a physically active lifestyle and engage in regular physical activity (Cale & Harris, 2009; Dale & Corbin, 2000; Dale, Corbin, & Cuddihy, 1998; Pearman et al., 1997).

Because the value of physical fitness testing depends largely on how tests are administered (Ferguson, Keating, Bridges, Guan, & Chen, 2007; Harris & Cale, 2006), investigating test administration practices is important. Research conducted on physical fitness testing has primarily focused on collecting reliability and validity data on individual physical fitness tests. Although several studies have

examined individual tests, limited research has been performed on whole test batteries or on school-based physical fitness testing practices (Cale & Harris, 2009). The most researched area on school-based physical fitness testing includes studies on attitudes toward physical fitness testing, which generally found students' attitudes toward fitness testing to be negative or neutral, whereas teachers' attitudes were only slightly positive (Ferguson et al., 2007; Hopple & Graham, 1995; Mercier & Silverman, 2014). However, research examining current physical fitness testing practices in the schools is limited (Keating, 2003). Knowing how teachers use physical fitness testing in the schools can increase the understanding of physical fitness testing implementation and help facilitate effective physical fitness testing practices in the schools. With effective and appropriate physical fitness testing practices, students can learn to value a physically active lifestyle (Ferguson et al., 2007; Naughton et al., 2006). When students understand the value of physical activity in promoting physically active lifestyles, the primary goal of physical fitness testing can be accomplished.

The purpose of this study was to examine teachers' physical fitness test administration practices, specifically how physical education (PE) teachers help their students to develop a cognitive understanding of the health-related physical fitness components before and after test administration. This study addressed the following questions:

1. How do PE teachers help their students develop a cognitive understanding of the health-related physical fitness components?
2. Prior to physical fitness testing, to what extent do PE teachers develop their students' cognitive understanding about the health-related physical fitness components?
3. After physical fitness testing, to what extent do PE teachers interpret test results to their students?

This study provides a better understanding of how PE teachers incorporate health-related physical fitness instruction in the curriculum, which is important in promoting a physically active lifestyle that leads to improvements in health-related physical fitness instruction and therefore makes physical fitness testing a valuable assessment.

Method

Participants

In-depth interviews were conducted with a convenience sample of 10 PE teachers from 10 schools in Central California. The PE teachers were recruited via regular or electronic mail and asked to participate in an interview about their physical fitness test administration practices. Criteria for participating in the study included current employment as a PE teacher at a middle or high school and having administered the California Physical Fitness Test (CaPFT). In California, the CaPFT is required for all public school students in Grades 5, 7, and 9, via the FitnessGram test battery (California Department of Education, 2015). Of the participants, 50% (n = 5) were middle school teachers, 50% (n = 5) were high school teachers, 60% (n = 6) were male, and 40% (n = 4) were female. The teachers' ages varied, with most of the teachers being experienced educators who had been teaching for more than 10 years. Only two of the participants had been teaching for less than 10 years. Additionally, the participants had administered the CaPFT more than 10 times, with only one participant having administered the test less than five times. Each participant was identified with a number (i.e., Teacher 1 [T1], Teacher 2 [T2], etc.), with T1–T5 being the middle school teachers and T6–T10 being the high school teachers.

Procedures

Following a pilot study, the researcher modified the interview protocol to improve interview effectiveness. Interviews were scheduled at the school site of each of the 10 participants. The interview protocol included interview instructions, questions to be asked, and a space to take notes on participant responses (Creswell, 2002) and was used to guide the researcher through the interview process to help ensure consistency from interview to interview.

The instrument for the study was a 45-min individual interview including open-ended questions for examining physical fitness test administration practices. The questions were meant to investigate how PE teachers help their students develop a cognitive understanding of the health-related physical fitness components. In the interview, the PE teachers were asked to describe how they prepared

the students for the tests and how the test results were reported and interpreted to the students. Because instruction on health-related physical fitness components helps promote physical activity (Dale & Corbin, 2000), the questions specifically focused on the teachers' descriptions of how they educated their students about the health-related physical fitness components before and after physical fitness test administration. To help answer the research questions, the researcher asked open-ended questions with probes to obtain additional information when the responses were incomplete or vague (Creswell, 2002).

Following each interview, the digital recordings were transcribed and then sent via electronic mail to the participants, which allowed them to verify the accuracy of their responses.

Data Analysis

Data were analyzed via organizing the data, describing the data, and summarizing the data (Creswell, 2002). To organize the data, the researcher coded the transcripts using a marginal coding technique (Creswell, 2002; Miles & Huberman, 1994). Once organized, the data were described via a cross-case analysis (Miles & Huberman, 1994). A cross-case analysis can help deepen the understanding and explanation of the data by allowing examination of multiple cases and identification of recurring themes. Once entered into the matrix, the data were partitioned and clustered into the variables consistent with the research questions. This process of describing the data helped the researcher to refine, summarize, and reduce the data into a more manageable format. The final step of the analysis involved summarizing the data through identification of common themes. The researcher used data summary tables to refine, summarize, and reduce the data so the common themes could be recognized. The researcher also conducted triangulation of the data to ensure reliability of the coding procedures.

Results

Research Questions

The first question, "How do PE teachers help their students develop a cognitive understanding of the health-related physical fit-

ness components?" examined how the teachers were educating their students about fitness concepts. If the purpose of physical fitness testing is to help students develop an active lifestyle, how are teachers helping the students to develop a cognitive understanding of the health-related fitness components? Three themes emerged from this question. The first emergent theme involved classroom availability. The participants were asked if they had access to a classroom. If a classroom was available for the teachers to use, they might be more likely to provide in-depth instructions about fitness testing and the health-related fitness components. Most of the middle school teachers (4 of the 5) had access to a classroom. Three teachers (T1, T2, and T5) described using a classroom to give instruction. Access to a classroom, however, did not guarantee that the teachers would use it to provide formal instruction. None of the high school teachers had access to a classroom, but two teachers (T7, T9) expressed a desire to have one so they could conduct more formal, in-depth discussions about fitness and health. T7 described instruction as being "nothing in-depth because we don't have a classroom." When asked if he had access to a classroom, T9 responded,

> No, not really because everything is occupied. We have the wrestling and weight rooms, but they aren't conducive to anything. If I had time and I found something I could use, I would love to. Kids are into watching something. Something I could show them. I would like to do it, but I don't have the money or the facilities to do it.

Access to a classroom did not ensure that teachers would use the classroom to provide instruction to the students, but most of the middle school teachers who had access to a classroom used it for instruction. High school teachers who did not have access to a classroom expressed the desire to have one.

The second emergent theme was about health-related fitness instruction. The teachers were asked to explain how they conducted health-related fitness instruction. Three middle school teachers (T1, T2, and T5) described giving specific health-related fitness instruction. All three of the teachers had access to a classroom and described explaining to the students why the health-related fitness components

are important and how they relate to the physical fitness tests. T5 said,

> I feel it's important for kids to understand why we do what we do. So they understand that cardiovascularly we're trying to get our heart rate up and into that target heart rate zone for a certain length of time. And they understand that we're working on muscular strength when we're working in the weight room and doing push-ups.

T2 described the importance of helping students make connections between the health-related fitness components and the tests. She explained to the students that "each test has a reason that it's important to your health and well-being for your lifetime, not just while you're in seventh grade taking the test for the State." Two teachers (T1, T3) said that the students were given a written test on health-related fitness components. T1 stated,

> I don't just tell them, they have to know why. They have a test on the components of fitness. What are they? What tests can we do for them? What can we do? And so they know, I hope, by testing, they know the reasons for them.

Another teacher (T3) described wanting to spend 1 day/week on instruction, but did not want to reduce their activity time. T3 said,

> There should be one day a week that should be a health day, but if you're taking away an activity period to have a sit down cognitive discussion about the health and how it connects, then you're not getting that activity time.

None of the high school teachers described giving specific health-related instruction that was presented in a planned, formal manner, but all of them reported incorporating instruction to some extent into their lessons. T8 said, "I try to explain those things to them, like why running is important. Why cardiovascular fitness is important. I try to explain those kinds of things. Why flexibility is important." The amount of instruction on health-related fitness instruction varied among the teachers. The middle school teachers were more likely to spend time on specific health-related instruc-

tion; however, all of the teachers made some effort to incorporate the instruction into their lessons.

The third emergent theme involved the students' knowledge of the Healthy Fitness Zones (HFZ). The teachers were asked to describe the instruction they provided to their students about the HFZ. The FitnessGram is a criterion-referenced test that places students in a "Healthy" or "Unhealthy" category. The participants were asked to describe student knowledge about the HFZ. One teacher (T9) did not tell the students the HFZ, because he did not know what they were; however, most of the teachers (90%) reported telling the students the HFZ and that their students knew what scores they needed to achieve the HFZ. T2 said, "I keep a chart, 'Look, you've improved.' I circle it if they are in the fitness zone. The kids know what the fitness zone is; at least I hope they know, we keep repeating it." T8 explained to the students, "This is the HFZ. This is where you need to be. This is what is healthy for you, to be in this zone." T6 stated that she tapes the HFZ chart on the gym wall by the testing stations for the students to see. Although most of the teachers thought it was important for the students to know the HFZ, they expressed frustration about the students only striving to achieve a passing score. The teachers described students stopping once they reached the HFZ even if they could do more. T4 explained,

> We always had listings of what the passing scores were, but we didn't like to broadcast that ahead of time because they'll always go to the test. They'll always go just to here instead of going to the next level.

T6 said, "Something that I've seen in administering the test is that they know once they get to a certain point and they pass they just stop instead of trying to do their best." It appeared that most of the students knew the HFZ for the tests; however, a problem with the students knowing the passing score was that it kept them from trying to exceed it.

The second research question, "Prior to physical fitness testing, to what extent do PE teachers develop their students' cognitive understanding about the health-related fitness components?" addressed instructions provided to the students before test administration. Two themes emerged from this question. The first theme

identified how the students practiced the test protocols. The teachers were asked to describe how they prepared the students for the test. Because the tests in the FitnessGram include specific test protocols, the teachers were asked to describe how the students practiced the protocols to prepare for the test. All of the teachers described including at least some practice of test protocols. A majority of the teachers (60%) provided "some" practice for the tests, whereas the rest of the teachers reported "extensive" practice of test protocols. The middle school teachers were more likely to have their students practice extensively. T1 stated, "We practice the form all the time. They're always doing the form so they're used to it. So when we go to testing, they're used to doing the test." T2 said, "We go over the protocols [before the pretest] and as we are going through the year."

The second theme described instructions the students received about the test purposes. The participants were asked to describe what instructions they gave their students about the purpose of the test. The teachers gave various responses about what they told their students about the purposes of the test. Three of the teachers (T1, T2, and T6) specifically addressed the health-related fitness components when discussing the purposes of the test. Most of the teachers identified the importance of health and physical fitness. T1 discussed core strength and said, "If you have it, you can prevent injuries." T8 explained to the students that "they're trying to figure out how healthy or unhealthy you are." Two of the teachers (T4 and T8) discussed the increase in obesity rates. T4 explained, "We talk about the prevalence of childhood obesity and why we are trying to improve your fitness level." T8 described how she explained to the students that the State is "trying to figure out how healthy or unhealthy as a whole the kids in California are. That's important because, as you know, obesity is on the rise and we're trying to get rid of that." T2 was the only teacher who specifically identified the importance of lifetime fitness when she described telling the students that "each test has a reason that it's important to your health and well-being for your lifetime."

When the teachers were asked to describe instructions to the students about the purposes of the test, none of the responses included explanations about motivating the students to be physically active, the intended purpose of the test. The teachers were asked the follow-

ing question: "Do you think physical fitness testing helps motivate the students to be physically active?" The participants clearly did not think that physical fitness testing motivated the students to be physically active. A few of the teachers responded that it might be motivating for some of the students, but the majority did not think so. The teachers identified activities they thought were more motivating to the students, for example, the Governor's Fitness Challenge and the Family Fitness Challenge. A high school teacher (T8) found certain activities taught during PE class motivated more physical activity outside of school than the fitness tests. T8 explained,

> I don't think it helps. Looking at the kids that [*sic*] I have, I don't think that it motivates them to do anything outside of school. It motivates some of them to do well outside of the test because of their competitive nature. I've found that when I introduce tennis, a lot of kids that [*sic*] are very negative about tennis and think it's dumb, but then they get playing and understand the game. I've actually had numerous kids who were like, "I'm going to join the tennis team." You don't get those things from the FitnessGram. You don't get, "I did 20 push-ups because I did really bad [*sic*] my freshman year on the FitnessGram." I think that with some of the things they understand the importance if I explain the importance to them. Then they might think they should do some of them on their own. But that's a select group of kids.

Responses about the purposes of the test varied, but most of the teachers included a discussion about physical fitness and health. A few of the teachers included a discussion of the health-related fitness components in their responses. None of the teachers, however, described instruction about promoting lifetime physical activity, which is the intended purpose of the FitnessGram test battery.

The third research question, "After physical fitness testing, to what extent do PE teachers interpret test results to their students?" examined how the teachers explained the test results to the students. Two themes emerged from this question. The first theme identified who received the test results (i.e., students, parents) after test administration. The participants were asked to describe if the students and parents received the test results. Only half of the teachers

reported giving the test results to the students. The middle school teachers were more likely than the high school teachers to give the students the test results. The responses indicated that the students received the results either verbally or by seeing them on their fitness charts. Two middle school teachers described displaying the scores on a graph for the students to see, to help increase understanding of the test results. T1 said, "You write it in a chart and it doesn't mean much, but you put it in a graph, and they really start to understand what is going on." T3 also explained that he mostly gave the students the scores verbally but that he also tried "to put them on an Excel program and onto a graph so they can visually see if they're going up, or down, and see how they compare to everyone else." The responses were more varied for whether the parents received the test scores. Half of the teachers were unsure whether the parents received the results. T10 stated, "I think the district just sends them home to the parents, but you would have to ask our department chair about that." When asked if the parents received the test results, T7 replied,

> I don't know. I don't think so because a couple of people that I had in class last year said that they passed but then found out that they failed when they got to school the next year because they were signed up for another PE class. They said, "I didn't sign up for a PE class."

T2 said that forms had been purchased but never used. She explained, "Years ago when the FitnessGram was started, the superintendent bought us all the forms that we needed if we used the FitnessGram to just print out and send home to parents. We never took advantage of it."

For the parents who received the results, the results were most often sent home through the district. T1 stated, "Formally the district right now, they send something home that tells the parents what the fitness scores are." The teachers' responses varied on who received the test results. If students received the tests results, the results were given to the students verbally. If the parents received the test scores, the scores were sent by the district, although many teachers did not know if the parents received the test results.

The second theme addressed how the test results were explained to the students. The teachers were asked to describe how the test

results were explained to the students. The teachers reported giving "somewhat of an explanation" of the test results to the students or "no explanation" of test results to the students. A complete explanation of test results would involve specific individual instruction. None of the teachers described giving a complete explanation of test results to the students. Half of the teachers reported that they gave no explanation of test results to the students, with the other half responding that they gave somewhat of an explanation about the test results to the students. T2 responded, "It's not on an individual basis as it is part of the general class time." T7 described talking to the students while measuring their height and weight. He explained,

> One comes up at a time. I weigh them, get their height, and then I talk to them personally. I say, "You know what? You want to know where you're at right now?" If it's someone with a real medical issue, I'll talk to them. I never get on the heavy people. I encourage them to walk. There's no way they're going to run. I try to get them to walk at a pace that is comfortable and try to challenge them to lose weight each week or each month. They take it pretty good [*sic*]. But that's one test I do personally, the BMI.

T8 said that she does not like to discuss weight with the students. She stated, "The one I stay away from is the height and weight. It's hard because you want to say something, but how do you say that to a 13- or 14-year-old kid?" An explanation of test results would help give the test meaning; however, none of the teachers provided an in-depth explanation of the test results to the students. Several of the teachers provided no explanation of test results to the students. A majority (60%) of the teachers offered somewhat of an explanation of the tests results to the students.

Additional Findings

Additional themes emerged as the teachers responded to the interview questions relating to teacher training for test administration and incorrect test administration practices. While talking about test administration practices, the teachers described a varying amount of training, but overall it became apparent that teacher training was lacking. The teachers received little or no training from

the schools to administer the physical fitness tests. The teachers who were trained obtained voluntary training through conferences and workshops. All of the teachers reported receiving written materials (e.g., book, pamphlet) describing the test protocols. It also became evident that the teachers made several test administration errors. While describing test administration practices, some of the teachers explained how the students performed certain tests. Discussions regarding test performances were not planned, but occurred at different times during some of the interviews. In discussions of test practices, several of the teachers described administering tests incorrectly. The FitnessGram is a standardized test and includes specific test protocols for each of the tests.

Discussion

With the purpose of physical fitness testing being to promote students to be physically active, this study investigated how teacher practices of physical fitness testing might help accomplish this goal. The aim of this study was to examine PE teachers' physical fitness test administration practices and how the tests helped their students develop a cognitive understanding of the health-related physical fitness components relative to physical fitness testing.

The first research question asked the teachers to describe how they helped their students to develop a cognitive understanding of the health-related fitness components. Only the teachers who had a classroom available conducted planned, in-depth instruction about health-related fitness. Even though all of the teachers made some effort to incorporate health-related instruction, it appeared that access to a classroom increased the likelihood that the teachers would provide planned, specific health-related instruction to the students. To be a valuable assessment, physical fitness tests must be accompanied by health-related fitness instruction. Physical fitness tests have little meaning when administered simply to obtain a score and when the teachers fail to educate the students about health-related fitness and the importance of a physically active lifestyle (Keating & Silverman, 2004; Lloyd et al., 2010). Studies are limited on the relationship between health-related fitness instruction and physical activity; however, three studies (Dale & Corbin, 2000; Dale et al., 1998; Pearman et al., 1997) have examined this relationship.

According to these studies, when health-related fitness instruction is provided, a physically active lifestyle is more likely to be adopted. If the purpose of physical fitness testing is to be accomplished, it is imperative that teachers provide health-related instruction to their students and how it relates to physical fitness testing. When health-related fitness instruction is provided, the students are more likely to understand the benefits of physical fitness and adopt the behavior (Dale & Corbin, 2000; Dale et al., 1998; Pearman et al., 1997).

The second research question examined the instructions the students received before test administration. The teachers were asked to describe how the students were prepared for the tests. Physical fitness tests include specific test protocols that are important for students to practice prior to test administration (The Cooper Institute, 2013; Harris & Cale, 2006). All of the participants reported having their students practice the specific test protocols prior to the test. This is consistent with the Harris and Cale (2006) study that found most of the teachers studied reported helping the students to prepare for the tests. When the teachers were asked to describe the instruction they gave their students about the test purposes, their responses varied, with most of them including a discussion about the importance of health and physical fitness. When the participants were specifically asked if they thought the test motivated the students to be physically active, a few of the teachers responded that they thought it might be motivating for some of the students, but the teachers did not think the tests were motivating for most, if any, of the students. Whitehead and Corbin (1991) examined the relationship between external feedback statements during testing and intrinsic motivation to be physically active. The study indicated that students were more intrinsically motivated to be physically active when they received positive feedback statements during physical fitness testing. If the purpose of the tests is to motivate students to be physically active, it is important for teachers to consider how the tests are administered. When teachers have a good attitude about the tests and present them in a positive way, students are more likely to adopt a physically active lifestyle. Even though the purpose of the FitnessGram is to encourage students to be physically active, the teachers clearly did not think that it accomplished that goal. If

teachers receive more training about physical fitness test administration, they will better understand the purposes of the tests. With a better understanding of the tests, teachers will be more equipped to educate students, which increases the likelihood of students adopting a physically active lifestyle.

The third research question asked the teachers to describe how the test results were interpreted to the students. If the students have the opportunity to learn from the tests and how they are related to physical fitness, an investigation of how the test results are given to the students is important. This study was conducted in California, where the teachers are mandated by the State to give the test results to the students after completing the fitness tests (California Education Code, 1998). Only half of the teachers reported giving the test results to the students. If the teachers are not giving the test results to the students, an explanation of the test results is absent as well. When the students do not know the test results, it is impossible for them to understand how the tests relate to their own fitness. Providing the test results to the students and explaining what these results mean can help improve the students' cognitive understanding of health-related fitness and how it relates to the tests (Harris & Cale, 2006). Unfortunately, the teachers did not give the students specific instruction about their test results. For students to understand the health-related fitness components and how they relate to their personal fitness, the results need to be explained more completely. Only then will the goal of physical fitness testing, to promote a physically active lifestyle, be accomplished (Harris & Cale, 2006).

An additional finding of the study was that teachers received little training for administering the physical fitness tests. If teachers are expected to conduct a standardized test, they should be trained so the tests may be administered in a standardized way. The teachers who had received the most training for physical fitness test administration sought out training on their own through conferences and workshops. A few of the teachers received training when the test was first mandated in 1998 but have not received training since that time. All of the teachers reported receiving written information about test protocols and procedures, but it was apparent that most of the teachers did not read the materials carefully. The lack of teacher training and knowledge of proper testing protocols was evident during the

interviews, with half of the teachers describing administering tests incorrectly. Examining test administration errors was not a purpose of the study; however, during the interviews, the teachers' comments revealed test administration errors, and it is possible that more errors existed but were not mentioned. The FitnessGram is a standardized test that requires standardized administration; therefore, it is imperative that teachers receive training on how to administer the tests correctly so the incidence of test administration errors can be reduced and the reliability and validity of the tests can be increased (The Cooper Institute, 2013).

Conclusion

The purpose of this study was to investigate PE teachers' practices of administering physical fitness tests. Specifically, this study examined how teachers helped their students to develop a cognitive understanding of health-related physical fitness components before and after test administration. Physical fitness testing is commonly used in the schools with the purpose of motivating students to be physically active. If this goal is to be accomplished, it is important that teachers provide health-related fitness instruction in conjunction with physical fitness testing to increase students' understanding. Unfortunately, most of the PE teachers in this study provided little or no instruction on health-related fitness. In fact, half of the teachers failed to give the test results to the students. Perhaps, if the teachers were provided with more training in physical fitness test administration and how to incorporate health-related fitness instruction into the curriculum, they could provide more effective test administration, instruction about health-related fitness, and interpretation of test results to the students. When effective test administration, instruction of health-related fitness, and interpretation of test results to the students occur, physical fitness testing may be a valuable assessment that leads students to be more likely to adopt a physically active lifestyle.

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FITNESS

Relationship of Enjoyment, Perceived Competence, and Cardiorespiratory Fitness to Physical Activity Levels of Elementary School Children

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Abstract

Because of the continued increase in obesity rates and decrease in children's physical activity and fitness levels, this study investigated the relationship between habitual physical activity and perceived competence, enjoyment of physical activity, and cardiorespiratory fitness among upper elementary school children. This study used the FitnessGram PACER test to measure children's cardiorespiratory fitness, the Children's Physical Activity Correlates (CPAC) to measure perceived competence and enjoyment of physical activity, and the Physical Activity Questionnaire–Children (PAQ-C) to measure habitual physical activity. Results of a forced-entry multiple regression demonstrated that each predictor variable significantly predicted physical activity. The results of bivariate correlations also exhibited significant results. Enjoyment, perceived competence, and cardiorespiratory fitness were positively correlated with physical activity. These results support previous research and have many implications on

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elementary students. This study demonstrates that enjoyment is a significant variable in getting children to engage and persist in physical activity, providing support for the youth physical activity promotion model. These results provide support that school physical education programs need to be restructured to promote enjoyment and physical activity more effectively, ultimately to improve overall physical fitness in today's youth.

The health status of children in the United States is facing a dilemma with the increasing rate of obesity. One of the goals of Healthy People 2010 (U.S. Department of Health and Human Services, 2000) was to decrease childhood obesity, yet childhood obesity continues to steadily increase, now affecting 1 in 5 youth aged 6 to 19 (Centers for Disease Control and Prevention [CDC], 2017). The CDC (2017) reported that the number of children who are overweight (i.e., BMI > 95th percentile for age and gender) has more than tripled since the 1970s. A 2014 CDC report said that obesity affected 17% of children aged 2 to 19 (CDC, 2016). These findings from the CDC may predict another generation of overweight adults who may be at risk for weight-related health conditions.

Physical activity (PA) may be a solution for combating obesity, yet research exhibits a rapid decline in PA during adolescence (Kemper, Post, Twisk, & Van Mechelen, 1999). Multimedia-based inactive behaviors, such as watching television and playing video games, are increasingly replacing children's active behaviors (Tremblay, Barnes, & Copeland, 2005). Research demonstrates further inverse relationships between PA and obesity (Dencker et al., 2006; Johnson et al., 2000) and suggests that overall youth fitness levels have decreased (Stratton et al., 2007). In attempting to reverse this trend, researchers recommend that youth engage in at least 30 to 60 min of daily PA (Strong et al., 2005), which has been associated with increased aerobic fitness, lower blood pressure, higher levels of self-esteem, and lower levels of anxiety and stress (Dietz, 1998).

Explaining Factors Influencing Youth Physical Activity

To foster these aforementioned benefits, one must gain more understanding of the factors that influence PA. Sallis, Prochaska,

and Taylor (2000) reviewed such factors in children and adolescents and uncovered a multitude of determinants of PA levels (e.g., gender, previous PA, parental influence). Further and more recent research supported Sallis et al.'s findings of factors relating to PA in children and adolescents (Van Der Horst, Paw, Twisk, & Van Mechelen, 2007). Attempting to uphold and explain research demonstrating the association between many factors and youth PA, scholars have begun to propose various empirically supported theoretical models, including the expectancy-value model, self-efficacy theory, and youth PA promotion model.

Expectancy-Value Model

The expectancy-value model proposes that individuals' beliefs regarding their success in and value of the activity explain their activity choices, persistence, and performance (Atkinson, 1957; Spence, 1983; Wigfield, 1994; Wigfield & Eccles, 1992). These expectancies and values are presumed to be influenced by task-specific beliefs (e.g., ability beliefs, perceived difficulty of tasks; Wigfield & Eccles, 2000), which are influenced by individuals' perceptions of their previous experiences and social influences (Spence, 1983; Wigfield & Eccles, 1992). This model also uses achievement value components (e.g., attainment value/importance, intrinsic value, cost; Spence, 1983; Wigfield & Eccles, 1992) to explain PA behavior in youth. Ultimately, individuals' ability and expectancy beliefs are the foundation of the expectancy-value model and help explain motivation in youth (Wigfield & Eccles, 2000).

Self-Efficacy Theory

Self-efficacy theory focuses on different aspects of self-knowledge and individuals' conceptions of their personal effectiveness that predict their thought patterns, behaviors, and motivation (Bandura, 1977, 1986). Self-efficacy theory also proposes that judgments are based on what individuals can do with the skills they possess (Chase, 2001), which produces their efficacy levels, which predict effort and persistence (Chase, 2001). Research emphasizes the importance of educators and coaches encouraging children to attribute their failures to lack of effort or preparation (Schunk, 1994) and view ability as a malleable trait as opposed to innate (Bandura, 1990). Evidence has suggested a positive relationship between self-efficacy and moti-

vation (Chase, 2001) when motivation is defined as malleable. Thus, if youth are taught that level of PA is a developed characteristic, they may develop more intrinsic motivation, which may result in many beneficial outcomes.

Youth Physical Activity Promotion Model

The youth PA promotion model describes the conceptualization of how children's unique developmental, psychological, and behavioral characteristics promote PA (Welk, 1999). This model was developed specifically to cater to children. It provides a conceptual framework from a social-cognitive perspective for understanding the factors that may predispose (i.e., enjoyment, competence; Welk, Schaben, & Shelley, 2004), enable (i.e., motor skills, physical fitness; Gallahue & Ozmun, 1998), and reinforce (i.e., support; Welk et al., 2004) a child to be physically active (Bandura, 1986). This model also suggests interactions among these variables and supports multiple dimensions of influence (i.e., intrapersonal, sociocultural, environmental; Welk, 1999) that can directly and indirectly affect behavior. Moreover, research demonstrates that the PA promotion model is advantageous and practical, identifying the importance of outside support on children's levels of PA and providing ways to integrate such influences from different avenues (Welk, 1999).

Physical Fitness and Physical Activity

Physical fitness is closely related to PA such that physical fitness is largely determined by recent PA patterns (Blair, Cheng, & Holder, 2001). For example, individuals who increase their level of PA also likely experience improvements in physical fitness, which demonstrates a reciprocal relationship. Cardiorespiratory fitness, also known as aerobic fitness, is arguably the most important component of physical fitness. This element is widely used in the management of obesity (Epstein & Goldfield, 1999) and is the focus of the most frequent type of assessment conducted in early school physical education (Gao, 2008). Strong evidence indicates that higher levels of cardiorespiratory fitness in childhood and adolescence are associated with healthier cardiovascular profiles later in life (Ruiz, 2009). Experts recognize this association and recommend that intervention programs such as school physical education programs and

after-school PA programs emphasize health-related fitness (e.g., cardiorespiratory fitness; Payne & Isaacs, 2007; Wanless et al., 2014). Strong et al. (2005) found that increasing the level of habitual moderate to vigorous PA (MVPA) for youth to at least 60 min/day promotes overall health and disease prevention. Recent research supports this recommendation and has detected positive relationships between health-related physical fitness, self-reported PA, and various psychosocial factors (e.g., attitudes, perceived behavioral control; Gao, 2008; Shen, McCaughtry, & Martin, 2007).

Purpose of the Study

Students' motivation beliefs are key antecedents to PA participation and cardiorespiratory fitness performance (Parish & Treasure, 2003; Planinsec & Fosnaric, 2005; Shen et al., 2007). Because of the growing concern about obesity rates among children in the United States and decreasing children's PA and fitness levels, this study investigated the relationship between habitual PA and perceived competence, enjoyment of PA, and cardiorespiratory fitness in upper elementary school children.

Method

Participants

Participants for this study included students in the fifth grade from an elementary school located in a rural community in the Midwestern United States. The school was purposefully selected because of its semiannual fitness testing (spring and fall) during physical education class and its accessibility to the investigators. The institutional review board at the University of Northern Iowa approved the study. Prior to data collection, a parent or guardian gave written permission, and student participants completed a minor assent form.

Instruments

The student participants performed the FitnessGram PACER (Progressive Aerobic Cardiovascular Endurance Run), a test developed by the Cooper Institute (2005) to measure children's cardiorespiratory fitness. The test consists of a 20-m multistage shuttle

run during which students must run at increasingly higher levels of intensity. Students listened to a standardized CD with instructions and pacing cadences while performing the test on a measured course in the school gymnasium. The total number of 20-m segments that students satisfactorily completed in accordance with the prescribed pace (cadence) during the test represented students' scores (Cooper Institute, 2005). The PACER test has been reported as reliable and valid in measuring cardiorespiratory fitness in children (McClain, Welk, Ihmels, & Schaben, 2006; Morrow, Jackson, Disch, & Mood, 2000) and has shown acceptable concurrent validity and criterion-referenced validity when compared with measured VO_2 max (Morrow et al., 2000). Additionally, equivalent reliability scores indicate that the PACER test correctly measures cardiorespiratory fitness in most individuals (Gao, 2008; Plowman & Yan-Shu, 1999).

Selected scales from the Children's Physical Activity Correlates (CPAC) questionnaire measured perceived competence and enjoyment of PA (Schaben, Welk, Joens-Matre, & Hensley, 2006). The CPAC questionnaire was originally developed to assess the predisposing and reinforcing factors described in the youth PA promotion model, although only predisposing factors were of interest in this study. The predisposing factors focused on key social cognitive theory constructs underlying the youth PA promotion model, namely, outcome expectations and efficacy expectations (Schaben et al., 2006). The psychological scales on the CPAC questionnaire were derived from the Children's Attraction to Physical Activity (CAPA) scale developed by Brustad in 1993. This scale was initially created to assess the extent of children's interest in PA and was based on the concept that children's motivation to participate in PA depends on their affective reactions to various dimensions of involvement. These dimensions of involvement include children's liking of exercise (Likeexer), liking of games and sports (Likegame), and fun of physical exertion (Funexert), which together represent children's attraction (or enjoyment) to PA (Brustad, 1993, 1996). Perceived competence (Percomp) was measured using a six-item scale from the CPAC questionnaire that was derived from Harter's original Perceived Athletic Competence Scale (Schaben et al., 2006). The items on each scale were worded with a structured alternative format and scored on a 4-point scale with higher scores representing

more positive responses. After the various subscales were combined, the resultant questionnaire used in this study consisted of 14 questions that measured the constructs of (1) enjoyment (attraction) of PA, which consisted of liking of games and sports (Likegame), liking of exercise (Likeexer), fun of physical exertion (Funexert), and (2) perceived competence (Percomp). Welk, Wood, and Morss (2003) reported alpha reliabilities of $r = .82$ for the composite attraction scale and $r = .71$ for the perceived competence scale.

Habitual PA was measured using the Physical Activity Questionnaire–Children (PAQ-C), a validated self-report instrument designed to assess PA behaviors during the previous 7 days (Kowalski, Crocker, & Faulkner, 1997; Moore et al., 2007). The instrument was designed to measure levels of moderate to vigorous PA (MVPA) in children aged 9 to 15 years (Kowalski et al., 1997). The questionnaire was developed as a way of helping researchers overcome the limitations of using adult-version self-report measures when studying children (Paxton, Estabrooks, & Dzewaltowski, 2004), namely, that young children are not cognitively able to determine intensity and duration (Welk, Corbin, & Dale, 2000). The instrument used nine questions to assess a child's PA participation in a variety of situations and times, including during school, at recess, after school, in the evening, and on the weekend (Kowalski et al., 1997). Each question was scored on a 5-point Likert-type scale, with higher scores reflecting a greater level of PA. A composite PA score (PA Index) was then computed as the mean of the nine items and could range from 1 to 5. The first question on the instrument listed activities for which respondents indicated how frequently they participated in that activity during the previous 7 weeks. The score for the first question was then calculated as the average score across all items (activities). For Questions 2 to 9, participants responded to questions involving their activity during school, after school, during lunch, at recess, and on the weekend. Responses to these items included indicators of type of activity (e.g., sitting, standing, walking, riding a bike, running, and playing hard) and frequency of participation during the specified times.

The PAQ-C has been shown to have acceptable levels of construct validity and to be moderately related to objectively measured PA, as well as other self-report measures ($r = .39$ to $r = .63$; Kowalski et al.,

1997). In a follow-up study, test–retest reliability was reported to be acceptable for males (r = .75) and females (r = .82; Crocker, Bailey, Faulkner, Kowalski, & McGrath, 1997). Janz, Lutuchy, and Wenthe (2008) found standardized Cronbach's alphas ranging from 0.72 to 0.82 for the PAQ-C, which suggests good internal consistency.

Procedures

Students were administered the FitnessGram PACER test during a regularly scheduled physical education class. At a subsequent physical education class 1 week later, both paper-and-pencil questionnaires were administered at the beginning of the class. Students were spread throughout the gymnasium, provided the various surveys to complete individually, and given as much time as needed to answer the questions. To accommodate all students' reading ability, the investigator read each question aloud. Completed questionnaires were collected, checked for accuracy, and then matched with PACER test results prior to data entry and subsequent statistical analyses using SPSS (version 21.0). Independent-samples t tests were conducted on all variables and examined the role of gender on test results. Correlational techniques determined associations among the variables of interest. An alpha level of .05 was set for all statistical tests.

Results

Participants in the study included 42 Caucasian students (25 boys, 17 girls) aged 10 to 11 years in the fifth grade at the selected school. Participants' height ranged from 53 to 63 in., with an average of 58 in. Their weight ranged from 61 to 156 lb, with a mean of 98 lb. Body mass index (BMI) varied from 15.1 to 29.9, with an average of 20.4. The variables measured in the study included PA (PA Index), cardiorespiratory fitness (PACER score), perceived competence (Percomp), and measures of enjoyment (Likeexer, Likegame, and Funexert). Table 1 shows the results of the independent-samples t tests, which determined any differences between males and females for the variables of interest.

Table 1
Descriptive Statistics for Measured Variables

Variable by gender	*n*	*M*	*SD*	*t*	*p*
PACER				0.05	0.96
M	25	37.28	19.13		
F	16	37.06	10.33		
PA Index				0.60	0.55
M	25	3.08	0.80		
F	17	2.96	0.42		
Likegame				0.11	0.92
M	24	3.42	0.81		
F	17	3.39	0.65		
Funexert				0.77	0.45
M	24	3.17	0.81		
F	17	2.98	0.73		
Likeexer				-0.09	0.93
M	24	3.15	1.04		
F	17	3.18	0.68		
Percomp				-1.24	0.22
M	24	2.85	0.91		
F	17	3.16	0.71		

All *p* values for differences in gender were greater than 0.22, which indicated no significant differences in the mean scores for males and females on the variables of interest. Therefore, the gender groups were combined for subsequent correlational analyses.

After finding that gender was not significant, the researchers calculated Pearson product-moment correlations between all variables of interest in the study. Table 2 shows the intercorrelations among all variables, revealing that all correlations were positive and moderately high. All variables were significantly related to self-reported PA (PA Index), and the variable with the highest simple correlation was the PACER test score ($r = .60$).

Table 2
Correlations Between Psychosocial Variables, Cardiorespiratory Fitness, and Physical Activity

Variable	PA Index	PACER	Likegame	Funexert	Likeexer	Percomp
PA Index						
PACER	0.60**					
Likegame	0.54**	0.42**				
Funexert	0.43**	0.36*	0.45**			
Likeexer	0.45**	0.56**	0.64**	0.57**		
Percomp	0.51**	0.53**	0.73**	0.39*	0.65**	

**Correlation significant at the 0.01 level (two-tailed). *Significant at 0.05 level (two-tailed).

A forced-entry multiple regression analysis predicted PA (PA Index) from the other variables in the study. The overall regression model using five predictor variables was significant: $F(5, 36) = 18.83$, $p < .05$ with $R = .72$ and $R^2 = .52$. Table 3 shows the model summary. The results of the analysis demonstrated that all significant standardized beta coefficients in the full model (i.e., Likegame, Funexert, PACER) were positively related to PA: each of these predictor variables made a significant contribution to the prediction of PA. The beta coefficients for the remaining variables, Likeexer and Percomp, exhibited a negative relationship with PA. These coefficients were not significant, yet still demonstrated an interesting and worth-noting trend. Residual analysis was also conducted with the results, showing that the residual values were normally distributed with no significant outliers.

Table 3
Multiple Regression Analysis Results: Coefficients and Collinearity Statistics

	Unstandardized coefficients		Standardized coefficients			Collinearity statistics	
Model	**B**	***SE***	**Beta**	***t***	**Sig.**	**Tolerance**	**VIF**
CONSTANT	0.79	0.42		1.87	0.07		
Likegame	0.41	0.18	**0.46**	2.34	0.03	0.37	2.69
Funexert	0.27	0.13	**0.31**	2.03	0.05	0.62	1.60
Likeexer	-0.20	0.14	-0.27	-1.36	0.18	0.36	2.75
Percomp	-0.03	0.16	-0.04	-0.19	0.85	0.36	2.76
PACER Score	0.02	0.01	**0.44**	2.97	0.01	0.63	1.58

Note. Dependent variable is physical activity (PA Index).

The variance inflation factor (VIF) shown in Table 3 was calculated and addressed the concern of multicollinearity among the predictor variables, as demonstrated by the significant correlations reported in Table 2. Although there are no specific guidelines about what value of VIF should be a cause for concern, Myers (1990) suggests that a value of 10 or greater may be this mark of concern. Furthermore, Montgomery, Peck, and Vining (2001) later suggest that if any of the VIFs exceed 5 or 10, the regression coefficients appear to be poorly estimated because of multicollinearity. Thus, because the highest VIF was 2.76, it is likely that multicollinearity is not a major problem in this study and that the significant variables (i.e., Likegame, Funexert, and PACER) are good predictors of PA. Overall, the model accounted for approximately 52% of the variance associated with PA. Using the standardized beta coefficients as the basis for determining the relative importance of the predictor variables, the researchers identified Likegame as the most important predictor variable in the model, followed closely by PACER score and then Funexert.

Discussion

This study investigated the relationships between PA of elementary school children and their enjoyment, perceived competence, and cardiorespiratory fitness. These relationships were examined within the framework of Welk's (1999) youth PA promotion model, which sought to explain youth PA behavior through a social-ecological model. The model categorizes the numerous correlates that influence children's PA into predisposing, enabling, and reinforcing factors. Considering predisposing factors represent the overall tendency of a child to be active, the model identifies two fundamental questions that aim to explain youth PA behavior: "Is it worth it?" and "Am I able?" These factors were of interest in this study and were operationalized in the model as enjoyment and perception of competence.

The results of this study indicated no differences between boys and girls in terms of PA level, cardiorespiratory fitness, and measures of enjoyment and perceived competence. These findings are contrary to those in previous studies that report boys engage in more PA than girls (Beighle, Morgan, Masurier, & Pangrazi, 2006; Riddoch et al., 2004; Sallis et al., 2000), boys exhibit higher levels of cardiorespiratory fitness than girls (Laudsepp, Libik, & Hannus, 2002), boys find more enjoyment in PA than girls do (Brustad, 1993, 1996; Laudsepp et al., 2002), and boys' perception of their physical competence is greater than girls' (Brustad, 1993, 1996; Eccles & Harold, 1991). Although there is not a specific explanation for this lack of significance, gender-related differences may not be fully manifested within the age range of this study sample, or the unique setting from which the sample was obtained may not be subject to the differences found in previous literature. In this sample, students were enrolled in a daily physical education program that emphasizes cardiorespiratory endurance and implements heart rate monitors to promote awareness of cardiorespiratory fitness levels. Moreover, the application of these monitors in the sample's physical education program may promote higher levels of PA for all students, and these higher levels of PA may dilute the differences suggested in previous literature. It also is worth noting that the participants in this study reported a substantially higher mean on the PA scale (M = 3.08 out of 5) than participants in a study of similarly aged children from a similarly rural demographic (M = 1.83 out of 5; Paxton et al., 2004),

which further demonstrates the unique results of this sample and potentially explains the lack of empirical support.

Brustad (1993) specifically examined the interaction between attraction and perceived competence in elementary school students. The findings of this study support Brustad's findings that children's perceived physical competence is an important influence on their attraction to PA. The findings of this study also indicate that when considered separately, each variable also positively correlates with PA.

Research with children and adolescents has found that physical self-perceptions are significant correlates of PA and fitness (Laudsepp et al., 2002). According to Welk (1999), youth who are physically fit and skilled are more likely to seek out opportunities to be active and will most likely persist in their chosen activities. Thus, it is a sensible prediction that students from this study likely have higher physical self-perceptions because of their generally higher PA and cardiorespiratory fitness levels.

When looking at the results of this study through a multivariate lens (i.e., the results of the regression analysis), one may find that liking games and fun of exercise (i.e., components of enjoyment as an outcome expectation) and cardiorespiratory fitness become important predictors of PA behavior. These results demonstrate the importance of enjoyment in the PA and perceived competence relationship in that once enjoyment is controlled for, that relationship is significantly reduced, which is consistent with results reported by Paxton et al. (2004).

PA courses have been recognized as an optimal vehicle for influencing PA habits in youth (Welk, 1999); they provide an organized structure and present opportunities for most school-age children to participate in meaningful PA experiences that improve their overall health and allow them to develop healthy exercise practices. With the rise of obesity and the decline of PA, the current model of physical education in most schools seems to be lacking in properly equipping students with the knowledge and skills needed to lead a healthy, active lifestyle. Implementing an effective physical education program is an important step in providing students with the understanding and experience to possess these lifelong skills. Designing an appropriate curriculum, choosing activities and games that

students enjoy, and delivering the curriculum in a manner that fosters enjoyment and competence for PA participation are important implications derived from this study. Ultimately, children must first enjoy the activity before they can feel competent and subsequently persist in participating in it.

Limitations

Limited research has been conducted on the effects of the ability of school-based programs to increase PA levels of elementary-age participants. This study shares similarities with other studies on the topic (Wanless et al., 2014). First, the small sample size, from a single school in a rural Midwestern setting, limits variability and results in low statistical power. Second, because of foreseen (e.g., socioeconomic status and access to resources) and unforeseen variable differences among the populations, the geographical restrictions of the sample may also limit aspects of the generalizability. Finally, recruitment of elementary-age participants is often difficult given the need to obtain parental/guardian consent and the extra steps required to do so.

The use of self-report measures represents an additional limitation based on the innate idea that self-reports may not accurately represent the participants' disposition. The validity of various scales, particularly those measuring enjoyment, serves as a limitation of this study. In this study, enjoyment was not measured directly as a variable in its entirety. Instead, each subscale was tested individually. This approach was consistent with Brustad's (1993) original conceptualization of the constructs, but previous literature has developed and used a multidimensional construct identified as attraction to PA, which was not implemented in this study (Schaben et al., 2006; Welk et al., 2003).

Conclusions

The findings in this study add support for the validity of the youth PA promotion model. Positive attitudes toward the outcome of participation in PA (operationalized as enjoyment in this study) and positive self-perceptions of ability to engage in PA are key factors for determining children's PA behaviors. Moreover, it appears that enjoyment mediates the relationship between PA and perceived competence. Physical fitness, namely, cardiorespiratory

fitness, was also strongly linked to children's PA, which thus reinforces the notion that physical status is important to children's PA behavior. However, the numerous determinants of children's PA need to be more fully explained, and continued research is necessary. A better understanding of the factors influencing children's PA will facilitate the development of intervention programs designed to increase PA levels among children and reduce the rate of childhood obesity. Addressing the underlying behavioral and psychological mechanisms leading to the rising obesity trajectories is a vital step to solving the problem (Wanless et al., 2014).

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METHODOLOGY

Physical Education Gym Class Heroes, Try-Hards, and All-Stars: An Analysis of Facebook Comments

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Abstract

This study inductively analyzed posts made on an existing participant-initiated open Facebook group page called "Dude, Calm Down…It's Gym Class." Following data retrieval, the first 25 days' posts following the page's inception were examined. Open coding was used as a method of identifying the content and curricular activities discussed within the page's posts. The frequency of codes were determined with descriptive statistics, and post content was examined with the constant comparative method. Quantitative results showed that 1,882 of the 2,969 posts analyzed were coded as being made by males (63.3%), whereas 36.7% (n = 1,087) were coded as being made by females. Nearly half (49%) of the posts described participants' own or their peers' participation behaviors exhibited in physical education class. Of the 337 activity references, invasion games (n = 145, 43%) dodgeball (n = 72, 21.4%), and net/wall games (n = 69, 20.5%) were the most frequently mentioned. Qualitative analyses resulted in three major themes: student groups (Pro-Page—supported the page's ideology; Anti-Page—did not support the page's ideology; and Reasonables—could see the validity of both arguments), participation

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patterns (Overachievers, Underachievers), and Meanness (a general derogatory and negative nature of the posts). Results of this study support the need for further exploration of peer behavior as a potential influencer on student attitudes toward physical education.

Quality physical education (PE) is associated with several positive benefits including improved motor skills (Fotrousi, Bagherly, & Ghasemi, 2012; P. Morgan et al., 2013; van Beurden et al., 2003), increased physical activity levels (Dale, Corbin, & Dale, 2000; C. Morgan, Beighle, & Pangrazi, 2007; Pate et al., 2005; Sallis et al., 1997), and academic achievement (Ardoy et al., 2013; Trudeau & Shephard, 2008). The national 2015 Youth Risk Behavior Surveillance System survey, however, estimates that only 27.1% of students in Grades 9 to 12 engage in one hour or more of moderate- and/or vigorous-intensity physical activity each day, with females achieving this less often (17.7%) than their male counterparts (36.0%; Kann et al., 2016). Additionally, 70.6% of these students reported not attending daily PE classes when they were in school, and only 51.6% reported attending PE classes on one or more days in an average week (Kann et al., 2016). Thus, it appears that many students are not opting to take additional PE credits beyond those required by their schools.

Literature Review

Attitudes

When considering why students may not be enrolling in additional PE courses, the researchers examined student attitudes toward the subject. Among the various attitude models, Maio and Haddock (2015) cite the multicomponent model (Eagly & Chaiken, 1993) as the most influential. Eagly and Chaiken (1993) define attitude as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (p. 1). These entities are often referred to as attitude objects and may be abstract (e.g., perceived favoritism) or concrete (e.g., a PE uniform), as well as individual (e.g., my PE teacher) or collective (e.g., invasion games; Eagly & Chaiken, 2007).

Within the multicomponent model, attitudes consist of cognitive, affective, and behavioral components (Eagly & Chaiken, 1993). The cognitive component consists of beliefs, thoughts, and attributes associated with the attitude object (Eagly & Chaiken, 2007; Fishbein & Ajzen, 1975; Maio & Haddock, 2015). If PE is viewed as the attitude object, the cognitive component of that attitude may consist of students' beliefs about its purpose and thoughts about the curriculum and activities they experience. The affective component comprises feelings and emotions linked to the attitude object (Eagly & Chaiken, 2007; Maio & Haddock, 2015). This may include feelings and emotions that students experience when walking into the gymnasium or partnering with peers. The behavioral component includes overt actions toward the attitude object, intentions to act (Eagly & Chaiken, 2007), as well as past behaviors or experiences regarding an attitude object (Maio & Haddock, 2015). The behavioral component could be associated with current and past behaviors in gameplay, as well as students' intentions to participate in those types of games. Important to note, a person's past experiences establish a "tendency to respond with some degree of positivity or negativity to an attitude object" (Eagly & Chaiken, 2007, p. 585). Thus, students who have poor experiences in PE are more likely to have a negative attitude toward it in the future.

Attitudes may be "formed or expressed primarily or exclusively" through singular components and/or a combination of the three components (Eagly & Chaiken, 2007, p. 592). These components have a synergistic nature—they work together to support a particular attitude (Eagly & Chaiken, 1993), and their implications have been found to be positively correlated (Maio & Haddock, 2015). A student's negative beliefs about his or her PE class are, therefore, likely associated with unfavorable feelings about his or her class.

Secondary Student Attitudes in Physical Education

In a review of student attitudes in PE, Silverman and Subramaniam (1999) stated that "attitude influences whether we begin or continue with certain areas" (p. 97) and whether we develop through personal beliefs, and it may be inferred based upon a person's verbal and nonverbal behavioral responses. They concluded that an individual's attitude toward PE can be inferred by his or her belief statements about PE or expressions about PE. Additionally, they noted a decline

in attitudes toward PE as students become older. Although Silverman and Subramaniam recognized attitudes as malleable, they cited the importance of investigating the origins of a specific negative attitude so that appropriate measures may be taken to change it. Silverman and Subramaniam also emphasized the need for further study of student attitudes toward PE, as some evidence has suggested that students with unfavorable attitudes toward the subject may also have low physical activity participation outside of school hours.

Curriculum and physical education teacher. The PE curriculum and teacher have consistently been identified as influential factors in developing positive or negative attitudes toward and/or having positive experiences in secondary PE (Carlson, 1995; Couturier, Chepko, & Coughlin, 2005; Figley, 1985; Luke & Sinclair, 1991; Rice, 1988; Sleap & Wormald, 2001; Subramaniam & Silverman, 2000; Tannehill, Romar, O'Sullivan, England, & Rosenberg, 1994; Tjeerdsma, Rink, & Graham, 1996). A major factor influencing students' negative feelings toward PE curriculum stems from the repetitive nature of certain sports and activities year to year with little to no modifications (Carlson, 1995; Couturier et al., 2005). Positive experiences in PE have been found in programs that encourage success, inclusiveness, and opportunities for teamwork, as well as provide a variety of activities (Tannehill et al., 1994). Additionally, although gameplay has been shown to be preferred over skill and drill practice (Morey & Goc Karp, 1998; Tjeerdsma et al., 1996), student preference for individual and dual sports over traditional team sport choices has been shown (Biddle & Chatzisarantis, 1999; Strand & Scantling, 1994). Regarding the influence of physical educators on student attitudes, Luke and Sinclair (1991) found that the PE teacher was a more powerful determinant of negative attitudes than positive attitudes at the high school level. Personal interest in PE class and feelings of powerlessness were also found to affect students' perceptions of teacher injustices related to discipline, support, monotonous activities, and wasted time (Martel, Gagnon, & Tousignant, 2002).

Student skill level. Higher skilled students are generally associated with having more positive attitudes toward PE, whereas lower skilled students' experiences are generally negative (Silverman & Subramaniam, 1999). PE programs with a competitive focus may

make it difficult for low-skilled students to experience success. Self-reported average to below average skill level is common among students who feel alienated in PE classes, and competitive activities have been recognized as decreasing the will of students to participate in class (Carlson, 1995). Griffin (1984, 1985) found that low-skilled boys and girls were often criticized by higher skilled students in team sports and that they rarely contacted the ball. Low-skilled students in Portman's (1995) study also reported that they might be more successful in class if they were not criticized by their peers—particularly in competitive situations. Similarly, Martins, Marques, Sarmento, and da Costa's (2015) reviewed qualitative studies and found that adolescents' low perceptions of skill competence serve as a barrier to physical activity participation and that students are often concerned about performing poorly in front of their peers and/or being embarrassed.

Gender. Research on gender differences in attitudes toward PE has produced mixed results that may be partially due to measurement issues (Subramaniam & Silverman, 2007). Subramaniam and Silverman (2007) found that middle school boys and girls had moderately positive attitudes toward PE, with no significant differences between the genders. Alternatively, Säfvenbom, Haugen, and Bulie (2014) found that Norwegian middle school girls had less favorable attitudes toward PE than boys did. Qualitative research has shown that females tend to enjoy PE when it includes nontraditional activities, de-emphasized competition, and individual assessment (Gibbons & Gaul, 2004; Gibbons & Humbert, 2008; Humbert, 1995; Olafson, 2002). When asked about in-school and out-of-school physical activity participation, adolescent females identified an environment free of harassment where they could be with their friends, choice and variety of activity with a preference for individual activities, the need to experience fun and enjoyment, and opportunity to develop meaningful skills (Gibbons & Humbert, 2008). Even when choice and a variety of activities are offered, the context of these offerings can still be a deterrent for females (Flintoff & Scraton, 2001). High school females who do not participate in elective PE courses have also cited the physical educator as a factor for developing negative attitudes toward PE (Luke & Sinclair, 1991). Other researchers have cited that perceived favoritism for boys over girls and comparisons

between the genders in their classes make PE less enjoyable for girls (Gibbons & Humbert, 2008; Olafson, 2002).

Summary. Numerous researchers have examined student attitudes in PE. The PE curriculum and teacher are notable factors influencing student attitudes toward PE. Students tend to dislike repetitive curriculum, favor gameplay over practice tasks, and prefer alternatives to team sports. Lower skilled students tend to have less favorable attitudes toward PE than their skilled peers, and research has not conclusively determined if student attitudes significantly differ between the genders.

Study Background

While using Facebook, one of the investigators discovered her 14-year-old niece had "liked" a page titled "Dude, Calm Down… It's Gym Class." The premise of the page was to discuss the overly competitive and aggressive behaviors of students in PE classes. This open access group page had over 784,000 "likes" as of January 2010. After reading numerous posts on this Facebook page, the investigator recognized that it could be used as a means of examining students' comments about PE.

Facebook was founded in 2004 by Mark Zuckerberg as a means for Harvard students to network (Phillips, 2007). Facebook has become a major platform for people all over the world to share information. In 2007, the Pew Internet and American Life Project reported that 55% of online teens (12 to 17 years) had created profiles on a social networking site such as Facebook (Lenhart, Madden, Macgill, & Smith, 2007), and this number increased to 73% in 2010 (Lenhart, Purcell, Smith, & Zickuhr, 2010). Thus, over half of American teens were partaking in social networking sites when the majority of postings were made on this Facebook page. Because of the three quarter of a million "likes" the page received and the overall presence of teens on social networking sites, the researchers viewed the page as a viable data source.

Facebook pages and groups provide a unique research opportunity because individuals voluntarily post thoughts, feelings, beliefs, and activities (Williams & Merten, 2008). Thus, Facebook pages and groups have the potential to display all three components of attitude

(i.e., cognitive, affective, and behavioral). Greenfield and Yan (2006) noted,

> The Internet is more exciting and challenging as a research environment than earlier media because it is a complex virtual social and physical world that children and adolescents participate in and co-construct, rather than something that is merely watched (TV) or merely used (PC). It becomes a complex virtual universe behind a small screen on which developmental issues play out in old and new ways, offering new views into the thoughts, feelings, and behaviors of children and adolescents. (p. 393)

Williams and Merten (2008) cite the Internet as a potentially positive and safe outlet for self-expression. Others see it as a place where adolescents who feel they have lost their voice or are unheard by authority figures can express themselves (Kidwell, Dunham, Bacho, & Pastorino, 1995). This may be particularly important for examining secondary attitudes toward PE, as student alienation has been identified in PE classrooms (Carlson, 1995). Hence, the purpose of this study was to (a) inductively analyze unsolicited student postings about PE found on the open Facebook group page titled "Dude, Calm Down, It's Gym Class"; (b) use descriptive statistics to examine themes by gender and activity; and (c) compare resulting themes and patterns to previous studies regarding attitudes in PE.

Method

Data Retrieval

The university institutional review board granted a waiver for review because of the public sharing of information on Facebook and lack of contact between the researchers and participants. Following the approval of the waiver, data from the Facebook page "Dude, Calm Down. . .It's Gym Class" were retrieved and preserved for the first 25 days post–page inception. This included 2,969 posts by individuals. All posts on these pages were collected directly from Facebook without alteration. Traditionally, *posts* generally refers to a primary statement directly on the page and *comments* to statements

made under a particular post. For the purpose of this study, posts and comments are referred to collectively as posts.

Procedures

Following data preservation, the researchers took a series of steps to ensure systematic data analysis and reliability, as suggested by Hruschka et al. (2004). All four research team members read the posts individually and generated initial notes of emerging themes. A team discussion followed and notes were compared. After extensive dialogue, an initial list of 31 posting codes and definitions was generated. Two researchers proceeded to search the first 345 posts (just under 12% of the total posts) for negative cases that did not fit the existing coding structures. Following this negative case search, the two coders discussed and revised the operationalized definitions of the 31 posting codes. In addition, it was determined that gender (male or female—based on profile names and pictures) and curricular activities (e.g., basketball, volleyball, and dodgeball) would be coded for each post. Each activity was given its own code, and activities were added to the activity coding list as they were discovered.

Using the revised sets of codes (posting, gender, and activity), the two researchers each coded the initial 345 posts twice, 2 weeks apart, to determine intra- and interreliability. It is important to note that a single post could contain multiple posting codes. Following acceptable intra- and interreliability levels for all three coding sets, one of the coding investigators continued to code the remaining posts in the data set.

Intra- and interrater reliability were measured in each of the three sets of codes: posting, activity, and gender. A benchmark of 80% was determined to be the minimally acceptable level for intra- and interrater reliability prior to coding. Following the second round of coding of the first 345 posts by both researchers, data were input into SPSS statistical analysis software and analyzed. Intra- and interrater reliability were determined with Spearman's correlation coefficient, and data were described with descriptive statistics. For each coding set (posting, activity, and gender), intra- and interrater reliability percentage agreement ranged from 86.1% to 100%.

For analysis purposes, the 31 posting codes were condensed into five major categories. The first category included all codes pertaining to the purpose of PE ("Purpose of PE"). This included comments

about PE providing academic purpose, not being a "real" class, being a place to just have fun, and serving as a venue to showcase competition and exert dominance, and discussions of whether its importance was equal to other subject areas. The second category included all codes used when participants described reasons for participating or not participating in PE and when participants described the participation behaviors of themselves or peers ("Participation Behaviors of Self or Others"). Reasons for participation/nonparticipation included enjoyment, skill disparities, and negative peer behaviors. Participation behaviors included levels of engagement in class, levels of competitiveness, labels used to describe patterns of peer behavior, naming specific individuals who exemplified labels, or describing the type of individual who needs to "calm down" in class. Codes related to descriptions of behaviors and actions that are not congruent with the affective goals of PE were categorized as "Behaviors Not Congruent With Affective Goals of PE." These included posts containing negative stereotypes regarding gender, race, and sexuality and descriptions of bullying, harassment, acts of violence, and injuries witnessed or performed in class. Codes associated with physical educators were categorized as "PE Teachers" and included posts describing inappropriate and appropriate practices, naming specific teachers, and the marginalization of the profession. Finally, codes for all non-content-related posts were assigned to the "Non-Content Related" category and included chain letters, advertisements, and socializing unrelated to PE.

Activities were also grouped into larger categories based primarily on the Games Classification System (Almond, 1986). Invasion, Net/Wall, Striking/Fielding, and Target categories were used, with the addition of Dodgeball, Playground Games, and Other. It is important that dodgeball retained its own identity within the categories because of its prevalence (21.4%) within the total number of activities mentioned.

The posting categories and activity categories in regard to gender were described with frequency statistics. Beyond descriptive statistics, the investigators established qualitative themes that emerged from examining posting codes. The investigators used the constant comparative method of investigating themes within and across posts, as outlined by Lincoln and Guba (1985). A richer understanding of the dialogue on this Facebook page as it pertains to attitudes toward

PE was achieved through the analysis and discussion between and among the investigators.

Participants

Given the security settings and the option to include or exclude specific personal demographic information from public views of Facebook user profiles, it was difficult for the researchers to ascertain the exact age, gender, location, socioeconomic status, and race/ethnicity of the participants. Likewise, this information could not be verified due to researchers' nonparticipatory observation of the participants. Although participant profile pictures and post contents suggested a primarily adolescent population posting on the page, it could not be assumed nor validated that all individuals were in this age group. Gender was the only demographic variable examined and was coded by individuals' profile usernames and pictures for those who posted on the page. Of the 2,969 postings, the majority of posts were coded as being made by males (n = 1,882, 63.3%), whereas 36.7% (n = 1,087) were coded as being made by females. Similar to coding of age, coding of gender could not be validated because of the observational nature of the study.

Results

Descriptive Statistics

The 2,969 posts resulted in 3,363 posting codes. Participation Behaviors of Self or Others was the most cited posting category (n = 1,116, 33.2%), followed by Non-Content Related (n = 1,092, 32.5%) and Behaviors Not Congruent With Affective Goals of PE (n = 941, 28%). When Non-Content Related posts are removed from the posting codes analyzed, Participation Behaviors of Self or Others accounts for nearly half (49.1%) of the posting codes. Among males, the categories of Participation Behaviors of Self or Others (n = 766, 35.8%), Non-Content Related (n = 746, 34.9%), and Behaviors Not Congruent With Affective Goals of PE (n = 513, 24%) contained the most posting codes. The most prevalent categories associated with females were Behaviors Not Congruent With Affective Goals of PE (n = 428, 34.9%), Participation Behaviors of Self or Others (n = 350, 28.5%), and Non-Content Related (n = 346, 28.2%). See Table 1 for additional frequency statistics.

Table 1
Frequency of Posting Codes on Facebook Group Page "Dude, Calm Down…It's Gym Class"

	Overall		Male		Female	
Posting code	***N***	**%**	***n***	**%**	***n***	**%**
Purpose of PE	118	3.5	58	2.7	60	4.9
Comments About PE Teachers	96	2.9	54	2.5	42	3.4
Behaviors/Actions Not Congruent With Affective Goals of PE	941	28.0	513	24.0	428	34.9
Non-Content Related	1092	32.5	746	34.9	346	28.2
Participation Patterns of Self or Others	1116	33.2	766	35.8	350	28.5
Total	3363	100	2137	100	1226	100

Within the 2,969 posts, there were 337 activity references. See Table 2 for a complete list of activities mentioned, which are organized by their games classification category. The most frequently mentioned category was Invasion games (n = 145, 43%) such as basketball, soccer, and football. Dodgeball (n = 72, 21.4%) was the second most referenced, followed by Net/Wall games (n = 69, 20.5%) such as volleyball and badminton. The three activity categories most mentioned by males were Invasion games (n = 102, 44.5%), Dodgeball (n = 58, 25.3%) and Net/Wall games (n = 33, 14.4%). Similarly, females most frequently mentioned Invasion games (n = 43, 38.7%), Net/Wall games (n = 36, 32.4%), and Dodgeball (n = 14, 12.6%). See Table 3 for additional frequency statistics regarding activity categories.

The most frequently mentioned activities were dodgeball (21.4%), basketball (12.4%), and volleyball (12.4%). Although these activities were similar among the two genders, the order of prevalence differed. Males cited dodgeball (26.9%) the most, followed by basketball (11.7%) and volleyball (7.1%), whereas females cited volleyball (21.9%) the most, followed by basketball (13.6%) and dodgeball and soccer (both 11.2%). See Table 3 for all activities and their corresponding frequency statistics.

Table 2
Physical Education Activity Categories Cited on Facebook Group Page "Dude, Calm Down…It's Gym Class"

Classification	Games
Invasion	Basketball, Soccer, Hockey, Football, Ultimate Frisbee, Flag Football, Floor Hockey, Capture the Flag, Handball, Bongo Ball, Ultimate Football, Lacrosse, Speedball
Net/Wall	Volleyball, Badminton, Pickleball, Ping Pong, Tchoukball
Target	Javelin, Bowling, Golf, Frisbee Golf
Striking/Fielding	Kickball, Baseball, Softball, Wiffle Ball, Four Base
Other	Square Dancing, Swimming, Yoga, Rope Climbing, Fitness, Weights, Dance, Gymnastics, Wrestling
Playground Games and Misc.	Four Square, Tag
Dodgeball	Gator Ball, Agility Ball

Table 3
Frequency of Physical Education Activity Categories by Gender, Cited on Facebook Group Page "Dude, Calm Down…It's Gym Class"

	Overall		Male		Female	
Activity category	*N*	%	*n*	%	*n*	%
Target Game	6	1.8	3	1.3	6	5.4
Playground Game and Misc.	8	2.4	7	3.1	1	0.9
Striking/Fielding Game	17	5.0	12	5.2	5	4.5
Other (Aquatics, Dance/ Gymnastics, Fitness)	20	5.9	14	6.1	6	5.4
Net/Wall Game	69	20.5	33	14.4	36	32.4
Dodgeball	72	21.4	58	25.3	14	12.6
Invasion Game	145	43	102	44.5	43	38.7
Total	337	100	229	100	108	100

Qualitative Themes

Three themes and multiple subthemes that illustrate students' perceptions of and attitudes toward classmates, physical educators, and PE as a content area emerged from the data. Quotes are identified by the pseudonym of the participant and are unedited (profanity, typos, and grammatical errors remain intact).

Groups of students. Results indicated that three distinct groups of students emerged on the Facebook page "Dude, Calm Down…It's Gym Class": the pro-page students, who support the notion that "it's only gym class"; the anti-page students, who express varying degrees of hostility toward those who dislike PE; and the "reasonables," who appear to understand both sides of the argument pertaining to the value of PE.

Pro-page. Researchers determined that those who expressed in their posts an agreement with the notion "Dude, Calm Down… It's Gym Class" fell within the pro-page category of students. The pro-page students often commented on their overall excitement that the page was created, provided examples of frustrating events within PE, or expressed disdain for those who appeared to take PE class seriously. Lauren offered,

> I despise people who are in gym and there [*sic*] cheeks are rosy from running around, and there [*sic*] so focused like any minute the gym teachers gonna award them a gold medal for being so friggin great. I'm like..'really? I'm texting right now, buddy, and your shoving your sweaty ass body onto me. Take it down a notch.

Juan wrote, "I love it when they put me on the team with 'those guys.' I'm a pale, thin, vegan. Haha. The joke is totally on them. I just stand there in my skinny jeans. Lol. This group = epic win."

Anti-page. Although the Facebook page's purpose was to malign PE and those students who participate fully, many students seemed to disagree with the sentiments expressed. The anti-page students articulated frustration and anger toward those who dislike PE, often using disparaging words about the pro-page students' presumed overweight and/or low-skilled status. For example, Lance stated,

> I saw this group and I was like what the hell, when I came and looked at it my suspicions were confirmed. Its just a bunch of fucking loosers [*sic*] who get their asses kicked in gym everyday [*sic*]. Gym is such a sick class to beat people who suck at sports and rub it in their faces!

Travis said,

> This group was made by a fat person, gym class rules, it's the only time you can throw shit at fat fucks and nerds without getting in trouble, fuck fat people it's not just gym class it's one BIG competition.

Reasonables. The majority of the Facebook commenters appeared to fall into one of the two major categories, pro-page and anti-page, but a small group of students articulated perceptions that were neither hostile toward nor encouraging of either stance. The "reasonables" offered comments that expressed understanding of both sides of the various arguments presented. For instance, Dan said,

> . . . I think there's a reasonable argument here. Calm down its just math class or science class or w/e. U [*sic*] get those kids that do all their damn hmwk [*sic*] and answer all the teachers questions 2 [*sic*] feel good and get noticed. I honestly can say academics is not a strong side 4 [*sic*] me. But athletics is something I excel at. . .

Alex stated,

> I was the guy who tried my hardest in gym class…however, I try not to make fun of anybody who is not as athletic as I was in gym class. Also most of the time we are going all out in gym because it is the one place where we can just blow off all the stresses that we have from our other classes in school.

Participation patterns. Three distinct groups of students emerged from the data, yet student comments revealed further descriptors of various participation patterns in PE. The researchers were interested to note similarities with Griffin's (1984, 1985)

identified participation patterns, which could fall under two larger umbrella labels: overachievers and underachievers.

Overachievers. Griffin (1984, 1985) identified students who either displayed enthusiasm for PE through active participation or were at least supportive of those who valued the class. Those students, who she labeled as athletes, machos, junior machos, nice guys, JV players, and cheerleaders, would fall under this investigation's umbrella of "overachievers." Griffin's (1984, 1985) overachievers demonstrated behaviors ranging from kind and supportive to aggressive and confrontational.

The results from this study revealed that overachievers were identified with a variety of terms, such as try-hards, fags, gym class heroes, gym class warriors, gym class all-stars, douchebags, showoffs, and machos. Although the words *heroes*, *warriors*, and *all-stars* are typically perceived to have a positive connotation, the context of the statements indicated that these terms were used sarcastically. Students characterized overachievers as "way too competitive" and having "temper tantrums" when they lose games in PE. One student wrote, "Ahh. They freak out and have meltdowns and scream. Seriously."

In addition to describing behaviors of the overachievers and identifying specific students who fit those descriptions, pro-page students also articulated that try-hards and machos should keep "gym" in perspective. According to the pro-page students, PE class is not life or death, the NFL, the Olympics, the World Series, or going to battle/war, nor will it result in a scholarship. Luther offered, "Ive [*sic*] seen several people call themselves 'gym class heroes' on here. Seriously. Nobody thinks your a hero. And also its spelled hero. Not heroe. Which obviously means you need to learn more . . ." Leslie said, "They stack the teams, never wash their clothes, take 'roids and fall on the gym floor during volleyball . . . get the hell up."

Pro-page students indicated that they often verbally rebuke overachievers with comments such as "calm down." Further, many students offered examples of the ways that they antagonize overachievers by sabotaging games in PE. Dana stated, "This dude Tom was flippin out cuz I wouldn't serve the birdie. It was hilarious because he thinks he's so tough. So I continued to hold it in my hand and stare at it."

Underachievers. In addition to describing the participation patterns of overachievers in PE, Griffin (1984, 1985) described observable patterns of various underachievers. These students, the lost souls, femme fatales, systems beaters, invisible players, and wimps, displayed a wide range of behaviors during PE classes. Some avoided PE by providing notes from parents or doctors, whereas others simply mocked students who appeared engaged in class activities.

The data from this investigation revealed that underachievers were labeled as wimps, scrubs, lazy fucktards, slackers, pussies, weaklings, and nerds, among others. Anti-page students expressed that PE underachievers, regardless of the term ascribed to them, are "worthless," "unathletic," and "lazy." Many anti-page students expressed frustration pertaining to their classmates' lack of effort during activities. James wrote, "I hate the girls that stand in the corner of the gym with there [*sic*] arms crossed and then just move or kick the ball when it goes near them . . ." Jordan stated, "Some people want to have fun in gym class. What is so wrong with that? You're not being 'cool' by being a lazy ass in gym."

Where anti-page students articulated anger toward underachievers and their in-class "laziness," pro-page students expressed a general disdain for the "pointlessness" of PE, those who participate, and the teachers that lead the classes. Kim offered, "It's a fucking CLASS that grades you on wearing wrinkly, smelly clothes and if you did your warm up." Susie stated, "The people in my gym class r either cheerleader that don't do anything people who stand around (me) or the overaggressive people making a fool of themselves." Although only 3% of comments pertained to physical educators, the anti-page students' opinions were not favorable. For example, Douglas wrote, "Is it just me or are most gym teacher either fat or smoke???" Amy said, "If you want to have a worthless, pointless life, become a PE coach."

Meanness. A final theme that emerged pertained to an overall sense of "meanness" among students, especially when they were defending their position. Many comments were antagonistic, hostile, or celebratory of violence or cruelty directed toward students in PE. Often the comments expressed harassment toward students who were perceived to be different or weak in some way. For example, Derrick said,

> Gay kids who don't won't to participate are fair game. I dislike gays, but I would never bully one. I won't make fun of them in the hallways to their faces or throw their books down just because their gay. That's discrimination. I just pick off the weakest link in gym. And gay kids fall under that.

Charlie wrote, ". . . I just love *accidentally* punching kids who look like fags in the face . . ." Halley stated, ". . . This kid is fat with a huge head! He would run so fast thinking hes [*sic*] cool. Oneday [*sic*] it aggervated [*sic*] the hell out of me, so Itripped [*sic*] his fat ass and watched the lard cry ! J Made My Day!

Students also expressed that physical educators often ignore or exacerbate harassment occurring in PE. For instance, Shana offered,

> . . . you know the special kids who annoy everyone even the teachers but they still go to regular classes well we have one of those in my gym class. He got decked in the back of the head and the gym teacher was right next to him. He starts balling his eyes out and some people are trying not to laugh but I'm just pointing and laughing my ass off. And the gym teacher shes [*sic*] an angry lesbian turns around and laughs.

Jeff wrote, "We would hurt the one in our class and he would complain to the teacher and the teacher said these exact words 'you brought this upon yourself' funny as hell." Rick stated, "It's not necessarily the kids that do this, but the teachers as well. This one time he [the teacher] basically formed a firing squad to 'execute' the last opponent."

Discussion

Posts on the Facebook group page "Dude, Calm Down…It's Gym Class" revealed mostly unfavorable beliefs and feelings about PE, as well as negative behaviors enacted by or witnessed by participants. When non-content-related posts are ignored, individuals posted most often about participation patterns of themselves or peers and student behaviors not congruent with the affective goals of PE. Combined with the popularity of the page, this highlights peers' participation patterns and behaviors as variables potentially needing more attention in the study of student attitudes toward PE. It also

adds to previously identified influencers on student participation and attitudes in PE (e.g., curriculum, teachers, skill level, harassment for not being skilled, and gender).

Negative posts illustrated a lack of value for PE, marginalization of the subject and those who teach it, feelings of disdain toward those who are overly aggressive and competitive, and specific instances of harassment, bullying, and physically violent acts in PE classes. Although this was an observational study in which contexts could not be determined and follow-up probes could not be conducted, these posts call an alarming attention to the learning climates established in PE classes. This study's results support findings by O'Connor and Graber (2014), who found that most episodes of harassment in a middle school PE program were based on perceived differences such as appearance, body size, physical ability, and personal attire.

Previous research (Carlson, 1995; Griffin, 1984, 1985; Portman, 1995) noted the repetitive nature of team sports and invasion games in the curriculum and their associated issues, such as creating predominantly competitive learning environments. While activities in this study were not further coded to indicate whether they were associated with a positive or negative viewpoint, invasion games and dodgeball were the most frequently mentioned activities on this predominantly negative Facebook page. Highly concerning were the number of dodgeball references within this group page given that the National Association for Sport and Physical Education (NASPE; now dissolved) published a position statement in 2006 against the use of human targets in PE.

PE programs should be taught by a state-licensed or state-certified teacher endorsed to teach the subject and well versed in best practices (Society of Health and Physical Educators, 2015). Offering competitive and noncompetitive activities, as well as team and individual opportunities for participation may appeal to a greater number of students. Physical educators can also increase the breadth of activities offered within their PE curriculum by adopting the national grade-level standards and outcomes (Society of Health and Physical Educators, 2013) and differentiating instruction as needed to meet all students' needs. Physical educators can also encourage a positive class climate by incorporating icebreaker, cooperative, and team-building activities throughout PE courses. These activities

provide students with opportunities to learn from one another, find common ground, and develop healthy relationships. Employing such strategies may encourage students to continue taking PE courses beyond the minimum requirements.

Study limitations primarily lie with the researchers' inability to understand and verify participants' perspectives and to validate their demographic data. It is also uncertain if students were exaggerating claims of cruel behavior or engaging in online posturing. Interpretation of the page's commentary is subjective and dependent upon what the researchers chose to disclose and on their personal biases. As such, the findings should only serve as an indicator for further exploration of the effect of peers' participation patterns and behaviors on student attitudes toward PE and participation. However, the unique contribution of this research is the form of data collection—an unsolicited data set constructed by the participants. The rawness of thoughts and language expressed in this data source may not have occurred in a more traditional research setting.

Future research on student PE attitudes should investigate peer participation patterns and behaviors more thoroughly. Nontraditional research settings may prove valuable in gaining further insight. The results of this study suggest that a more inclusive approach to PE that ensures all students' needs are met through instruction and the learning environment cocreated by teachers and their students may be needed. Finally, although appropriate practices in the field are well established, the profession must continue to advocate for their use.

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PEDAGOGY

A Clinically Rich Model in Physical Education Teacher Education

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Abstract

An exploratory study was conducted to examine the perspectives of teacher candidates (TCs) and mentor teachers (MTs) of a clinically rich model (CRM) implemented within a physical education teacher education (PETE) program as compared to a traditional model (TM) of student teaching. Survey questions were focused on participant's perceptions of the CRM compared to a TM of student teaching, including items on perceptions of the usefulness of the CRM in the preparation and implementation of the educative Teacher Performance Assessment (edTPA). The sample of 29 TCs and 28 MTs produced similar favorable ratings for the CRM relative to the TM on the evaluated characteristics.

In 2009, the Obama administration initiated a stimulus package aimed to improve public education and the teaching profession (Darling-Hammond, 2010). At the same time, the Council for the Accreditation of Educator Preparation (CAEP) commissioned a Blue Ribbon Panel to investigate clinical preparation and partnerships for teacher education (Howey & Zimpher, 2010). Both initiatives challenged teacher preparation programs to consider implementing

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clinically rich models of teacher training (Darling-Hammond, 2010; Howey & Zimpher, 2010).

One such approach—a clinical residency model—mirrors the medical profession, whereby, like a physician, a teacher candidate (TC) must complete a yearlong residency under the supervision and mentoring of a teacher. This differs from the customary model of teacher preparation that Darling-Hammond (2010) detailed:

> The traditional versions of teacher education have often required students to take batches of front-loaded coursework in isolation from practice, then adding a short dollop of student teaching to the end of the program, often in classrooms that do not model the practices previously described in abstraction. Often, the clinical side of teacher education has been fairly haphazard, depending on the idiosyncrasies of loosely selected placements with little guidance about what happens in them and little connection to university work. (p. 40)

Comparatively, Darling-Hammond (2010) defined a residency model as "learning to practice *in* practice" (p. 40). Other experts have agreed that this approach bridges the gap between theory and practice that for many years has hindered teacher education (Howell, Carpenter, & Jones, 2013; Solomon, 2009; Strand, Linker, Deutsch, Hahne, & Douglas, 2016; Zeichner, 2010).

Consequently, teacher education programs are evolving to include a clinical residency as the culminating experience of their curricula. Programs in Chicago and Denver alongside the University of Wisconsin–Milwaukee have successfully ushered in new techniques for clinical practices in teacher preparation (Darling-Hammond, 2010; Zeichner, 2010). Solomon (2009) described another program in Boston:

> The core of [Boston Teacher Residency's] teacher preparation program is a full-year "residency" in a [Boston Public School], working closely full-time 4 days per week with a [Boston Teacher Residency]-trained and -supported Mentor teacher in his or her classroom. Residents are placed in host schools in clusters of six or more. Residents begin their placement

> the week before schools starts, though many have started working with their Mentors as early as the previous June, and Residents are in the school Monday through Thursday full-time until the last day of school. (p. 483)

Not all teacher education programs can offer a full-year residency for TCs due to state requirements, college curricular requirements, or other factors. Therefore, a clinical residency model of teacher training can be modified to incorporate integrated clinical experiences without adding time to degree completion (Richardson, 2011; Zeichner, 2010). A clinically rich model (CRM) encompasses aspects of a residency model such as sequenced coursework and field experiences that better prepare candidates for student teaching. For example, Strand et al. (2016) identified a successful clinically rich physical education teacher education (PETE) program in their Midwest institution. In their model, TCs are enrolled in a cohort structure beginning in their sophomore year, which has demonstrated positive results.

> As active three-year members of the same cohort group, TCs within a given course come with the same knowledge base and skill set. This greatly enhances what instructors can expect and are able to do with the TCs in their courses. (p. 49)

In addition, the cohort system employed in Strand et al.'s (2016) program is another component of residency models (Solomon, 2009).

At the same time, the aforementioned Obama initiatives have also contributed to state-level changes in teacher certification. These reforms have led to incentivized revisions to state education departments' licensure requirements of teachers (Wiseman, 2012). As a result, 12 states have adopted a new teacher certification exam entitled the educative Teacher Performance Assessment (edTPA; American Association of Colleges for Teacher Education, n.d.). The edTPA is a national teaching performance portfolio developed by educators to improve the quality of TCs entering the profession (Stanford Center for Assessment, Learning, and Equity, n.d.). Teacher candidates usually complete the edTPA during their clinical experience in their last semester. This assessment is designed to be authentic with artifacts, including video, that demonstrate TCs' abilities to plan, implement

instruction, and assess outcomes in a three- to five-lesson segment during their clinical experience.

Given the above account, these trends need to be investigated more closely. Although it seems logical that CRMs may improve the preparation of TCs, a limited amount of empirical evidence about their use in PETE programs has been published. In addition, PETE programs that adhere to the Council for the Accreditation of Educator Preparation's guidelines must satisfy Standard 2 entitled "Clinical Partnerships and Practice" (Council for the Accreditation of Educator Preparation, n.d.) and will need to consider new innovative ways to stay current and structure clinical experiences (Richards, Gaudreault, & Templin, 2014). For novel approaches to be successful in teacher education, it is important for teacher education programs not only to partner with K–12 institutions, but also to obtain feedback from mentor teachers (MTs) about strengths and weaknesses of new models to adjust and make improvements.

The purpose of this study was to examine the perspectives of TCs and MTs in a CRM when compared to a TM of preparation for a PETE program. The authors explored the following research questions:

- What are the perceptions of TCs and MTs of a CRM in a PETE program as compared to a TM of student teaching?
- What are TCs' and MTs' views about how a CRM aids a TC with the edTPA?

Method

Ethical Considerations

The university institutional review board reviewed and approved the study protocol. Participants completed a written informed consent procedure. Online data collection was anonymous (no personal identifiers were collected).

Participants, Setting, and Program

A PETE CRM with a residency component at a regional comprehensive university in the Northeast was developed in collaboration with program faculty and local physical educators during the

2012–2013 academic year. The CRM was approved and implemented at the university beginning in the fall 2013 semester. Input from faculty colleagues in related majors that typically use clinical placements (athletic training, health and wellness) was also solicited. In addition, the CRM resembles facets of other programs that have surfaced throughout the country (Solomon, 2009). The addition of what is called the Practicum (PtM) is the primary distinction between the CRM and the TM used by the PETE program.

Before students begin the PtM phase of their training in the PETE program, TCs must successfully complete field hours in elementary physical education (30 hr), health (50 hr), and secondary physical education (30 hr). This typically takes place during TCs' sophomore and junior years, and like the PtM, field hours are linked to courses in the PETE major. Teacher candidates begin the PtM in their final year of enrollment in the semester prior to student teaching. The PtM is a semester-long (15-week) experience during which TCs complete coursework on Mondays and Tuesdays while being placed with an MT on Wednesdays, Thursdays, and Fridays. Teacher candidates are required to complete 200 or more clock hours during this experience and if successful, continue in their final semester in the same placement with the same MT for the first student teaching placement. This programmatic sequence is referred to as a "looping" placement. The clinical experience that follows (loops) from the PtM is a 7-week Monday–Friday student teaching placement and provides the TC an opportunity to participate in an extended clinical experience. Ewart and Straw (2005) reported successful gains for TCs and MTs by lengthening the clinical placement.

The anonymous online survey was completed voluntarily and was not a course requirement. It was circulated to 82 TCs and MTs (41 TCs, 41 MTs, $N = 82$) who participated in the PtM and looping (see explanation above) student teaching placement from Spring 2014 to Spring 2016. Table 1 lists the distribution of TCs and MTs. Participants included 23 male and 18 female TCs and 22 male and 19 female MTs representing one rural, two urban, and 38 suburban school districts. During this study, on five occasions the same MT was used for different TCs, each completing the PtM and looping student teaching cycle. In each instance, the researchers instructed the MT to complete the survey for each TC he or she hosted.

Table 1
Teacher Candidate and Mentor Teacher Participation by Semester

	Teacher candidates (TC)				Mentor teacher (MT)					
	Gender		Response rate		Gender		Response rate		Practicum weeks	Student teaching weeks
Semester(s)	Male	Female	*n*	%	Male	Female	*n*	%	(Spring/Fall)	(Spring/Fall)
Spring 2014, Fall 2014	13	9	15	68	11	11	14	64	15/15	7/10
Spring 2015, Fall 2015	6	7	8	62	7	6	8	62	15/15	7/10
Spring 2016	4	2	6	100	4	2	6	100	15	7
Total	23	18	29	71	22	19	28	68		

Instrumentation

The survey consisted of 12 items with Questions 1 to 8 using a five-level Likert scale (*strongly disagree* to *strongly agree*, Table 2). The items were drafted by the clinically rich model developers (two of the coauthors). The model developers have a combined 40 years of experience in physical education teaching in PK–12 and higher education levels. Item content focused on eight key aspects of the models. The survey was reviewed and piloted prior to the study by five PK–12 physical educators for readability, clarity, and technological issues with the electronic format. The five survey reviewers also provided feedback on face validity. Minor revisions to the language of two survey items were recommended by the reviewers and adopted by the researchers. Items polled respondents about their perceptions of the CRM compared to the TM with questions about the potential for improved P–12 student learning, the challenge of the CRM, the usefulness of the CRM with completing the edTPA, the ability of the CRM to clarify TCs' and MTs' expectations, CRM authenticity, and the helpfulness of the CRM. The final four survey items were used by the researchers to identify duplicate or multiple submissions.

In addition to analysis of individual items, an exploratory analysis of item intercorrelations and total score was conducted. Table 3 shows the scale intercorrelations. The range of coefficients ranged from -.29 to .70, with many moderate positive correlations. The column of correlations for Item 2 is distinct in that all but one of the coefficients are negative. Therefore, the researchers assessed reliability with this item as originally scored, with the item reversed, and without the item at all. In the first analysis, the Cronbach's coefficient alpha was .73 and the average of the interitem correlations was .33. All of the item-total correlations were positive, except Item 2 at -.15. The second analysis with the reverse-coded Item 2 improved alpha to .79, with the item-total correlation for Item 2 changing sign to .15. The average interitem correlation improved minimally to .38. The third analysis conducted without Item 2 produced an alpha of .85, with an average interitem correlation of .47. The total score was therefore computed as the mean of the seven items with Item 2 excluded.

Table 2
Survey Items

1. The clinically rich model provided a better opportunity than the traditional model to improve PK–12 student learning.
2. The clinically rich model was a challenge for the candidate (student-teacher) to complete while enrolled in classes on Mondays and Tuesdays.
3. The clinically rich model provided a better opportunity than the traditional model to learn specific PK–12 student needs.
4. The clinically rich model provided a better opportunity than the traditional model to be successful on the edTPA.
5. The clinically rich model provided a better opportunity than the traditional model to learn about the candidate/cooperating teacher's expectations.
6. The clinically rich model was more authentic than the traditional model.
7. The clinically rich model provided a better opportunity for the candidate (student-teacher) to immerse in the culture of an educator at the school.
8. The clinically rich model was helpful for both the candidate (student-teacher) and cooperating teacher.

Note. Scale format: 1= *strongly disagree*; 2 = *disagree*; 3 = *not sure*; 4 = *agree*; 5 = *strongly agree*.

Table 3
Item Correlations

Item	1	2	3	4	5	6	7	8
1 Learning	–							
2 Challenge	-.02	–						
3 Needs of PK–12	.56**	.18	–					
4 edTPA	.28*	-.24	.17	–				
5 Needs of Student Teacher	.52**	-.11	.40**	.18	–			
6 Authentic	.53**	-.04	.67**	.27*	.62**	–		
7 Culture	.54**	-.20	.41**	.24	.71**	.63**	–	
8 Helpful	.49**	-.29*	.48**	.20	.54**	.70**	.69**	–

**Correlation is significant at the .01 level (two-tailed).
*Correlation is significant at the .05 level (two-tailed).

Procedures

A Web-based survey tool (Google Forms the first year and Qualtrics subsequently) was distributed via e-mail and/or the university learning management system to collect TCs' and MTs' (N = 82) responses at the conclusion of the looping student teaching placement. The researchers sent two reminder e-mails to each cohort (TC and MT) during each semester to increase response rate. The responses of 29 TCs (71%) and 28 MTs (68%) yielded an overall response rate of approximately 70%. Results were analyzed using descriptive and inferential statistics.

Results

Overview of Data Analysis

The goal of the analysis was to examine TC and MT ratings on the CRM for the individual items and the total score. The researchers used the instrument's Likert scale to define effectiveness of the CRM. Responses of 4 and 5 on the Likert scale (*agree* or *strongly agree*) were deemed as high quality for purposes of this investigation. Specific steps in the analysis were as follows: (1) examination of data integrity (missing data, data accuracy), (2) examination of item descriptive statistics, and (3) comparisons of TCs and MTs on the individual items and the total score, with additional attention to the item on preparation for the edTPA.

Data Integrity

Data entry was accomplished via electronic forms that TCs and MTs completed anonymously over six consecutive semesters. Data for each semester were stored online and downloaded in Excel files. These files were then merged into an SPSS (version 23) data file. The accuracy of the file merger was checked by visual comparison of the original Excel and merged SPSS data files. All of the surveys received (MT = 28, TC = 29) included complete data for all items.

Comparison of Teacher Candidates and Mentor Teachers

Table 4 reports the means and standard deviations for the TCs and MTs, as well as the overall sample, for the eight items. For the entire sample, the mean level of endorsement of six of the eight items was above 4.0 (*agree*), and one was very close to that level (Item 4,

$M = 3.79$). The mean TC ratings for five of the eight items were above 4. The MT ratings were slightly more positive with six of the eight means above 4. The exception to the pattern of endorsement was that TCs and MTs reported the lowest agreement with Item 2 regarding the degree to which the model challenges students ($M_{TC} = 2.76$, $M_{MT} = 3.21$, $M_{overall} = 2.98$). Respondents used at least four of the five response options on six of the eight items. Distributions showed strongest levels of agreement on Items 1 and 5. Item 1, regarding effect of the CRM on student learning, was endorsed as agree or strongly agree by 89.5% of the sample. Similarly, Item 5 on the strength of the CRM to help identify candidate needs was endorsed as agree or strongly agree by 93% of the respondents.

Table 4
Descriptive Statistics

	TC ($n = 29$)		MT ($n = 28$)		All ($N = 57$)	
Item	***M***	**(*SD*)**	***M***	**(*SD*)**	***M***	**(*SD*)**
The CRM compared to the TM:						
1. improves student learning	4.24	(.87)	4.32	(.61)	4.28	(.75)
2. challenges the candidate	2.76	(1.15)	3.21	(1.03)	2.98	(1.11)
3. learn specific student needs	4.21	(.62)	4.32	(.72)	4.26	(.67)
4. success on edTPA	3.62	(1.15)	3.96	(.69)	3.79	(.96)
5. identify needs of student	4.31	(.71)	4.46	(.64)	4.39	(.68)
6. more authentic	3.90	(.82)	4.21	(.79)	4.05	(.81)
7. immerse in school culture	4.28	(.65)	4.57	(.57)	4.42	(.63)
8. helpful for student and teacher	4.10	(.77)	4.29	(.76)	4.19	(.77)
All items	4.09	(.55)	4.31	(.53)	4.20	(.55)

TC and MT ratings were compared on each item and the total score. The individual item means were slightly higher for the MTs on every item. The total score was calculated as the average of all items with the exclusion of Item 2 (to maximize reliability in this sample). The total score was normally distributed with a mean of 4.20 and standard deviation of .55. The total score means ranged from 2.29 to 5, with five cases (8%) at the maximum of 5.0. Figure 1 shows a boxplot of the TC and MT data. The figure depicts a large degree of overlap in the ratings, with similar medians and ranges. The MT median is slightly higher than the TC median. Independent *t* tests of mean differences between groups showed no differences on any of the nine variables tested (the eight items and the total score mean).

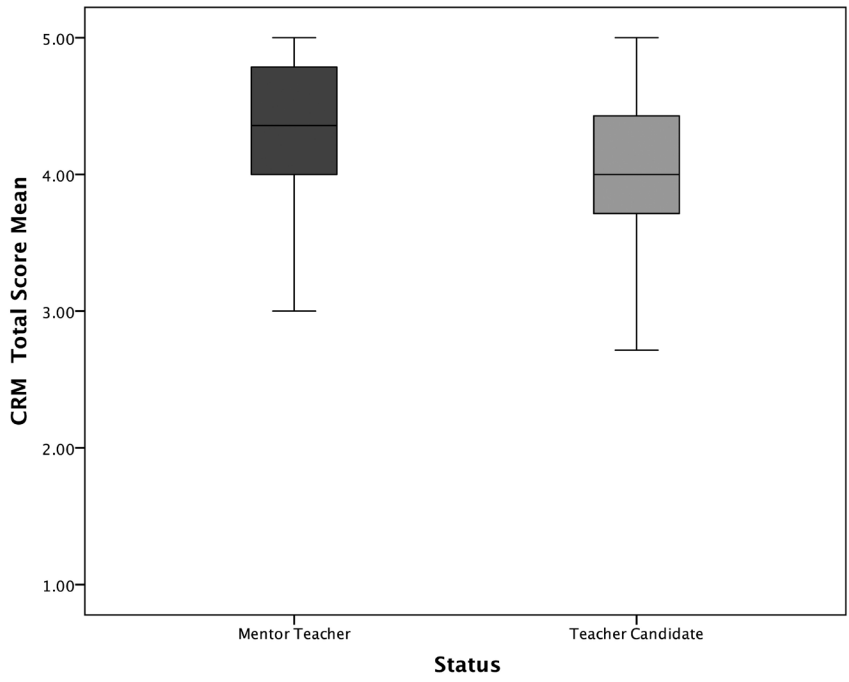

Figure 1. Boxplot of mentor teacher and teacher candidate total score means.

Perspectives on the edTPA

Ratings of the CRM on preparation for the edTPA were regarded as particularly important. In Figure 2, it is apparent that the MTs had slightly higher ratings of the utility of the CRM in likely success on the edTPA than the TCs did. Both group means were slightly below the 4.0 level, scaled as agreement with the item, and interpreted as the threshold level of a positive rating. The difference between the groups was not significant ($t = 1.37$, $p = .18$, two-tailed). There was more variability in the TC ratings, as reflected in the standard deviations (MT = .69, TC = 1.15) and a significant difference on Levene's test for equality of variances ($F = 7.49$, $p = .01$).

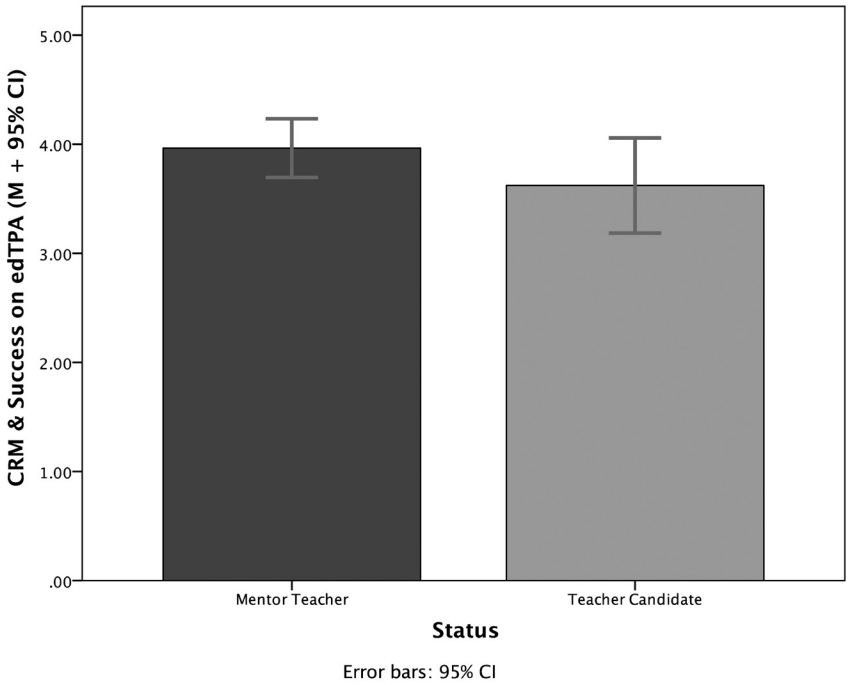

Figure 2. Mentor teacher and teacher candidate ratings of CRM and edTPA.

Discussion

The purpose of this study was to analyze the perceptions of TCs and MTs about the quality of the CRM compared to the TM. There were no significant differences between TCs and MTs on the ratings of any item. Further, TCs and MTs provided generally high ratings of the CRM compared to the TM. The exception to this pattern was that participants rated the degree of challenge of the CRM, which they tended to rate as equivalent to or lower than the TM. Teacher candidates and MTs provided only moderate endorsement of the idea that the CRM provides a greater challenge (M_{TC} = 2.76, M_{MT} = 3.21, $M_{overall}$ = 2.98). This result could point to a flaw in the item itself. Teacher candidates participating in the CRM may be unable to weigh the level of challenge without a comparison point (TM).

Over 89% of the combined sample agreed or strongly agreed with Item 1 regarding the effect of the CRM on student learning.

In addition, 93% of those surveyed supported the strength of the CRM in identifying candidate needs (Item 5). At the same time, both groups supported additional aspects of the CRM. The overall helpfulness of the CRM for TCs and MTs (Item 8) was viewed positively (M_{TC} = 4.10, M_{MT} = 4.29, $M_{overall}$ = 4.19). In addition, responses to Item 7 were promising. This statement asked respondents about the ability of the CRM to immerse both cohorts into the school culture. Responses included M_{TC} = 4 .28, M_{MT} = 4.57, and $M_{overall}$ = 4.42. These scores contributed to the highest overall mean in the study. Given the consistent positive ratings, it was not surprising that the total score (mean of seven items) was above the 4.0 level. Coupled with the low variability between groups, these findings suggest that both TCs and MTs agree and value the partnership and collaboration the CRM provides. This supports previous discoveries about the benefits of extended placements for teacher preparation (Ewart & Straw, 2005).

Conversely, other trends in the data warrant discussion. For example, the advent of the edTPA as a New York State Teacher Certification requirement was one reason why the CRM was originally developed; however, TCs and MTs responses to Item 4, which asked about how the CRM may lead to success with the edTPA, were not as convincing. The mean scaled score for Item 4 for TCs was 3.62 and for MTs was 3.96, with an overall average of 3.79. This suggests that both groups were undecided about whether the CRM helped them complete the edTPA.

Although concerning, it is also important to note that the standard deviation for TCs was 1.15 compared to .69 for MTs, demonstrating greater variability in TC responses. While the standard deviation for TCs may suggest some uncertainty about the merits of the CRM, the majority of TCs rate the CRM as helpful preparation for the edTPA. Sixty-six percent of TCs polled agreed or strongly agreed with Item 4 versus 34% of TCs who were neutral, disagreed, or strongly disagreed. It may be that on this item, individual interpretation of the term *challenge* (perhaps with both positive and negative connotations) contributed to the wide range of scores and rating close to the center of the scale (the *unsure* point).

Limitations in this study may influence the generalization of the results. First, the participants were known directly by the research-

ers as either students in the PETE program or physical education professional colleagues in the field, which resulted in a potential for inflated responses. Second, the study was conducted in Western New York, which thus represents TCs' and MTs' views from this region. Similarly, the generalizability of the study may be limited to states that require the edTPA for licensure. Another potential weakness was the inability for TCs to compare the components of a CRM to a TM without directly experiencing both. Future studies might include additional aspects of reliability and validity in assessing the measure. Finally, as mentioned previously, in five instances the same MT was used for different TCs, each completing the PtM and looping student teaching cycle. In all scenarios, the researchers directed the MT to complete the survey for each TC he or she hosted. Therefore, the opportunity of MTs to complete the poll for a second time provided some familiarity with the instrument and may have affected responses.

In conclusion, these findings bode well and suggest that TCs and MTs enjoyed participating in the CRM. The model itself supports innovative approaches to teacher education that link theory to practice in the field (Darling-Hammond, 2010; Solomon, 2009; Strand et al., 2016; Zeichner, 2010). For PETE programs specifically, it places the profession ahead of the curve and supports what many experts claim as an essential component of teacher education moving forward. The International Association for Physical Education in Higher Education (AIESEP, 2014) calls for PETE programs to partner with local schools and teachers: "Effective physical education teacher education requires the creation of a series of systematic and sustainable collaborations that support the development of the subject of physical education and the work of physical education teachers in schools" (p. 4).

Overall, the CRM shows promise and adds to the limited body of knowledge in PETE programs. With initial steps to validate a CRM quality metric in place, an analysis of this model over time may be fruitful. At the same time, a direct comparison of the CRM to the TM would be interesting. Therefore, a comparative study between two PETE programs—one using the CRM and the other the TM—would be useful for future discussion. "The various school realities and contexts should be to the forefront in the programme planning

undertaken by teacher educators. A central aspect of this work is to conduct research with teachers and students in school" (AIESEP, 2014, pp. 4–5). It is hoped that both PETE programs and local K–12 schools will benefit from this line of research.

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PEDAGOGY

Pedagogical Practices and Curriculum Considerations for a Study Away Course in Sport

Brad Stinnett and Evelyn Oregon

Abstract

As academic programs relative to sport continue to grow and evolve, college and university faculty are tasked with developing innovative curricula to enhance the overall experiences of their students. A viable option to facilitate this charge is complementing traditional courses with domestic study away opportunities. This article adds to the limited literature on domestic study away courses in sport by detailing pedagogical approaches and curriculum design strategies utilized in a faculty-led study away course within an academic program in sport. Several theories including constructivism, cooperative learning, discovery learning, and experiential learning made up the theoretical framework and were adopted for pedagogical and curriculum planning purposes. A variety of course assignments, assessments, and experiences were implemented and integrated with student-centered and active learning concepts. Practical implications from this paper include encouraging openness to new instructional methods, integrating active learning theories into study away activities, and the importance of well-designed course assignments and assessments. This paper establishes a foundation for future investigations on the topic and presents recommendations for further research.

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The concept of study away, as opposed to international study abroad, acknowledges that students can have positive, career-altering experiences domestically. Students are increasingly seeking ways to enhance their overall competency and marketability. Additionally, students have a need for learning that provides opportunities for participating in the practices of sport management (Light & Dixon, 2007). Developing and administering domestic study away courses can facilitate influential experiences for students, such as growing their professional network and securing internships (Sobania & Braskamp, 2009).

Typically, academic programs within sport comprise a curriculum consisting of courses in administration, facility management, fiscal practices, legal issues, public relations, and other relative areas. Ideally, these course offerings within the program add to the students' knowledge base and ultimately prepare them for their future career endeavors. Study away courses and experiences could add a new dimension to the curriculum by helping students in a variety of ways. By structuring a sport-specific study away course effectively, faculty can provide their students with experiences in which they will have the opportunity to meet personally with a broad spectrum of industry professionals, add to their professional network, and enhance their career opportunities—outcomes that are difficult to duplicate in a traditional classroom setting.

As the sport sector continues to evolve, faculty in college and university academic programs must regularly perform curriculum reviews to ensure that their graduates are adequately prepared for the increasing career opportunities in the industry. According to the U.S. Bureau of Labor Statistics (2016), employment opportunities in recreation and sport are anticipated to grow by 11% through the year 2024. This statistic makes it more important for the academic curriculum to foster skills necessary for today's sports industry in a practical manner through real-world experiences (King, 2009). An innovative enhancement to be considered by appropriate academic departments is the addition of a study away component for program students.

Pedagogical approaches within study abroad courses have been well documented in the literature (Bai, Larimer, & Riner, 2016; Gonsalvez, 2013; Lutterman-Aguilar & Gingerich, 2002) and provide

a myriad of teaching guidelines for faculty. Although some instructional techniques used for these international courses can also suffice for domestic-focused programs, there is seemingly a shortage of literature specific to study away teaching strategies. As in traditional classroom settings, faculty can facilitate student learning opportunities in study away courses with effective and compelling methods of instruction that will hopefully lead to transformative experiences for students.

Striving to keep the Master of Science in Recreation and Sport Administration degree program innovative and practitioner focused, the School of Kinesiology, Recreation, and Sport (KRS) at Western Kentucky University (WKU) has coordinated and administered an annual faculty-led study away course. The course facilitates continued professional growth for students pursuing a career in recreation or sport. Specifically, the course gives students an understanding of the facility planning, design, and management aspects in recreation and sport venues. Although the course has a venue management focus, it also provides an opportunity for students to network with industry professionals from a variety of sectors and improve their job search strategies and techniques.

Collaborating with the WKU Study Away Office, KRS faculty developed this practical-based course. The WKU Study Away Office (2016) offers innovative teaching and learning opportunities in partnership with WKU's academic departments and faculty who seek to provide their students and the community differing perspectives of America. A blended approach allowed for adequate student preparation for the experience and, as noted by Wicks, Craft, Mason, Gritter, and Bolding (2015), integrates a combination of traditional learning with Web-based online techniques.

As previously expressed, there have been fewer accounts of domestic study away courses in the literature compared to international study abroad programs. Literature regarding sport-specific study away courses is even less apparent. This article seeks to add to the literature by detailing pedagogical practices and curriculum design strategies utilized in a faculty-led study away course within a sport management academic program.

Rasch (2001) noted that faculty serve in a variety of roles when leading courses outside of the traditional classroom setting. Although administrative and counseling duties are important, the core functionality of faculty should be that of teacher. This article provides a template of instructional and curriculum design strategies for sport management faculty who are contemplating leading a study away course to consider when teaching a comparable course.

Curriculum Design

To ensure the course met specific academic purposes, program faculty came up with the learning objectives using the backward design method, inclusive of three stages. The first stage, identifying desired results, prompted faculty to identify the goals of the course clearly. Faculty determined student learning outcomes and planned for purposeful student transformation to occur by the end of the course. The remaining stages in the backward design method cued faculty to determine acceptable evidence of understanding and to plan learning experiences and means of instruction (Wiggins & McTighe, 2005).

Planning, developing, and managing recreation and sport facilities were the focal points of the course and facilitated the student learning objectives and outcomes. Although the facility aspect of the course was the primary emphasis, strategic objectives regarding student professional development were stressed as well. It was anticipated that after successful course completion, students would have the ability to

- explain the master plan, site selection, and development phases;
- plan venues for safety and risk management;
- describe sustainable design, construction, and building operations;
- apply universal and accessible design strategies;
- discuss design variables that influence ancillary areas;
- strategize for effective graphics and signage;
- understand the development of specialized recreation and sport spaces;

- identify recent design trends in arenas, stadiums, and recreational sport venues;
- assess personal skills and abilities for meaningful employment; and
- specify strategies and techniques for conducting a successful job search.

Sawyer's (2013) textbook was used for the course and aided in the development of specific course objectives. After determining the course objectives, program faculty wanted to craft a unique combination of assessments and learning experiences to make sure the stated learning objectives were met. To ensure active engagement and learning effectiveness, faculty employed an array of learning theories to help frame the instructional and assessment components of the course.

Theoretical Framework

A variety of learning theories were adopted for pedagogical and overall course planning purposes. This section provides an overview of the various theories including constructivism, cooperative learning, discovery learning, and experiential learning.

Constructivism

Student-centered instruction and active learning are grounded in constructivism, a theory of learning based on the work of Jean Piaget and Lev Vygotsky (Pass, 2007). Constructivist learning is based on the belief that learning is brought about as a process of active, individual construction of knowledge (Stage, Muller, Kinzie, & Simmons, 1998, p. 35). Teaching grounded in this theory centers on student learners actively constructing knowledge, instead of passively receiving information (Stage et al., 1998). The underlying principle behind constructivist learning is that learning is constructed by doing as opposed to passively absorbing information.

Student-centered instructional methods make it imperative for the student to be at the center of learning by shifting the focus of activity away from the instructor (Felder & Brent, 1996). Thus, student-centered instruction calls for student engagement, immersion, and personal responsibility. Instructors, although still leaned on, are more so facilitators and apply a coaching-like approach

to their students. Felder and Brent (1996) also surmise that student self-reliance is promoted through a variety of action-oriented instructional formats that either replace or support traditional lectures. Therefore, student-centered instruction was the foundation that the instructors utilized for the pedagogical planning and overall structure of the course.

Lowerison, Sclater, Schmid, and Abrami (2006) concluded that perhaps the most profound overall impression that emerged from data was students' overwhelming support for constructivist (active learning) approaches to instruction. Faculty reasoned that to plan and implement engaging and effective learning activities, they needed more-intentional pedagogical approaches for the study away course. Faculty organized course activities and assessments around the following active learning theories: cooperative learning, discovery learning, and experiential learning.

Cooperative Learning

Cooperative learning is the instructional use of small student groups working together to maximize their own and their classmates' learning (Johnson, Johnson, & Smith, 1998). In the Johnson and Johnson model of cooperative learning, the essential elements are (1) positive interdependence, (2) promotive interaction, (3) individual accountability, (4) group processing, and (5) social skills. In cooperative learning, students work together in small groups on a structured activity and, ideally, learn how to work cooperatively with others, compete for fun and enjoyment, and work autonomously on their own (Johnson et al., 2014).

Discovery Learning

Discovery learning theory suggests that learners are encouraged to build on past experiences and knowledge, creatively use their intuition, and search for new information to discover facts and correlations (Klahr & Nigam, 2004). Although discovery learning definitions vary, it is commonly accepted that its principal aim concludes that target information must be discovered primarily by the learner (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011).

Learning does not equal absorbing what was said or read, but involves actively seeking out answers and solutions. Discovery learning assignments involve collaboration and internalization, with the

support of the instructor throughout the experience. Ormond (2003) believes that students learn better through discovery than through accumulation via a textbook, as acquiring knowledge is a process.

Experiential Learning

Experiential learning theory provides a holistic model of the learning process. This theory correlates with what is known about how people learn and develop (Kolb, Boyatzis, & Mainemelis, 2001). The core of experiential learning theory is the premise that learning is the process whereby knowledge is created through the transformation of experience (Kolb, 1984).

Experiential learning is a process through which students develop knowledge, skills, and values from direct experiences outside a traditional academic setting. As McCarthy (2016) noted, for learning to be considered experiential, it must contain the elements of reflection and critical analysis; opportunities for students to take initiative, make decisions, and be accountable for results; and options for students to engage intellectually, creatively, emotionally, socially, or physically.

Experiential learning emphasizes the central role that experience plays in the learning process, an emphasis that distinguishes this theory from other learning theories (Kolb et al., 2001). In experiential learning, the instructor guides, rather than directs, the process where students are naturally interested in learning (Wurdinger & Carlson, 2009). Experiential learning requires students to actively participate in and have a personal role in the direction of their own learning (University of California, Davis, 2011). Therefore, faculty integrated these principles when structuring assignments, assessments, and overall experiences to be undertaken in the course, which are discussed in the next section.

Course Assignments and Experiences

Because the first two weeks of the course were administered in a Web-based format, a course site through the learning management system Blackboard was developed for organizational and instructional purposes. The Blackboard site, used as a course management mechanism, was organized into the sections of general information, academic content, and student resources.

The general information section included announcements by program leaders, faculty biographical and contact information, the course syllabus, and material regarding logistical information and scheduling specifics. Academic content was comprised of a discussion board thread facilitated by the faculty, assignment information and guidelines, and detailed profiles and Web links of the selected venues on the trip itinerary. Access to information technology assistance, library services and databases, and a multitude of tools made up the student resources section on the course site.

Pre-Departure Assignments

Prior to departure, students were required to complete two exams for the purpose of establishing a foundation for what was to come in the course. The first exam consisted of 40 questions in a variety of formats including fill in the blank, multiple choice, and short answer. Students were given a glossary of key terms relative to the facility planning and design process to study and learn. This activity enhanced student vocabulary specific to the industry and allowed them to "speak the same language" as the seasoned industry professionals who would be presenting to them during the scheduled site visits.

The focus of the second exam was familiarizing students with the venues they were scheduled to visit. This exam consisted of 25 questions in a variety of formats and was developed so that students would be equipped with knowledge of each venue. Venue facts, figures, and operational information were distributed to each student. Aside from checking student comprehension of the materials issued, the exam also served as a means of ensuring better student preparation for the scheduled site visits.

To help confirm student preparedness for the exams, instructors placed a time limit on the online exam and required those who made below an 85% to retake the exam until they achieved above the required score level. Only the score received on the first exam attempt was recorded as the official exam grade. Instructors emphasized to students the need to thoroughly review and study the information and lectures that were placed on the course site, pertaining to the exams.

Site Visits

The focal point of the study away course, and a vital piece of the experiential learning objective, was the site visit component. The site visits showcased a sampling of outstanding recreation and sport facilities, in addition to introducing students to industry professional. The innovative experience offered students an intimate look at the planning, design, and management aspects in a variety of professional, collegiate, scholastic, and recreational sport venues. In consultation with various partnering organizations, the School of KRS coordinated an ambitious slate of site visits in the selected city.

The site visits consisted of comprehensive tours and generous access to each venue. Typically, upper-level venue management staff led the tours and facilitated interactive, engaging discussion sessions with students. Although the primary intent of the site visits involved exposing students to the management and operational aspects of the specialized facilities, ancillary benefits also arose. A significant added bonus for the students included presentations from industry professionals, who offered excellent advice regarding the job search process, networking, and résumé preparation. Many of the industry professionals shared personal stories that spotlighted their own start in the field and practices that kept them on the cutting edge in their specialization area.

Another intriguing experience for the students typically involved a visit to a professional association within the industry. For example, during a study away in Indianapolis, program faculty coordinated a seminar at the National Collegiate Athletic Association's (NCAA) corporate office. NCAA staff conducted presentations and visited with students in the course. Holle (2012) noted that effective and sustainable partnerships begin with a dialogue that establishes a common vision and shared goals. Additionally, the building of partnerships has provided the opportunity for program faculty to maintain an appropriate and enabling environment in which educational and training activities can take place. Partnering organizations have played a pivotal role in each of the study away courses conducted.

Site visit profile documents were provided to industry professionals as a way of adding structure and encouraging interactive sessions during the site visits. The site visit profile document con-

tained approximately 20 key components of venue planning, design, and management, in addition to questions relative to career and professional development. Students were provided with the site visit profile documents and were required to complete them during each visit to selected venues. The profile documents were designed to allow students to collect data on each venue and served as a notable means of keeping students engaged during the site visits. A significant component of the overall course grade involved students fully completing and submitting the site visit profile documents. The site visit profile document facilitated interactive sessions with each industry professional who led his or her respective tour and correlated with experiential and discovery learning.

Course Blog

The blog assignment allowed a forum for students to put terms and knowledge into practice. Additionally, the blog assignment forced students to demonstrate their competency in showing that what they had learned theoretically was being applied practically. Students were required to complete a blog post and were instructed to think about what they had learned, to share their experiences, and unveil new knowledge attained in a reflective yet creative way. Finally, the blog assignment served as a means of data collection. Faculty could use the visual and written content for future promotion of the academic program and additional study away courses.

Culminating Activity

A culminating activity in the form of a group presentation rounded out the curricular aspect of the study away course and allowed faculty to implement cooperative learning. Culminating activities are summary exercises that are carried out with a high degree of independence (Fenner, 2015). Specific information regarding the culminating activity was posted on the Blackboard course site and was discussed with students during the pre-departure meeting. Prior to departure, faculty formed groups of students based on the course enrollment and the overall scope of the culminating activity.

One example of a culminating activity included a presentation in which students summarized data collected at each venue visited during the course. The student group was given a specific compo-

nent of the site visit profile document regarding venue planning, design, or management that would serve as the topic of their presentation to be conducted on the final day of the course. Students were expected to work on the presentation throughout the week by reviewing resources provided by the instructors, conducting outside research, and collecting data on the assigned topic at each site visit via the site visit profile document. On the final day of the course, students presented their findings to their classmates and faculty. This activity proved to be effective as it allowed for detailed presentations on a multitude of important industry topics.

Other effective culminating activities included student groups conducting mock interviews that provided a synopsis of what was learned during the study away experience, a presentation that detailed facility design and management trends noticed during site visits, and an activity that highlighted meaningful career practices attained from meeting with industry professionals while taking the course. Students were given a detailed grading rubric that specified faculty expectations regarding the culminating activity. The rubric detailed presentation guidelines concerning the group's ability to follow instructions, show full understanding of the topic, effectively deliver the presentation or activity, and accurately answer questions from faculty and other students.

The aforementioned activities and assessments were a result of faculty integrating student-centered instruction and active learning concepts. When a course is designed using the previously stated activities, assessments, and learning theories, it creates opportunities for students to participate actively. This prompts students to have a personal role in their learning and allows instructors to guide the discovery process instead of directing it.

Discussion

This article adds to the literature pertaining to pedagogical practices and curriculum design strategies in study away courses. Spence, Hess, McDonald, and Sheehan (2009) assert that educators in sport management programs should intentionally examine and assess their pedagogical practices. Three key implications for educators can be drawn from this article. These implications include (a) an openness to new student-centered instructional methods, (b) integrating

active learning theory into course activities, and (c) the importance of well-designed course assignments and assessments.

The first implication is that this article adds to the literature relative to instructional strategies and study away courses. Faculty can utilize this information in their efforts toward improving or introducing their own sport study away class. Understanding specific pedagogical approaches, at least from one program's perspective, could allow faculty to assess their current practices and possibly implement new ones to further strengthen their own course.

Next, it is essential that instructors integrate active learning into courses with a domestic study away scope. Incorporating active learning theory is known to promote deep and lasting student learning effectively, bolsters interactive engagement, increases test scores, and fosters positive student attitudes (Eison, 2010; Prince, 2004). As Adler (1982) noted, all genuine learning is active and involves the use of the mind, not only for memory purposes, but also for the process of discovery.

Finally, well-designed course assignments and assessments are imperative for maximizing student learning. Students cannot effectively learn by being idle. Rather, they benefit intellectually by discussing what they have learned, as well as by writing and reflecting about their experiences. Faculty should embrace the practice of employing student-centered and active learning instructional strategies to maximize student learning. This implication is important as it can help faculty to connect the overall purpose of the course, assignments, and assessments effectively and strategically.

Limitations and Recommendations for Future Research

This article reports pedagogical approaches in a study away course within an academic program in sport at one institution. Because of this, the content is not pertinent to all sport management academic programs at all colleges and universities. Institutional structure, mission, human and financial resources, and other variables may render the outlined pedagogical approaches as not applicable. Additionally, this study away program is relatively new to the curriculum, with only three courses having been conducted. However, general feedback from participants and student inquiries regarding future study away courses have been positive indicators of the overall course delivery and format.

Program faculty ensured that every component of course design, instruction, and student assessments was theory driven. However, because no evaluative data were collected, it cannot be assumed that this was an effective design for a study away course. Although anecdotal evidence from students, faculty, and professionals points toward learning objectives being met, empirical research should determine if these instructional strategies were influential in student engagement, affected student academic performance, and played a positive role in overall student attitude toward learning. It is recommended that future research employ a mix of quantitative and qualitative research methods to assess student levels of interaction, engagement and retention of course content, student learning preferences, and instructor's design of course assignments and learning activities.

Because this article focused on a single institution's pedagogical techniques in a study away program, it is recommended that other sport academic programs that lead similarly structured courses be identified and explored. Survey research that provides an assessment of utilized instructional strategies could be conducted. In addition, researchers could interview lead faculty to gain additional insight on the topic. Conducting this research would ideally lead to a summary of dynamic practices regarding pedagogy in study away courses and could provide useful breakthroughs to other faculty members.

Another area of future research could center on learning from past mistakes regarding instructional practices within a study away course. Findings from a "lessons learned" research project could proactively aid faculty in strengthening their overall teaching effectiveness. Faculty preparation and training, specifically on pedagogical techniques in a study away course, could be identified and analyzed as a part of this research area.

Conclusion

Study away courses can be viable additions to the curriculum for sport academic departments. Domestic off-campus programs complement traditional means of academic instruction and can give students the skills that employers seek (Fischer, 2015). While each learning activity and assessment theory has limitations, program fac-

ulty used multiple approaches to minimize potential shortcomings in the overall course design. Effectiveness data were not collected, and although well-intended instructional strategies were applied, program faculty could not definitively conclude that the said strategies were effective.

The study away course administered by the WKU School of KRS facilitated continued professional growth for students pursuing a career in recreation or sport. The course gave students an understanding of the facility planning, design, and management processes, provided the opportunity for students to network with industry professionals from a variety of sectors, and improved their job search strategies and techniques. Pauline and Pauline (2008) deem it essential for faculty members to share successful models and instructional paradigms. Hopefully, the background information, pedagogical practices, and curriculum design considerations detailed in this article will assist other sport management academicians who currently lead, or aspire to lead, similarly formatted courses.

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PEDAGOGY

A Study of Conceptually Based Physical Education in Higher Education

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Abstract

Purpose: *The purpose of this research was to determine whether university students who participated in conceptually based physical education (CPE) would achieve greater positive improvements in their physical fitness level, compared to students in traditional activity- and skills-based physical education (ASPE).* ***Method:*** *This was a pilot study based on an experimental design consisting of 2 intervention groups of CPE (n = 27) and ASPE (n = 29) students who were required to participate in fitness preassessments and postassessments scheduled accordingly during the semester at a medium-sized Midwestern university in the United States.* ***Results:*** *Descriptive and paired samples t test analyses indicated that all students made physical fitness improvements; however, no significant between-group differences were found based on ANOVA analysis.* ***Conclusion:*** *Most of the students showed gains in physical fitness; as a result, students benefited from participating in both types of physical education courses. There is a need for physical education in colleges and universities, and whether in the form of CPE or ASPE, these courses will benefit all students. CPE courses will*

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merely extend further opportunity for the cultivation of physical and health education, as well as potentially improve motivation, attitudes, and behaviors toward exercise during the semester of course enrollment and beyond.

National epidemiological data have indicated that the sharpest decline in physical activity (PA) and exercise participation occurs as adolescents age into young adulthood (Fischer & Bryant, 2008). According to a survey conducted by Calfas et al. (2000), 47% of recent high school graduates reported a decrease in PA, compared to PA levels demonstrated in previous years. School physical education (PE) programs do not always effectively prepare students to transition to optimal self-directed PA and exercise (Sallis & McKenzie, 1991). As the American College Health Association (ACHA) reported in the Spring 2016 National College Health Assessment (NCHA), only 47.2% of college students met the recommended PA and exercise guidelines for moderate or vigorous intensity, or a combination of the two guidelines, as developed for adults by the American College of Sports Medicine (ACSM) and the American Heart Association. Hence, the higher education setting can offer timely opportunities for physical and health education and promotional programming. In addition to providing much needed intervention, higher education institutions can reach large numbers of students at this important transitory stage from young adult to adulthood, and these college and university students are often a captive audience in classes that require them to complete the coursework to earn a grade.

Perhaps now more than ever, the value of PE should be appraised for not only children and adolescents, but also young adult students at the higher education level. Dating back to the early 1800s, colleges and universities in the United States began offering PE to introduce select principles of health education and to foster physical and skill development (Sloane & Sloane, 1986). Activity- or skills-based PE (ASPE) programming was initially focused on the physical development and health needs of the general college student population. Still today, students and faculty recognize these courses as central to the PE programming on most college and university campuses. The status and nature of ASPE has evolved over the years, but continues to be regarded as an important approach to PE.

American colleges and universities began to change the requirements for their courses, PE among those, for many reasons in the early 1960s. Factors included student demand for a wider choice in curriculum; decreased perceived need for fitness for war; large inpouring of students, which made the administration of required courses more difficult; and the newfound movement to make PE more "academic" (Sparling, 2003). Efforts to provide an alternative to traditional ASPE led to the development of conceptually based fitness and wellness courses (Kulinna, Warfield, Jonaitis, Dean, & Corbin, 2009). This new conceptually based PE (CPE) was introduced as a combination of lecture and laboratory. The lecture component provides instruction of concepts related to fitness, wellness, and behavioral change theory; the laboratory serves as a setting in which the learned self-management skills and fitness-related theory can be applied (Corbin & Cardinal, 2008). CPE has grown to educate students about the importance of a healthy lifestyle, including exercise, and its merit to their overall wellness. The significance of this type of course, then and now, is its experiential and intellectual qualities. The lecture assists college students in achieving an appropriate level of health literacy and equips them with the knowledge and analytical skills to navigate through the labyrinth of diet and exercise myths and programs today. Such courses may better enable students to understand concepts such as energy balance and proper nutrition and to exert healthful behavioral change. The associated lab provides students with the opportunity to learn and practice various forms of exercise and to utilize the coinciding concepts being learned in the classroom.

Although trends have fluctuated, colleges and universities have been progressing from providing traditional ASPE to increasing the offering of CPE, along with the requirement of such, into the general education core of courses. The availability of these PE courses indicates that higher education institutions are committing to promoting exercise and healthy living among their students (Kulinna et al., 2009).

All college and university PE courses are beneficial in that they provide instructional programming, increase participation in exercise, and improve physical fitness; however, CPE could more effectively do so by providing an educational rationale for the

importance of such in a person's health and well-being (Wallhead & Buckworth, 2004). In fact, it has been claimed that the higher education curriculum offers a valuable opportunity for improving the level of health-related physical fitness knowledge of students and providing them support to more successfully develop lifestyle wellness behaviors, including exercise (Adams, Graves, & Adams, 2006). Beyond merely providing activity- and skills-related instruction, CPE may also positively cultivate health education, motivation, attitudes, and behaviors toward exercise (Adams et al., 2006).

Research focusing on CPE is limited. Initial programming and research was introduced in the 1960s, showed progress in the 1970s and early 1980s, and plateaued in the 1990s and early 2000s. Aside from recent research focusing on the prevalence and content of regional CPE courses published by this group of authors, one of the latest research studies regarding the progression and effectiveness of CPE was from 2009 and examined earlier work (Kulinna et al., 2009; Williams, Greene, Satinsky, & Neuberger, 2016). However, given the poor state of public health in the United States, it appears that continued CPE (and even ASPE) research efforts need to support and advocate for this type of programming at the higher education level to increase PA and exercise levels and contribute to a healthier culture.

Literature Review

Intervention Efforts for Students in Higher Education

Following public health efforts promoting PA from the U.S. Surgeon General, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services (HHS), ACSM, and American Heart Association, ACHA initiated PA and exercise promotion interventions for young college and university students, in particular (CDC, 2009a, 2009b, 2011; HHS, 2008, 2010). These intervention efforts introduced leading health indicators reflecting major public health concerns, including PA. In addition, ACHA (2009) identified a collection of guidelines and over 200 health objectives with baselines and targets for the nation's colleges and universities to achieve over the next decade. A more recent initiative specific to higher education, Healthy Campus 2020, emphasizes

the importance of increasing regular PA for college and university students by advocating ecological health models that attempt to design environments supportive for healthy behaviors (ACHA, 2012). PE, especially concepts based, is one of the most effective, practical options amid these interventions for young (college- and university-aged) adults.

CPE Programming in Higher Education

A variety of PE programs, including ASPE and CPE approaches, are being offered in higher education. This includes a spectrum of CPE programming ranging from a broad offering of lifetime fitness classes to specific programs such as Project GRAD (Graduate Ready for Activity Daily; Sallis, Calfas, Alcaraz, Gehrman, & Johnson, 1999a; Sallis et al., 1999b), ARTEC Project (Active Recreation Tertiary Education Campuses; Leslie, Sparling, & Owen, 2001), Project TEAM (Teaching Exercise/Activity Maintenance; Buckworth, 2001), and Training Interventions and Genetics of Exercise Response (TIGER) Study (Sailors et al., 2010), among similar programming and intervention efforts that have been introduced and studied (Adams, 1992; Brynteson & Adams, 1993; Corbin & Laurie, 1978; Flath & Leigh, 1966; Gibson, 1975; Going, 1984; Hallatt & Koenig, 1967; Laurie, 1981; Pearman et al., 1997; Slava, Laurie, & Corbin, 1984; Terry, Erickson, & Johnson, 1977; Trimble & Hensley, 1990).

The intervention behind Project GRAD integrated concepts and methods from exercise science and behavioral theory into a college-credit course. The purpose of the lecture component was to educate college students about the risks of physical inactivity, recommended PA patterns to promote health and fitness, principles of injury prevention, and concepts and methods of behavioral self-management. Each lecture was divided into two parts: exercise topics discussion and behavioral change methodology. The lab taught physical activities and helped students use self-management techniques to implement their own PA program. The ability of the intervention to increase the adoption and maintenance of PA among young adults transitioning from university to adult roles was evaluated. Results indicated differences between the responses of men and women to the intervention. For men, there were no effects, in general. There were significant effects for women on three PA outcomes: increased total caloric expenditure and improved amounts of both

strength and flexibility exercise. The most significant finding was the effect of the intervention on women's total energy expenditure in leisure time (Sallis et al., 1999b).

The ARTEC Project was a quasi-experimental study designed to promote on-campus and total PA for inactive students at an Australian university campus. The intervention comprised a program of activity classes available to the students for no charge, such as weight training and aerobics. In addition, the interventions included demonstrations of various activities, fitness assessments, swimming passes to a local facility, and on-campus media promotion. This project also attempted to identify determinants of PA. For those insufficiently active, predictors included less social support from family and friends, lower enjoyment of activity, unemployment for women, and (older) age for men. For students who were not active at all, some factors included strong gender preferences for activities and the desire to have greater accessibility to facilities and other similar sources of assistance. Researchers found that males were motivated to be active by weight gain and that females were motivated by weight loss, appearance, and exercising closer to home. From these findings, the intervention was designed to match program offerings to students' preferences for activities, gender-specific motivations to be active, types of assistance perceived to be important, along with social support and enjoyment. The intervention program lasted for 8 weeks and resulted in a significant increase in the proportion of students reporting higher levels of PA. ARTEC demonstrated that matching intervention offerings to students' perceived needs and preferences could influence PA in the university setting (Leslie et al., 2001).

Project TEAM was a 3-year research project on exercise adherence funded by the National Institutes of Health. It began in Fall 1998 at a large Midwestern university. Much like the participants in Project GRAD, its intervention group consisted of students enrolled in a 2-credit academic exercise conditioning course (aerobics, jogging, weight training); however, unlike the other studies, the TEAM Project also included long-term follow-up every 6 months for 2 years. The intervention included a 50-min lecture once a week and 45-min activity three times a week, followed by the periodic testing of outcome variables, including fitness testing. Theoretically based

modifications were implemented in the lecture segment, and then outcome variables were compared between the intervention group and the control group, or traditional PE curriculum. Aside from preliminary results suggesting that participation in the health and PA intervention courses were related to positive physical improvements, health attitudes, and behaviors, overall results were inconclusive. Seasonal effects were also found, as the study took place in the Midwest where there are four distinct weather seasons. Student participants from the fall conditioning course had significantly lower aerobic capacity and higher resting heart rate when retested after the winter. Participants in the course during the spring and retested after the summer had an increased aerobic capacity and decreased resting heart rate (Buckworth, 2001).

The TIGER Study began in 2003, introducing sedentary college students to regular exercise through a 3-day-a-week course taken for credit. The study examined the roles of genes related to adiposity and metabolism regarding body fat, blood pressure, and blood components. The program included 30 weeks of exercise intervention, along with pretesting and posttesting of the variables. While each exercise session lasted a minimum of 40 min, the educational component provided instruction in fitness and physiology relevant to public health including cardiovascular health, body composition, nutrition, genetics, energy balance, exercise program design, stretching, and exercise tracking. An online activity-logging program was also available for students to document exercise performed outside of class. Results from this study indicated that moderate exercise intensity is considered appropriate and achievable for young adults. Most of the study participants complied with the exercise protocol, which allowed for the assessment of exercise adherence and dose. Furthermore, a substantial contingent of the participants persisted in exercise despite encountering barriers such as finances, time, and other obligations. College credit appeared to be a motivating factor for taking course (Sailors et al., 2010).

Additional Associated Research Findings

Other studies have provided similar results and support for these CPE-related program interventions. Slava et al. (1984) conducted a study at Furman University in 1973 on a similar concepts-based PE course. The study revealed significant improvements in health-related

knowledge, attitudes, and behaviors among students taking this required class. Slava et al. reported that students exposed to a CPE course exhibited greater knowledge for making health decisions than did those who did not take the course. In addition, alumni who took the course participated more frequently and had more positive attitudes toward PA. Regarding other physical health characteristics, study participants also weighed significantly less and not only were knowledgeable about but also exhibited normal blood pressure and cholesterol levels. Separate findings from another study supported these results and suggested that cognitive health information was more valuable when provided in conjunction with PA (Powell, 1989).

Additional studies conducted by Adams (1992) and Brynteson and Adams (1993) compared the attitudes and exercise habits of alumni from colleges with varying degrees of PE programs and found not only a correlation between the CPE programs and positive effects on health and behavior, but also a dose–response relationship. The four colleges that were examined possessed different levels of PE requirements or offerings: College A had a general education requirement of one PE course every semester for a full-time student (one foundational PE course the first semester, with a 1-credit activity course every semester thereafter until graduation), plus a 1.5-mile running field test and participation of additional exercise outside of class; College B had a general education requirement of 4 credits of PE; College C had a general education requirement of 2 credits of PE; and College D did not have any general education requirements that specified PE, but rather offered a 1-credit PE activity course that students could elect from a list of art, music, speech, or PE courses to meet an area of general education courses. Statistical analyses indicated that alumni perceived the value of their college PE program in terms of fitness knowledge, attitudes toward fitness, and current exercise habits. College A alumni perceived their college PE program as having a significantly greater relationship to their current fitness knowledge, attitude toward fitness, and exercise habits than did alumni from the other three colleges. For knowledge, College B alumni placed greater value on college PE than did College D alumni and greater impact on exercise habits than did College C alumni. Also, significance was found regarding the value of exercise and its benefits, with Colleges A and B having a higher perceived value

than College D. Alumni from Colleges A, B, and C indicated higher exercise frequency than alumni from College D. Overall results indicated that the more credits required in PE, the more favorably alumni after 2 to 11 years of follow-up perceived their PE program and its contribution to their current knowledge, attitudes, and habits related to exercise and fitness. This suggests that differences in exercise behavior and frequency could originate from the underlying difference in philosophy between ASPE and CPE programs and that a CPE approach to required PE results in more physically active alumni than the ASPE approach.

A similar study by Ermler, Kovar, and Reinders (1993) examined resting heart rate, intent to exercise, and attitude toward exercise. The study examined three types of lifetime fitness courses. All met two times a week for 14 weeks, though the course structure was varied. Group 1 included 1 day of lecture and 1 day of activity each week. Group 2 consisted of three lectures and then one activity day over 2 weeks. Group 3 engaged in 20 min of activity and 20 min of lecture every class meeting. Course objectives, requirements, and activity protocols were identical for all three group sections. Results indicated that all groups experienced significant differences in resting heart rate and intent to exercise, though not in attitude toward exercise. Between-group differences were also significant and post hoc measures further indicated that Group 3 was significantly different from Groups 1 and 2. Group 3 course structure also improved resting heart rate significantly better than the course structures for Groups 1 and 2. Conclusions were made that all three class structures were equally effective in improving intent to exercise, with Group 3, including both activity and lecture each day, demonstrating the most effectiveness in improving cardiorespiratory endurance.

Additional research by Sparling and Snow (2002) investigated the PA patterns in recent college alumni. The alumni reported frequency of participation for three levels of PA: vigorous, moderate, and resistance training exercise. Relative to recommended levels of PA, 32.7% of respondents engaged in vigorous PA on 3 or more days a week, 6.0% participated in moderate-intensity PA on 5 or more days a week, and 21.0% engaged in resistance or calisthenics training on 3 or more days a week. Further, related findings by Sparling (2003) suggested that 84.7% of those who were regular exercisers as

college seniors were as active or more active at the time of the study survey, and 81.3% of the nonexercisers as college seniors reported being about the same or less active at the time of the survey. There was a significant association between exercise behavior as college seniors and exercise behavior as alumni. The participants who were regularly active in college were more likely to participate in recommended levels of PA, vigorous or moderate, after graduation. Logistic regression also identified three significant predictors of current PA level including attitude toward exercise, confidence in setting up an exercise program, and exercise behavior as a college senior.

Despite a lack of current or more recent research studies, the knowledge of theory and application learned through previous work continues to guide and support CPE programming. Since its early implementation in the 1960s, slow evolvement in the 1970s, and growth surge in the 1980s, this type of programming has undergone a significant amount of study and implementation in the 1990–2000s (Corbin & Laurie, 1978). Trimble and Hensley (1990) reported that approximately half of the surveyed colleges and universities offered a concepts-based course, and 33% of all higher education institutions accepted this type of PE course as a general education requirement. Other statistics stated that by 2000, the percentage of higher education institutions offering a lecture–laboratory course increased to 60%. Further growth occurred with 90% of the reporting colleges and universities offering CPE in 2009 (Kulinna et al., 2009). A 2016 study indicated that 77% of randomized institutions in the southeastern United States offered and 46% required CPE (Williams et al., 2016). These were the latest statistics found regarding the study and implementation of this type of programming. Although there seems to have been positive trends in the increased offering and/or requirement of CPE in the last few decades, there has also been the threat of PE being discontinued as a requirement, or even eliminated altogether, because of the lack of financial resources and call to revise or decrease graduation requirements (Naylor, 1997). To further support efforts aimed at preserving and improving CPE (and ASPE) programming, additional research needs to unveil contemporary practices and emerging trends (Hensley, 2013).

Importance of Physical- and Health-Related Knowledge and Practice in Young Adults

CPE targeted at young adults in colleges and universities would be beneficial to their personal health, and public health in general, and higher education institutions offer one of the last collective efforts to intervene. CPE and related programming can reach and influence a large population of young adults, providing education and motivation to encourage healthier behaviors, especially the adoption of PA and exercise into their lifestyle (Fischer & Bryant, 2008). Furthermore, college and university students receiving comprehensive, fundamental CPE will be better prepared to approach health proactively, not only as consumers, but also collectively as future professional and civic leaders (Kupchella, 2009).

The physical health benefits of regular moderate PA and exercise are numerous including a decreased risk of cardiovascular disease, some forms of cancer, non-insulin-dependent diabetes, osteoporosis, and early mortality, as well as improved weight management, performance, stamina, and quality of life (Blair et al., 1996; Blair, Kohl, Barlow, Paffenbarger, & Gibbons, 1989; Blair et al., 1995; Calfas et al., 2000; Leslie et al., 2001; Paffenbarger, Hyde, Wing, & Hsieh, 1986; Sailors et al., 2010; HHS, 1996, 2000, 2008, 2010). Exercise is also associated with improving other aspects of health including psychological, intellectual, and social dimensions (Wankel & Bonnie, 1990; Warburton, Crystal, & Bredin, 2006). In fact, young college and university adults may stand to benefit the most, given their transitional stage of growth and development as they embark on their independent lives.

In addition to physical and health education, CPE may promote a positive attitude toward an active lifestyle and motivate a change in behavior through the adoption of exercise. These characteristics are hypothesized to be positively associated with increased levels of PA and exercise. Consequently, improved overall health is not a short-term benefit—participation in a concepts-based program extends a greater likelihood of a person following such behavior and attributes later in life.

Method

Purpose and Design

The purpose of this study was to determine whether CPE programming would be more effective in improving levels of physical fitness, compared to traditional ASPE programming at the higher education level. This study included two intervention groups. Intervention Group 1 ($n = 27$) participated in a CPE course consisting of a lecture class and laboratory exercise activities. Intervention Group 2 ($n = 29$) participated in only an ASPE activity course.

The study was conducted at a medium-sized Midwestern university. Participants were students selected from a required general studies CPE wellness course and an elective ASPE aerobic fitness course. Research approval was granted from the institutional review boards at the authors' institutions. Study participation was noncompensated and voluntary. The students were ensured that participation would not affect their grade. The study participants recruited from these two courses signed informed consent and health history forms prior to engaging in any activity.

Participation in fitness assessments was a required component for many ASPE courses and for the required CPE course and its associated labs. Each assessment comprised a battery of tests that measured nearly all the health-related components of physical fitness.

Measures

Cardiorespiratory endurance, muscular endurance, body composition, and flexibility were selected as measurements of each student's fitness level; muscular strength was not included in this battery of tests because of the lack of proper equipment and safety. The individual tests included in these courses' fitness assessments were utilized based on several factors. During these fitness assessments, typically several sections of students participated, ranging upwards 50–100 students at a time, in a large gym or arena-type setting. Time and cost efficiencies, including the need for minimal equipment and personnel warranted field tests such as these. To improve validity and reliability, the researchers took various actions, including offering consistent assessment session times at the beginning and end

of the semester so that students could undergo the assessments on approximately the same day of the week at the same time. With equipment and personnel also serving as factors, the only feasible actions the researchers could take were to ensure that the number of personnel assisting with the assessments was adequate to provide proper supervision and monitoring, and to ensure personnel had associated training and preparation in the fitness testing protocols. The assessment sessions were administered by the CPE course and lab instructors, which numbered approximately three assistant professors and two staff members; the ASPE course instructor; and supplementary personnel including adjunct professors, instructors, coaches, and students from the university's health and exercise science degree program. Personnel were properly trained in the testing protocols. The CPE main course and lab instructors and the ASPE course instructor led the entire assessment, including each testing protocol, while the supplementary personnel provided additional monitoring, along with general assistance and supervision. The researchers employed these actions to increase the validity and reliability of the fitness assessment procedures and measures.

Cardiorespiratory endurance was measured through the YMCA 3-Minute Step Test, formerly known as the Rasch Step Test. Though reliability and validity measures for this assessment method are scarce, comparatively the Queens College Step Test (which bears similarity, except for a 16.25-in. bench height) has shown a test–retest reliability for recovery heart rate as $r = 0.92$. Likewise, correlation between recovery heart rate and VO_2 max has measured validity as $r = -0.75$ (McArdle, Katch, Pechar, Jacobson, & Ruck, 1972). Aside from predicting or extrapolating the VO_2 max from the resting heart rate measure, this assessment does not estimate an individual's aerobic functional capacity or VO_2 max data, so its validity is limited (Santo & Golding, 2003). This test involves stepping up and down at a 12-in. bench height at a specified cadence of 24 steps/min for 3 min, followed by a recovering heart rate measurement (ACSM, 2010a). This recovery heart rate was recorded and was used for categorizing physical fitness levels through comparison to established criterion-referenced or normative standards. It should be noted that the lack of control over modifications of environmental and behavioral factors can challenge the outcome. However, the step test is

often used because of its utility with most populations outside of a laboratory setting (ACSM, 2010b).

The abdominal crunch test as specified by the Canadian Society for Exercise Physiology measured muscular endurance. This simple field test demonstrated the maximum number of slow, controlled crunches (curl-ups) that could be performed in 1 min in time with a metronome at a rate of 25 beats/min without rest (ACSM, 2010b; Canadian Society for Exercise Physiology, 2003). Although its validity testing has yielded low correlations and experts often acknowledge—primarily based on the issue of specificity—that interpretation of findings is challenging, this assessment is often used to assess muscular endurance (Sparling, Millard-Stafford, & Snow, 1997).

The YMCA Sit-and-Reach Test measured flexibility. This assessment method was reflective of the hamstrings and lower back flexibility, in particular. At least one source claimed this test was a valid measure of this localized flexibility. In addition, reliability may be dependent on the warm-up that proceeds the test, as well as whether the same procedures are followed each time the test is conducted (Wells & Dillon, 1952). The sit-and-reach test is often used in the field setting (ACSM, 2010b).

Body composition was assessed via bioelectrical impedance by the OMRON Body Fat Monitor. This device and its protocol involved using a properly calibrated monitor and solicited personal data including height, weight, age, and gender. Bioelectrical methods are subject to scrutiny of their validity, though it has been claimed that their accuracy is similar to skinfold measurements if stringent protocols are followed and valid equations are used (ACSM, 2010b).

Procedures

A fitness preassessment at the beginning and a postassessment at the end of the semester were completed for each course. These helped establish the student participants' baseline and progression of their fitness- and physical-health-related measures. Each fitness assessment was administered by the CPE course and lab instructors and the ASPE course instructor, along with supplementary personnel including adjunct professors, instructors, coaches, and health and exercise science degree program students. All underwent training and preparation for proper administration of the fitness testing

protocols. Because of the high number of student participants, students were asked to pair up to assist each other in counting repetitions, tracking time, and recording measurements. Upon the conclusion of the battery of fitness tests, scorecards containing the measures were submitted to the assessment personnel.

Following the fitness preassessment, the courses commenced following their set semester curriculum. After 30 class sessions of participation in both sections of the courses, the students underwent the same battery of tests for the fitness postassessment. Again, the same protocols and procedures were followed as a way of ensuring consistency. After participation in all the individual fitness tests and completion of the recorded fitness measures, students turned in their scorecards for a final time. Postassessment fitness measures were then compared to the preassessment measures.

Intervention Group 1

Intervention Group 1 consisted of 27 students enrolled in a section of a lecture and a lab, which comprised a required CPE course. Throughout the semester, the students followed an approximate 14-week lecture-based wellness curriculum and associated 10-week lab section focusing on aerobic fitness.

Lecture. The lecture component was scheduled for two 50-min class periods a week for the semester. Though taught by several instructors, the lecture sections were required to follow a single fitness- and health-based curriculum including behavioral change, nutrition, body composition and weight management, cardiorespiratory endurance, muscular strength and endurance, flexibility, cardiovascular disease and cancer prevention, stress management, substance use/abuse, and sexually transmitted infections. Like the fitness assessments for the lab course, a cognitive preassessment and postassessment were administered at the beginning and end of each semester in the lecture course. Four written exams were administered during the semester as a method of assessing student understanding of the course material. Attendance was mandatory.

Lab. Although each laboratory section focused on one among a variety of exercises, the lab chosen in this pilot study was aerobic fitness. The lab component focused on a designated curriculum of aerobic exercise activities and met three times a week for 50 min for 10 weeks, for a total of 30 classes or 1,500 min. The fitness preassessment and postassessment were required, as was attendance.

Intervention Group 2

Intervention Group 2 consisted of 29 students enrolled in an elective ASPE aerobic fitness course focused on a designated curriculum of aerobic exercise activities. It met two times a week for 50 min for 15 weeks, for a total of 30 classes or 1,500 min. The fitness preassessment and postassessment were required, as was attendance.

Results

Data from the fitness preassessment and postassessment measures were compared within participant as of way of assessing each student's fitness development, as well as between participants as of way of investigating the difference between the courses. For statistical purposes, the acquired fitness assessment scored data were entered into SPSS, wherein they were analyzed with a paired samples *t* test, independent samples *t* test, and a one-way analysis of variance (ANOVA) with an original significance level of $p < .05$. Though, because groups were being examined comparatively, the level of significance was decreased to $p < .025$ (one-tailed), reflecting the optimal fitness levels, including increased measures for muscular endurance (ME) and flexibility (F) and decreased measures for cardiorespiratory endurance (CRE) and body composition (BC). For each fitness component measure: ME-upper one-tailed, CRE-lower one-tailed, BC-lower one-tailed, F-upper one-tailed.

Data entered into SPSS were defined by each of the fitness components, and an additional variable was created for each based on the differences in the fitness preassessment and postassessment measures. The study began with 56 participants and decreased to 49 after attrition. For students who were absent or unable to complete various tests, those data values were treated as missing and omitted from the data analysis.

Comparison of the health-related fitness component means showed improvements in all categories for both intervention groups. ME and F increased, whereas CRE and BC decreased, all of which are favorable outcomes(see Figure 1). A closer examination of the difference in the health-related fitness component means showed that Intervention Group 1 experienced greater improvements in ME and BC, whereas Intervention Group 2 saw a greater improvement in CRE and modestly greater improvement in F (see Figure 2).

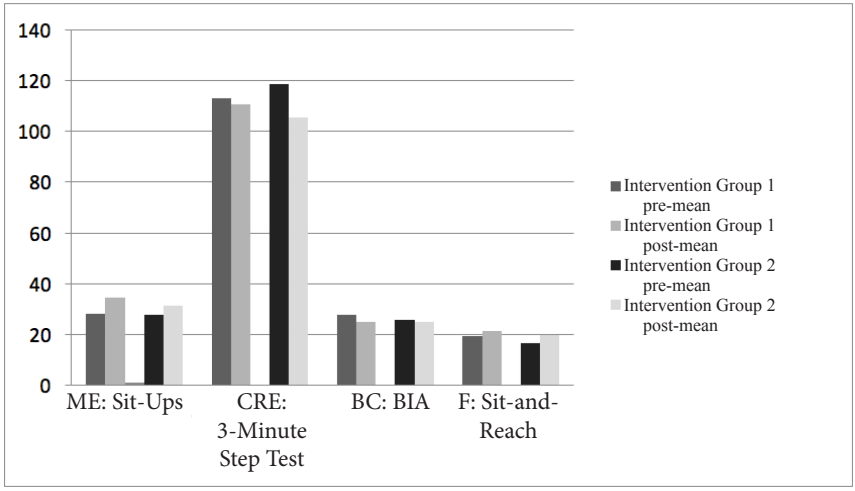

Figure 1. Fitness component means. ME = muscular endurance; CRE = cardiorespiratory endurance; BC = body composition; BIA = bioelectrical impedance analysis; F = flexibility.

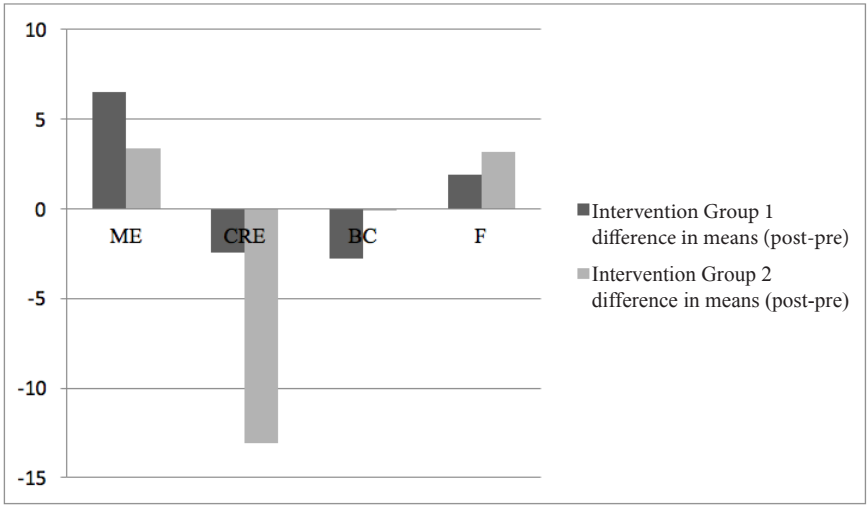

Figure 2. Differences in fitness component means. ME = muscular endurance; CRE = cardiorespiratory endurance; BC = body composition; F = flexibility.

A paired samples *t* test indicated statistically significant effects for all the prefitness and postfitness component measures. With a one-tailed test and *t*(critical) = 2.011, the measures suggest that all students made fitness improvements (see Table 1).

Table 1
Paired Samples t Test Results

	Pair	*df*	*t*	*p***	*p**
ME	pre, post	48	-5.705	.000**	.000*
CRE	pre, post	48	2.242	.030**	.015*
BC	pre, post	48	2.231	.030**	.015*
F	pre, post	48	-6.237	.000**	.000*

Note. ME = muscular endurance; CRE = cardiorespiratory endurance; BC = body composition; F = flexibility.

**$p < .05$. *$p < .025$.

More within-group differences were examined with Levene's Test for Equality of Variances. It indicated that ME and F were homogeneous, whereas CRE and BC variances were significantly different from the beginning, so equal variances were not assumed in these two latter interpretations. The difference in ME was almost significant at the $p < .025$ level and would have been significant at the $p < .05$ level. The difference in F would have also been nearly significant at the $p < .05$ level; however, none of these measures were significant at the intended level of $p < .025$ (see Table 2).

Table 2
Independent Samples t Test Results

Difference in measures (post–pre)	*df*	*t*	*p***	*p**
ME	47	1.848	.071	.035
CRE	47	1.572	.120	.0615
BC	47	-1.045	.297	.1505
F	47	-1.648	.106	.053

Note. ME = muscular endurance; CRE = cardiorespiratory endurance; BC = body composition; F = flexibility.

**$p < .05$. *$p < .025$.

No significant effects were found from the ANOVA for any between-group differences for the fitness component measures. Fitness component difference measures indicated that both groups seemed to be comparatively effective in improving the physical fitness components in this study (see Table 3).

Table 3
ANOVA Results

Difference in measures (post–pre)	*df*	*t*	p^{**}	p^{*}
ME	1, 47, 48	3.414	.071	.035
CRE	1, 47, 48	2.471	.120	.0615
BC	1, 47, 48	1.092	.297	.1505
F	1, 47, 48	2.716	.106	.053

Note. ME = muscular endurance; CRE = cardiorespiratory endurance; BC = body composition; F = flexibility.

$^{**}p < .05$. $^{*}p < .025$.

Discussion

Both groups in this study experienced significant gains, though the data did not support the notion that university students who participate in CPE programming would demonstrate greater positive improvements in their physical fitness compared to students who participate in a traditional ASPE course. Significance was found within the groups among the students in each course, but it was not demonstrated as predicted between the two courses. According to the collected data, each group of students experienced gains in their fitness levels. In fact, it appears that nearly all students experienced successful exercise and fitness gains from participating in each of the PE offerings.

The intended intervention (Intervention Group 1) of this pilot study was most similar in theory and design to Project GRAD and the TIGER Study. It also shared some similarities to other research including Project ARTEC, Project TEAM, and that conducted by Adams. Like these, the CPE course examined in this study integrated concepts and methods from exercise science, health, and behavioral change, from which the effectiveness to increase exercise

and physical fitness levels was predicted. It is hoped that like the institutions in the research comparing college PE requirements and offerings by Adams (1992), the institutions requiring PE will more positively influence their alumni exercise participation, through the demonstration of greater levels of exercise adherence after they graduate.

This study and the other studies support CPE programming and the beneficial effects it can have on a person's health behaviors, including exercise and physical fitness, and overall physical health. In addition to fulfilling some of the goals and objectives of Healthy Campus 2010, such programming also fosters the growth of other public health initiatives including Healthy People 2010 and 2020, along with HHS's National Physical Activity Plan. Furthermore, the adoption of CPE programming into the general education requirements could profoundly affect students' lives through enhancing the way they approach their own health, including PA and exercise, as well as broach public health and health-related issues as wiser consumers and leaders in society.

Conclusion

It was hoped that this study would provide additional support for the effects of CPE programming and consequently reinforce the value of such courses at the higher education level. Although the data did not indicate significant differences in physical fitness improvement between the CPE and ASPE groups, nearly all students experienced successful exercise and fitness gains. Some colleges and universities have dropped PE and health courses over the years, but this study seems to validate the need for required PE in the higher education curriculum (Kupchella, 2009). Whether in the form of CPE or ASPE, these courses will benefit all students. However, it is still theorized that CPE programs will provide a greater level of physical and health education, likely producing a stronger foundation, understanding, and appreciation of exercise and health in students during the semester of course enrollment and throughout their lifetime.

Recommendations for Future CPE Research

Much of the available research investigates the value of (required) PE; however, few studies have examined the long-term effects and

value of PE, especially CPE, at the higher education level. A future study could include a control group not participating in an ASPE or CPE course, to indicate more clearly the benefits of each. Regarding research specific to CPE, Project GRAD, along with studies by Adams (1992) and Brynteson and Adams (1993), attempted to look at the attitudes and exercise habits and adherence of alumni. Though, these studies are few. A future direction for research could include following a sample of students from the time of their enrollment in the college or university PE courses and 1 year after, at graduation, or even 5 or 10 years out of school. This time frame could provide a larger window for finding effects, at a later date. Also, future research could examine the cognitive and psychological effects related to intent, attitudes, value, or self-efficacy associated with participation in exercise.

Recommendations for Future CPE Programming

It has been reported that alumni from institutions with more credits of required PE place a greater value on their college or university PE program and exercise more frequently. Among other authors, Terry et al. (1977) and Adams et al. (2006) support the belief that students are more likely to engage in regular PA and exercise when they appreciate its importance more. Furthermore, the findings of this study and other studies suggest that individuals who have been involved in CPE programming possess greater knowledge to make informed decisions regarding PA and are likely to participate in exercise properly and experience improved levels of physical fitness and physical health, in general (Adams, 1992). On behalf of this group of authors, it is recommended that all college and university students be offered either elective or required CPE participation that will benefit their exercise and fitness levels, health, and well-being as they embark on their independent lifelong journeys as more active, healthier, wiser, and productive advocates contributing to society.

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PHYSICAL ACTIVITY

Effects of a Classroom Walking Program on Physical Activity Accrual and On-Task Behavior

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Abstract

The Walking Classroom (TWC) program provides a structured classroom physical activity (PA) break that incorporates academic content. The purpose of the study was to (a) explore differences in PA accrual on TWC school days versus non-TWC school days, (b) examine on-task behavior before and after TWC, and (c) better understand student and teacher experiences with the program. A mixed methods case study design was used as a method of examining the experiences of one fourth grade classroom and one classroom teacher in the western United States. Twelve weeks of pedometer steps were collected for the entire school day. Student on-task behavior was systematically observed for 10 weeks with 5-s interval recordings approximately 30-min before and after the implementation of TWC. Repeated measures ANCOVA (n = 22) revealed no significant differences between TWC days (M = 7,726 steps) and non-TWC days (M = 7,934 steps). Significant increases were observed in student on-task behavior following TWC breaks (+7.5%, t = -6.782, p < .001, Cohen's d = .944). Three major themes emerged from the qualitative data: (a) students had fun learning while exercising, (b) technology challenges hindered TWC

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implementation, and (c) social interaction was desired during TWC breaks. Although findings indicated that TWC days were no different than non-TWC days in terms of PA accrual, teacher logs suggested that an additional recess was provided on non-TWC days, thus washing out any potential PA effect. The students and teacher had positive impressions of TWC overall, but offered suggestions for how TWC could be improved.

Since 1980, childhood obesity rates have tripled, with rates of obesity among 6- to 11-year-olds more than doubling from 7% to 17.5% and rates of obesity among teens quadrupling from 5% to 20.5% (Centers for Disease Control and Prevention [CDC], 2014). Schools have been identified as primary sites for promoting physical activity (PA), because children and adolescents spend most their time in school (Mahar et al., 2006). Yet, because of budget constraints and pressures on increasing academic achievement scores, opportunities for students to be physically active in schools have been declining (Mahar et al., 2006).

Public health authorities recommend that schools provide PA opportunities to help children meet the 60 min/day PA guideline (CDC, 2010). Many schools provide insufficient PA opportunities, with students in some elementary schools receiving as little as 15 to 20 min of moderate to vigorous PA during school (Carlson et al., 2015). A sedentary lifestyle influences not only physical health, but also cognitive and brain health (Chaddock, Pontifex, Hillman, & Kramer, 2011). When not exposed to enough activity throughout the school day, students are more likely to be off-task and fidgety (Howie, Schatz, & Pate, 2015).

A whole- school approach, such as the Comprehensive School Physical Activity Program (CSPAP) model, is recognized as a way for children to accumulate daily PA (Carson et. al., 2014). A component of a CSPAP that few studies have examined is the effectiveness of the integration of PA during the school day (Howie, Beets, & Pate, 2014). Classroom PA breaks are a potential solution for increasing PA levels, because they have been shown to contribute meaningful amounts of PA and improve student on-task behavior and academic skills and decrease classroom behavior issues (CDC, 2010; Erwin, Fedewa, & Ahn, 2012; Katz et al., 2010). With the increase of PA in

venues other than physical education classes, additional opportunities such as classroom PA breaks need to be developed and evaluated (Donnelly & Lambourne, 2011).

The Walking Classroom (TWC) organization created an innovative program that provides a structured PA break while incorporating academic content. Students take a brisk 20-min walk as a class while listening to a kid-friendly podcast that comes preloaded on a Walk Kit (audio device; see Figure 1). The curricular materials align directly with fourth and fifth grade Common Core Standards and contain more than 100 preloaded podcasts at each grade level. Anecdotally, teachers report after implementing TWC that students retain information better, demonstrate improved behavior and engagement in the classroom, and show increased performance on standardized exams (The Walking Classroom Institute, 2016). However, no known studies have determined the amount of PA that the program can provide and how participation may affect classroom behavior. Therefore, the purpose of this study was threefold: (a) to explore the differences in PA accrual on the days TWC was implemented to non-TWC days, (b) to determine if the program affected student on-task behavior, and (c) to develop a deeper understanding of student and teacher experiences with the program.

Figure 1. Audio kit device.

Method

Prior to data collection, the university institutional review board and the school in which the project was implemented granted approval for this study. The parents of the students gave written consent, and the students verbally affirmed assent. An entire fourth grade classroom (N = 28) had the opportunity to participate in the study, 96% of the students and their parents agreed, 23 students participated in the focus groups, and 22 were included in the final statistical analysis.

School Environment and Participant Characteristics

The school selected for this study was located in the western United States. It included approximately 670 students in kindergarten to fifth grade. Sixty-one percent of the student population was eligible for free or reduced lunch. The campus was surrounded by open space, along with a paved walking loop that worked well with the implementation of TWC. The school was selected because it received access to a classroom set of TWC as part of the district's student wellness program. This was the first time the students and teacher had used the program. The school, teacher, and research team had no relationship with TWC.

The school physical education teacher and the classroom teacher collected demographic information. The school physical education teacher collected height, weight, and laps completed on the Progressive Aerobic Cardiovascular Endurance Run (PACER) during PE classes using FitnessGram testing protocols (The Cooper Institute, 2010). The classroom teacher provided ethnicity, gender, and age information, with permission from the school principal. Student VO_2 max was calculated using the Quadratic Model (Mahar, Guerier, Hanna, & Kemble, 2011) and BMI was calculated using the CDC BMI calculator for children and teens (CDC, 2016). Ten boys and 12 girls (aged 9 to 11) from one fourth grade classroom participated in this study. According to VO_2 max and BMI results, most students were in a healthy zone. Most students were Latino and Caucasian (see Table 1 for complete demographic characteristics).

The classroom teacher was female with 16 years of teaching experience. She held a bachelor's degree in interdisciplinary studies with an emphasis in elementary education and a master's degree in educational leadership with a principal license. The classroom teacher had a strong background in PA, studying ballet throughout her life. Her students had many opportunities throughout the school day to be active, including PA breaks, sitting on exercise balls instead of chairs, and extra recess periods.

Table 1
Student Demographic Characteristics

Participant characteristic	Girls	Boys	Total
Total (*n*)	12	10	22
Age (years)	10.2 (.17)	10.3 (.34)	22
VO_2 max (ml/kg/min)	38.4 (2.93)	42.7 (3.74)	22
BMI (kg/m^2)	18.3 (2.06)	16.5 (2.03)	22
BMI Percentile (age/gender normed)	56.8% (.23)	28.7% (.266)	22
Ethnicity			
Caucasian	3	5	8
Latino	8	4	12
Other	1	1	2

Note. Values presented as means (standard deviations).

Research Design

This study used a mixed methods design with quantitative data on PA and student on-task behavior and with qualitative data on participant experiences. This study used pedometers to measure PA accrual and systematic observation to record student on-task behavior. A deeper understanding of TWC was developed through a teacher interview and student focus groups. The classroom teacher kept weekly logs throughout the study to record any contextual factors that could influence PA accrual and TWC implementation.

Measures

Pedometers. FitStepPro pedometers (Gopher Sport) measured total steps during the school day. Pedometer reliability is moderate to high in children 5 years or older; thus, pedometers are deemed

an appropriate measure of PA in elementary-aged children (Clemes & Biddle, 2013). Pedometers were checked for accuracy with the 100-step walk test (Vincent & Sidman, 2003), and all values were found to be within ±5% of observed steps.

Students were asked to clip the pedometers onto their hip at the beginning of the school day and wear them until the end of the school day (~8:20–3:45). Prior to dismissal, students uploaded their pedometer data using an accompanying USB uploader device. Prior to the study, a 1-week practice data collection occurred that ensured proper procedures were followed and that accounted for potential participant reactivity. PA data were collected at the end of each school day on TWC days (Tuesday and Thursday) and non-TWC days (Wednesday and Friday). Steps were repeatedly measured for 12 weeks during the spring semester.

Systematic Observation of On-Task Behavior. Student on-task behavior was measured with systematic observation (see Figure 2). The protocols for measuring on-task behavior were adapted from Goh (2014). A student was considered on-task (T) if he or she was working on an assigned task, discussing work with a partner, looking at the teacher, moving in response to teacher directive, or asking questions. A student was marked off-task (F) if he or she was bouncing out of control on an exercise ball, fidgeting, excessively moving or talking without teacher directive, had his or her head on the desk, or was staring out the window. A student was coded missing (X) if he or she was absent, out of the room, or away from his or her desk.

Interobserver reliability among members of the research team was established prior to formal data collection (92% agreement), and periodic checks were conducted on one third of observations as a method of accounting for observer drift, with each reliability score being greater than 80%. The observers listened to an audio recording via headphones that had a beep every 5 s. At the signal, the observer noted the type of behavior the student was exhibiting. The observer was present approximately 30 min before and after TWC. With 360 observations per 30 min, each student was observed approximately 12 times during each observation period, resulting in 6,529 individual observations during the study.

On-Task Behavior Observation

Observer: _____ Date: _____ Start Time: _____ Stop Time: _____ Pre Post

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

On Task **(T)**: Working on assigned task, discussing work with a partner, looking at the teacher, moving in response to teacher directive, asking questions.

Off Task **(F)**: Bouncing out of control, fidgety, excessive movement or talking without teacher directive, tapping arm/leg, head on desk, staring out the window.

Student not in desk **(X)**: Absent, out of the room, away from desk as a result of teacher directive.

Observation Notes

- One primary observer and a secondary observer coming in for ≥ 20% of observations for reliability checks.
- Approximately 30-min observation before and 30-min observation after Walking Classroom.
- The numbers on the top of the table represent student number.
- The sequence will start at Student 1 and go to Student 30 then start back over at Student 1.
- Each observer will observe individual students for 5 seconds before moving on to another student, until all students in the class are observed.
- The researchers will repeat this sequence for the entire observation period.
- Each observer will listen to an MP3 file via headphones that signal every fifth second. At the signal, the observer will note the appropriate behavior code (BT, BF, T, F, X) and begin observing the next student.
- With 360 observations per 30-min period, each student will be observed approximately 12 times.

Figure 2. Observation form to code on-task behavior.

Teacher log. The classroom teacher completed a teacher log at the end of each data collection day. The purpose of the log was to monitor pedometer activities and to keep track of extenuating circumstances that may have affected PA levels. In addition to keeping track of whether TWC was implemented each day and what times the pedometers were put on and taken off, the teacher recorded how many minutes the students spent in physical education, at recess, or in other classroom-based PA breaks.

Qualitative data collection. At the end of the spring semester, four student focus groups (n = 23) and one teacher interview were conducted. The purpose of the interviews was to see how the students and the teacher felt about TWC. The teacher interview was related to five topics: (a) overall experience with TWC, (b) ease of use, (c) perceived student changes in PA, (d) safety, and (e) enjoyment. Student focus groups were related to three topics: (a) overall experience, (b) changes in PA, and (c) enjoyment. The teacher interview was completed at the end of a school day, and the four focus groups were conducted during students' lunchtime. For all questions in the focus group interviews and the teacher interview, detail-oriented, elaboration, clarification, and contrast probes were used as a method of eliciting additional information from participants (Patton, 2002; Rubin & Rubin, 2005).

Data Analysis

Quantitative. Prior to analysis, data were screened for missing values, outliers, and violations of statistical assumptions. Students with excessive missing data due to absences (n = 5) were removed from the data set, resulting in an n of 22 for quantitative analyses. Outliers in pedometer steps were defined as > 14,000 steps in 1 school day and were subsequently treated as missing data. To maintain sample size in a repeated measures design, the research team imputed missing values using the mean of nearby points (i.e., the observation immediately before and immediately after), as described by Meyers, Gamst, and Guarino (2013). Means and standard deviations for the 12 weeks of PA data and 10 weeks of observational data were computed. Skewness and kurtosis values were beyond a desirable range (-1.781 to 3.04) for the on-task behavior variable; therefore, the research team conducted a square transformation to moderate this

violation. The transformation resulted in an acceptable distribution of values (Shapiro-Wilks, $p \geq .001$; Meyers et al., 2013).

Pearson product-moment correlation coefficients were calculated for demographic characteristics (VO_2 max, BMI) and PA variables (TWC-PA and Non-TWC-PA). Repeated measures analysis of covariance (ANCOVA) tested differences in PA between TWC and non-TWC days, determined changes in PA over time, and explored potential interaction effects. A paired sample *t* test tested differences in on-task behavior before and after TWC sessions. Significance for all statistical analyses was set a priori at $p < .05$, and effect sizes were calculated for significant findings with Cohen's *d*. Analyses were conducted through SPSS version 23.

Qualitative. Audio recordings from the student focus groups and teacher interview were transcribed into a word processing document using Dragon NaturallySpeaking (Nuance), and transcripts were uploaded into NVivo 10 for qualitative analysis. Two research team members independently coded the data and identified broad themes in a process of open and axial coding (Strauss & Corbin, 1998). Results from each researcher's analysis were then compared through a process of peer debriefing, and consistent themes were identified. Once identified, the themes were sent to the classroom teacher for member checking, which ensured credibility (Lincoln & Guba, 1985).

Results

Quantitative

Students averaged 7,726 steps (*SD* = 1,488) on TWC days, compared to 7,934 steps (*SD* = 1,407) on non-TWC days. Positive, moderate correlations were observed between PA and VO_2 max on TWC ($r = .594$, $p = .004$) and non-TWC days ($r = .646$, $p = .001$); thus, VO_2 max was included as a covariate in the repeated measures analysis. Results of the repeated measures ANCOVA revealed no significant interaction effects among the variables and no differences in PA between TWC and non-TWC days, $F(1, 20) = .000$, $p = .996$. Results from systematic observation data revealed on-task behavior increased from 85.9% to 93.4% following TWC implementation,

which was found to be a statistically significant increase, $t(21) = -6.782$, $p < .001$, with a large effect size (Cohen's $d = .944$; Cohen, 1998).

Qualitative

Three major themes emerged from the qualitative data: (a) students had fun learning while exercising, (b) technology challenges hindered TWC implementation, and (c) social interaction was desired during TWC breaks.

Students had fun learning while exercising. The students were asked about their overall enjoyment with the program, and they frequently stated that they had fun learning while exercising. One student mentioned, "You get to go outside and enjoy the day and also learn something." Another student said, "If they are telling you something about nature and you are outside walking you learn more about what is around you and you probably are enjoying it more." A student stated, "I also like TWC because it gave you exercise plus learning, and I love exercise and it helps me learn and I like to learn new things."

Technology hindered TWC implementation. Throughout the semester, the students, as well as the classroom teacher, seemed to run into numerous technology issues. The biggest problem seemed to be the battery life of the audio players. The classroom teacher stated,

The battery life seemed to run out very fast and did not give any warning. The podcast would shut off and it makes things challenging when the whole thing shuts down when you are halfway through the lesson. Then you have six kids are at three minutes, one kid is at four minutes and then students start complaining that their podcast is dead and have to start all over again.

Students agreed with the classroom teacher. One student stated,

> The one thing I didn't like about TWC is [the audio player] would shut off while we were walking and one day when I was walking, I would turn it on, then it would turn off, then turn on, then turn off.

Another student added, "The biggest issue is the batteries and it would shut off on me." Overall, the students and teacher perceived

that if the technology was improved, the experience would be more enjoyable.

Social interaction was desired during TWC breaks. The students and the teacher agreed that they wished they could have interacted more with each other during the program. A student noted, "I wish we were able to stop and ask questions to different students about the lessons." Another student added,

> I liked TWC, but I didn't like that I was not able to talk to my friends, because I like to learn new things and I want to tell them about it, but I wasn't able to during the walking.

The classroom teacher stated,

> When they were walking, I wish they could have been able to pause and talk to their neighbor about it. It is a long time for kids without interaction . . . I would love to see more interactive content somehow. I think moving makes them better, but I believe that social interactions will increase their comprehension even better.

Discussion

The purpose of this study was to examine differences in PA accrual on TWC and non-TWC days, explore differences in on-task behavior pre- and post-TWC, and to gain a better understanding of student and teacher experiences with the program. Results indicated no significant differences in PA accrual on TWC versus non-TWC days, an increase in on-task behavior following TWC implementation, and overall positive impressions of the program, with some reasonable suggestions for program improvement. Results contribute to a growing body of knowledge on the effectiveness of classroom PA integration strategies.

TWC and PA

When comparing TWC days to non-TWC days, the research team found no significant differences in student PA accrual. However, teacher logs indicated that on non-TWC days, an extra 20-min recess was typically provided. Therefore, for PA accrual,

it can be concluded that TWC provided as much PA as an extra 20-min recess. Students accrued an average of 7,726 steps/school day, which is consistent with findings from other PA intervention studies. Mahar et al. (2006) found that two 10-min classroom-based PA interventions per week increased overall PA accrual in fourth grade students and contributed an average of 6,063 steps/school day. Erwin, Beighle, Morgan, and Noland (2011) found similar results; step accrual was higher for students who received an additional PA break during the day than for students in the control group. With the addition of a 20-min PA intervention in this study, students accumulated approximately 63% of their daily recommended steps (12,000 to 16,000 steps/day for boys; 10,000 to 13,000 steps/day for girls; Tudor-Locke et al., 2011) during school hours. A typical school day lasts approximately 7.5 hr, and this percentage has been shown to be a substantial amount of PA during the school day, because students are active over half the day. When children meet the requirements of PA during the school day, PA has the potential to provide multiple health benefits such as healthier bones and muscles, improved cardiovascular health, and reduced risk for developing chronic disease (CDC, 2010).

TWC and On-Task Behavior

On-task behavior increased by 7.5% following TWC implementation. This finding is consistent with findings in other studies that have shown increases in on-task behavior post–PA intervention. Howie et al. (2014) found that after a 10-min intervention, student on-task behavior increased by 10%. Carlson et al. (2015) and Webster, Wadsworth, and Robinson (2015) also found that the implementation of a PA break positively affected student on-task behavior. Off-task behavior is perceived to be problematic in a school setting because of the potential to limit learning opportunities, which could negatively affect student academic performance (Godwin et al., 2016). Results from this study suggest that TWC positively affects student on-task behavior, which could help increase student academic performance.

TWC and Enjoyment

Research suggests that children are more likely to participate in PA when they perceive it to be enjoyable, and enjoyment is positively related to the desire to continue PA participation (Coulter &

Woods, 2011; Gao, Zhang, & Podlog, 2013). Students enjoyed TWC and reported the TWC program was fun to use. However, students and the classroom teacher mentioned that they would have enjoyed TWC more if they were able to interact with their peers during the intervention. Engagement with peers, mentors, and teachers is critical for student achievement and overall development (Brand & Kasarda, 2014). Thus, TWC could be improved through the integration of more opportunities for student interaction during the lessons.

The use of technology is not without limitations, and understanding how teachers and students view the implementation of technology is important in that technology may affect future participation in PA (Partridge, King, & Bian, 2011; Welk, Corbin, & Dale, 2000). When first exposed to the use of technology, students are curious and looking forward to using it; however, as they begin to run into technological problems, curiosity turns into frustration and alters the student experience (Pokay & Tayeh, 1997). The implementation of TWC included similar challenges, and the results indicated that technology issues hindered the student experience with TWC. TWC program and hardware developers should consider addressing this issue moving forward to maximize the user experience.

Limitations

The results of this study must be interpreted with caution. The sample size was relatively small, and only one school was represented in the study. All the students were on a similar schedule and experienced the same school environment, which may or may not be the same as other schools. The classroom teacher strongly advocated for PA and provided additional opportunities for PA beyond TWC, which makes comparisons complicated. Future research needs to determine the effect of TWC on diverse populations and explore its effects on student knowledge and academic performance.

Conclusion

This study explored the effects of an integrated classroom PA program on PA accrual and on-task behavior. Although results showed that TWC had no positive effect on student PA accrual, it did increase student on-task behavior. This increase in on-task behavior could limit classroom management issues and affect overall student performance. The teacher and students enjoyed using TWC

and perceived it as a tool that they would like to use again. Limited social interaction time and technological difficulties diminished the users' experience with the program, and program developers could consider ways to improve these factors. Findings suggest that integrated classroom PA programs such as TWC have the potential to contribute meaningful amounts of daily PA and positively affect classroom behavior. More research needs to explore the effect of such programs across a variety of student and school populations and on additional academic outcomes.

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PHYSICAL ACTIVITY

Making After-School Physical Activity Programs a Success: Practical Lessons Learned

Timothy Baghurst and Kevin Fink

Abstract

After-school physical activity programs for youth can develop and extend physical and mental skills necessary for health across the life span. With the considerable time and effort required to operate such programs, it is important that youth are achieving tangible goals and benefit from the programs. Unfortunately, many after-school programs lack any formal evaluation process, and it is unclear whether participants accrue benefits. Using the experiences of developing and evaluating multiyear after-school programs, we discuss variables that should be considered in the design and operation of an effective after-school program. Examples include how to market the program, what to include, how the program's size can affect outcomes, and how to effectively assess program effectiveness. Recommendations can be applied to other sport and physical activity–based programs to the benefit of program staff and participants.

After-school physical activity (PA) programs for youth can develop and extend physical and mental skills necessary for health across the life span. This is important, as children and adolescents have become increasingly sedentary over the past few decades (Tremblay et al., 2011). For example, in a recent report card on PA for children and youth in the United States, Katzmarzyk et al. (2016)

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reported that overall PA received a *D*- and health-related fitness was scored at a *D*. This lack of PA in combination with other environmental and socioeconomic factors has a detrimental effect on health, particularly for children and youth who are overweight and obese (Trost, Rosenkranz, & Dzewaltowski, 2008).

Children and adolescents who are overweight and obese are at much greater risk of being overweight and obese as adults (Trost et al., 2008). Consequently, comorbid diseases, or the simultaneous presence of two chronic conditions or diseases, such cardiovascular disease and type 2 diabetes, as well as other negative psychological consequences, such as decreased self-esteem and depression, may become evident from weight status (Porter, Stern, Mazzeo, Evans, & Laver, 2013). Organized after-school physical activities that are perceived as appealing and fun may serve as a vital means for preventing child health risk factors while enhancing interest in leisure-time physical activities (Bailey, Cope, & Pearce, 2013).

Implementing PA such as school-based PA programs has the potential to counter physical risks associated with obesity. However, these programs may also improve psychological variables such as self-esteem and self-efficacy (Shapiro & Martin, 2014). Barton, Griffin, and Pretty (2012) reported that exercise for those with poor mental health was equally as effective as other existing therapeutic techniques in managing and supporting recovery and in reducing depression and increasing self-concept. Through a variety of data collection methods including the Self-Description Questionnaire Inventory (SDQI; Marsh, Craven, & Debus, 1998) and focus groups, Daley, Daley, Sydney, and Haley (2009) found that a sailing program for youth increased self-confidence, communication, teamwork skills, and problem solving. These findings suggest that PA programming for youth should consider measuring psychological and physical outcomes, as well as tracking continued participation at a future time.

Findings from studies of in-school physical education programs have reinforced the need for increased time spent in physical education and activity (Sollerhed & Ejlertsson, 2008), but PA programming for children and adolescents has had mixed results (Gabriel, DeBate, High, & Racine, 2011; Stein, Fisher, Berkey, & Colditz, 2007). Gabriel et al. (2011) suggested that some of the ineffectiveness of PA

programs might be caused by a failure of not involving all stakeholders, the community, program planners, parents, and participants. They found that maintaining a feedback loop among the multiple stakeholders plays an important role in the sustainability of youth programs by supporting ongoing evaluation of the programs and identification of concerns.

In response to these issues, the Centers for Disease Control (2013) and the Society of Health and Physical Educators developed the *Comprehensive School Physical Activity Programs: A Guide for Schools*. Its primary purpose was not only to develop quality physical education as the foundation, but also to build PA programming for before, during, and after school that includes staff, family, and community. The program is considered holistic, which generally requires a "champion" within the district or school site to oversee the multiple areas in which activities occur during the school day. Although the physical educator is often considered the best person for this role, barriers such as insufficient professional development, training, and support exist (Centeio, Castelli, Carson, Beighle, & Glowacki, 2014). Therefore, acquiring external support through external partnerships, as in these studies for example, may increase PA opportunities that best serve youth.

Offering PA opportunities outside of the school environment provides children and adolescents with programming that counters a sedentary lifestyle. It creates an opportunity to improve PA, physical outcomes, and potentially psychosocial benefits. Therefore, the purpose of this article was to present the findings of three after-school programs (one running and two rowing) that we developed and tested to improve physical and psychological outcomes. Using the findings and experiences from these programs, we present how future, similar programming could use best practices to improve based on the outcomes of these two projects.

Method

About the Programs

We conducted three after-school programs, one for running and two for indoor rowing. The running program (RUN) helped us to develop the indoor rowing program (ROW1), which was conducted

a second time (ROW2) using adjustments made from experiences acquired from ROW1. Please refer to Baghurst, Tapps, and Adib (2015) and Baghurst, Fink, and Adib (2016) for details about each program.

Participants

Participants in RUN were 10 boys and 17 girls in first to fifth grades from multiple schools in a small city in the Mid-South of the United States. Because this was a pilot project, other demographic data were not collected. Participants in ROW1 were 14 boys and 25 girls between fourth and fifth grade from two schools in an urban (n = 8) and suburban (n = 31) area. Most were Hispanic/Latino (59%), and the majority (85%) considered themselves very inexperienced at rowing. Participants in ROW2 were 24 boys and 22 girls in fourth and fifth grades from three schools in a suburban area. Most students were White/Caucasian (70%), and 80% considered themselves very inexperienced at rowing.

Programs

The RUN after-school program was conducted during the spring over 4 weeks on a Tuesday and Thursday for 50 min at an outdoor park. The first and last sessions were dedicated to testing, but each typical session mimicked a physical education lesson whereby following a warmup activity and stretching, participants were split into four groups and completed various stations dedicated to running technique, fitness, speed development, and a game tied to running.

ROW1 followed a similar pattern to RUN, except participants completed a plyometric station, a kayak station, and a rowing station. In ROW2, the kayak station was removed, not only so that participants could have more time on the rowing ergometers, but also because participant enjoyment for this activity was low. ROW1 and ROW2 were held twice a week over 6 weeks, ROW1 in the fall and ROW2 in the spring. Locations varied, as some groups participated in their school environment and others at a boathouse local to their school. At the end of both ROW programs, participants met up and competed in a "row-off" wherein individuals and schools competed against each other to 500 m. Data were collected at this event also.

Measures Used

Participants in all three programs were measured using the Self-Description Questionnaire Inventory (SDQI; Marsh et al., 1998), which is designed for use with adolescents. Only four components (of eight) were included in this study: (a) General Self-Concept (e.g., Overall I have a lot to be proud of), (b) Physical Abilities (e.g., I have good muscles), (c) Physical Appearance (e.g., I like the way I look), and (d) Peer Relations (e.g., I make friends easily). Other elements including reading, math, parent, or general school self-concept were not measured.

Participants in RUN completed a 40-yd sprint test (stationary and running start) and the PACER test, which measures running endurance, at the beginning and end of the program to measure change. Participants in the ROW programs completed a timed row to 500 m at the beginning and end of the program.

Results

In the RUN program, participants significantly improved their stationary sprint times, $t(20) = 3.78$, $p = .001$, but not their running start times, $t(20) = 1.02$, $p = .32$. Their PACER time also improved significantly from 5:02 to 7:10, $t(18) = -4.69$, $p = .000$. There was an error in data collection of SDQI scores, wherein participants put an identifier on the prequestionnaire but not the postquestionnaire. Therefore, the individual pre–post scores could not be compared. However, overall, participants' posttest scores were higher than their pretest scores on all subscale measures including Physical Appearance (4.05; 4.51), Physical Ability (4.31; 4.44), Peer Relations (3.55; 3.87), and General Self (4.33; 4.50).

In ROW1, there was no significant improvement in rowing time to 500 m from the beginning to the end of the program. However, participants rowed approximately 21 s faster than either point when in the competitive "row-off" environment, which was a significant difference, $F(1.48) = 22.71$, $p < .001$. There were no significant changes in SDQI scores from the beginning to end of the program.

ROW2 participants also significantly improved their rowing performances, $F(1.665) = 22.99$, $p < .001$, but not from the beginning to the end of the program, although participants were faster at the end of the program. Rather, the competitive times were found to be

approximately 31 and 20 s faster than either the beginning or end of program 500-m rowing times, respectively. However, unlike ROW1 participants, ROW2 participants were found to have significantly improved their Physical Appearance, Peer Relations, and General Self-Concept subscale scores of the SDQI.

Discussion

Several lessons were learned in the progression from a pilot running program to a repeated indoor rowing program as an after-school activity. Although some lessons are specific to the event, others are more relevant to any program being developed for youth after school. Here is a brief synopsis of our findings and recommendations.

With respect to the RUN program, we collaborated with a city parks and recreation department. This had benefits such as allowing the department to control the budget, but may have limited applicants because the department did not have an online registration system. Therefore, we recommend ensuring that registrations can be controlled electronically. The program was offered at a local park, which had many benefits. For example, some parents with younger children remained at the park to play on the playground. However, weather could have been an issue, and locating a safe and flat surface was challenging. Creating or utilizing an alternate location for poor weather in addition to a flat surface, especially for assessments, is important. For example, a soccer or football field would be an ideal location for this type of program.

The ROW programs yielded other important recommendations. First, we discovered that group size could be an important factor in whether programming is successful. Following ROW1, we limited ROW2 to a maximum of 20 participants to help keep the coach-to-athlete ratio lower and ensure that time was more efficiently used. In the academic setting, larger class sizes tend to increase time spent on nonacademic tasks (Hastie & Saunders, 1991), and there is no reason to suspect that this environment would be different.

Second, more time was also spent on the rowing machines during ROW2. Participants were dissatisfied with the kayak activity, and additional time on the rowers was believed to be more helpful in improving pre–post rowing times. This is supported by Busquets, Marina, Irurtia, Ranz, and Angulo-Barroso (2011), who reported

that time spent in practice is one of the most important factors responsible for improvements in motor skill ability.

Third, although significant improvements in rowing times were *not* found between the pretest and the posttest, participants *did* significantly improve at the final competitive test. This finding is important, as it shows the influence external factors such as competition and audience effects, in addition to many other variables, can have on a performance (Duda, 1987). It is evident that participants did not put forth maximum effort in the posttest especially, and programmers need to find a motivator to ensure that they do.

Depending on the purpose and desired outcomes of an after-school PA program, researchers may want to evaluate improvements in technique (see Fink & Baghurst, 2016) and plan a follow-up with participants at a future time to examine continued interest in the particular activity. If interest has discontinued, researchers can probe to determine if environmental barriers or personal interest were factors. For instance, a child may want to continue rowing, but does not have access to an ergometer, a nearby body of water, or a boat (Baghurst, Price, & Fink, 2017). Therefore, working with community partners is essential to creating effective, enjoyable programs that are sustainable and provide equitable access to targeted community members.

Conclusion

After-school programming that focuses on PA and skill development could have significant positive effects on youth participation that extend beyond the physical benefits of activity. However, as we discovered, a variety of factors must be considered in the development of such programming. Based on our own findings, we recommend careful consideration of the many challenges and variables associated with running an after-school program prior to program operation.

The future of after-school programming is bright, especially given the increasing adoption of comprehensive school physical activity programs (CSPAP) that include after-school PA. However, programmers need to carefully consider including assessment tools when developing these programs, which may not always happen. By evaluating program effectiveness, programmers are helping to

ensure that successes can be replicated and failures corrected so that the best possible outcome for the participants is achieved.

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PHYSICAL ACTIVITY

Physical Activity Levels in Coed and Same-Sex Physical Education Using the Tactical Games Model

Skip M. Williams and James C. Hannon

Abstract

This study compared physical activity levels of junior high school physical education students participating in coeducational and same-sex PE classes that followed the Tactical Games Model. A total of 446 students, aged 11 to 16 years old, enrolled in the seventh to ninth grades from one junior high school participated. Each student participated in four team sport units while wearing an accelerometer. All lessons followed the Tactical Games instructional model. Four three-way between-subjects analyses of variance were conducted as a method of evaluating the effect of gender, class setting, and grade on PE students' PA levels for each sport unit. There was not a significant difference in PA for males by setting or sport unit. During the volleyball, flag football, and soccer unit, there was a nonsignificant difference between female students in the same-sex setting and between female and male students in the coeducational setting for percentage of time spent in MVPA. Results suggest setting does not affect MVPA time of males but does affect that of females depending on sport. Results also suggest that males spend more time in MVPA than females regardless of setting and sport unit.

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Regular participation in physical activity (PA) can provide adolescents immediate and long-term physical and psychological health benefits (Office of the Surgeon General 2010; U.S. Department of Health and Human Services [USDHHS], 2008a, 2008b). Despite this knowledge, adolescents are becoming increasingly sedentary (Gordon-Larsen, Nelson, & Popkin, 2004; Kahn et al., 2008; Kelder, Perry, & Klepp, 1993; Owen, Sparling, Healy, Dunstan, & Matthews, 2010; Sallis, 2000; Trost et al., 2002). Approximately 47.8% of American youth lack regular PA (Song, Carroll, & Fulton, 2013). Research suggests that PA participation declines rapidly during the childhood and adolescent years (Centers for Disease Control and Prevention [CDC], 2013; Ekelund, Tomkinson, & Armstrong, 2011; Nader, Bradley, Houts, McRitchie, & O'Brien, 2008; Trost et al., 2002). As a result, the prevalence of adolescent obesity is increasing in the United States. Approximately 17% of children and adolescents in the United States between ages 2 and 19 years old are obese (Ogden et al., 2016). Children and adolescents between ages 6 and 19 are recommended to participate in 1 hr of moderate to vigorous physical activity (MVPA) on most days of the week, preferably daily (USDHHS, 2008b, 2010). Currently, more than 80% of adolescents do not get enough aerobic PA to meet the recommended guidelines (USDHHS, 2010). Because of the increase of obesity and the decrease in PA among adolescents, health initiatives such as Healthy People 2020 and national organizations such as the Society of Health and Physical Educators (SHAPE America) recognize that physical education (PE) classes can influence PA among children and adolescents (National Association of Sport and Physical Education, 2009). In a review study of PA research within PE, results indicated that students on average engage in MVPA for about 27% of the class time (Fairclough & Stratton, 2005). Many factors (environmental, psychological, and physiological) may help ensure that PE students are receiving appropriate amounts of PA, and these need to be accounted for and further researched. This research study examined the environmental factors of setting (same-sex vs. coeducational classes) and instructional model (Tactical Games) on PE students' PA.

An implication of Title IX (gender equity) was that PE classes would integrate same-sex classes into coeducational classes (Hannon & Williams, 2008). This occurred because it was thought that males

were receiving more or better opportunities to learn than females. Through the formation of coeducational PE classes, females would be receiving the same opportunities as males, thus the Title IX requirements of gender equity would be met. However, teachers were given limited opportunity to provide their input on the situation or be active participants in the legislation process mandating coeducational PE (Treanor, Graber, Housner, & Wiegand, 1998). Additionally, research has indicated that inequitable teaching behaviors still occur and thus limit the learning potential of all students (Dunbar & O'Sullivan, 1986; Griffin, 1984; Treanor et al., 1998). Since the mandate of coeducational PE, research regarding this topic has been somewhat contradictory and has focused mainly on teacher and student perceptions, teacher–student interactions, and student participation.

Few studies have measured and compared PE students' PA levels in same-sex and coeducational classes. McKenzie, Prochaska, Sallis, and LaMaster (2004) examined the PA levels of middle school boys and girls in coeducational and same-sex PE settings using the System for Observing Fitness Instruction Time (SOFIT). Their results indicated that the boys had similar amounts of MVPA in both settings, whereas girls accumulated more MVPA in a coeducational setting than a female-only setting. Hannon and Ratliffe (2005) examined PA levels of male and female high school PE students in soccer, flag football, and Ultimate Frisbee gameplay using pedometers. Their results indicated that males and females accumulated the same or higher steps per minute in the coeducational setting than the same-sex setting. Most recently in a study conducted in Europe, Van Acker, da Costa, Bourdeaudhuij, Cardon, and Haerens (2010) examined middle school students' MVPA levels in same-sex and coeducational PE classes using heart rate monitors. Results indicated females had higher levels of MVPA than males in both settings, and MVPA for males and females was higher in coeducational classes than same-sex classes. These studies suggest that coeducational classes are more appropriate than same-sex settings for providing higher levels of MVPA, which is in accordance with the Title IX philosophy. However, because few studies have examined PA in coeducational and same-sex settings and all have used a different method to measure PA, it cannot be concluded that coeducational

classes are appropriate in providing higher levels of MVPA. Further, studies need to be conducted with multiple grade levels with multiple individual and team sport activities before definitive conclusions can be made. Research exploring grade-level PA differences have indicated that PA level declines as grade level increases (Gao, Hannon, & Carson, 2009; Hodges-Kulinna, Martin, Lai, Kilber, & Reed, 2003; Parish & Treasure, 2003). Hannon and Williams (2008) suggested that additional studies need to be conducted on student PA levels in coeducational and same-sex settings among various grade levels and with the use of various instructional models.

PE instructional models provide a framework of what students are going to learn, how students are going to acquire that learning, and how they will be assessed. Within the various instructional models used in PE such as Sport Education, cooperative learning, direct instruction, peer teaching, inquiry teaching, and Tactical Games, little research has measured PA levels of students (Metzler, 2005). Specifically, the Tactical Games Model (TGM) has received little attention relative to PA. The small-sided games associated with the TGM may aid PE students in engaging in adequate amounts of PA (Harvey, Smith, Fairclough, Savory, & Kerr, 2015; McCormick et al., 2012). Because of the physical and psychological health benefits of regular PA participation, it is important for educators to understand how various curricular models, specifically the TGM, may influence PA in PE.

The TGM is a simplified three-step model derived from the original Teaching Games for Understanding six-step model (Mitchell, Oslin, & Griffin, 2006). The TGM is based on a sequence of developmentally appropriate games called game forms. The first step of the TGM is the game form. Students participate in a game form (modified/small-sided game) that focuses on a tactical problem. Typically, these games are usually three versus three or four versus four. Students solve the tactical problem through playing the game form and using the appropriate skill that corresponds with the tactical problem. For example, a tactical problem in basketball involves the player moving without the ball to get open to receive a pass to score. A game form for this tactical problem would be a half-court basketball game in which the rules of the original basketball game are modified so that each team is required to make four passes before

shooting and students are not allowed to dribble the ball. Playing this modified version of basketball forces the students to move without the ball and to create ways to elude the defenders so they may receive a pass. The second step is tactical awareness. During this step, the teacher helps students recognize the tactical problem through questioning. These questions pertain to what certain skills or movements are required to be successful. Once the students understand the skills or movements needed to be successful, the teacher can ask the students what they need to practice. This leads to the third and final step of the TGM: skill execution. During this step, the teacher can demonstrate and describe how to perform the skills and movements with the appropriate learning cues. After practicing the appropriate skills, the students go back to playing the modified game.

The TGM is not a widely adopted curricular model in PE in the United States. Past research on the TGM has focused primarily on improving student knowledge and student motivation or interest. To date, only one other study has examined PA levels using the TGM (Harvey et al., 2015).

A rationale for using the TGM is it provides an interesting and exciting way for PE students to learn games and is a positive motivator for participating (Mitchell et al., 2006). Previous research indicates that students find the tactical games approach to be motivational (Berkowitz, 1996; Burrows, 1986; Mitchell, Griffin, & Oslin, 1994). One teacher has indicated that students come to class excited, motivated, and ready to participate because they know they are going to play a game right away (Berkowitz, 1996). This is also supported by research conducted on five PE teachers and 392 secondary PE students (Cruz, 2004). Results indicated that teachers perceived that their students were more engaged, excited, and happier in the tactical approach than a skill-based approach. Students supported the teachers' perceptions by verifying that the tactical approach was more exciting and interesting and that they preferred to learn in this type of environment. It was suggested that the TGM provided the students with a positive emotional experience in playing games. Of the student participants, 76% indicated they would like their teacher to adopt the TGM for all games taught in PE (Cruz, 2004).

A second rationale for using the TGM in PE is that the knowledge gained through this approach will empower students to become

knowledgeable game players (Mitchell et al., 2006). The knowledge students obtain through the use of the TGM is decision making in game situations. Research has shown that the TGM may significantly improve student knowledge and decision making during game play (Turner, 1996; Turner & Martinek, 1992, 1999).

Because research demonstrates that the TGM influences student motivation and knowledge through decision making during gameplay, one may assume this model would in fact affect PA levels in PE. To date, limited research has been conducted on students' PA levels during instruction using the TGM. This study compared PA levels of junior high school PE students participating in coeducational and same-sex PE classes that follow the TGM in basketball, soccer, flag football, and volleyball units. The study is significant because it examines three factors (grade, setting, and instructional model) regarding their influence on junior high PE students' PA levels during 32 PE lessons.

Method

Participants

The participants in this study were 446 (240 males, 206 females) junior high school students between ages 11 and 16 who were enrolled in a required seventh, eighth, and ninth grade PE class. The study was conducted at a junior high school located in the Southwestern United States. Racial distribution of the participants of this study was 74.4% Caucasian, 10.8% Hispanic, 7.6% Multicultural, 3.6% Asian American, 1.6% African American, 0.9% Pacific Islander and 0.4% Native American. Racial background was not reported by 0.7% of participants.

Two experienced certified PE teachers, one male and one female, taught all PE classes. Each teacher had approximately 20 years of teaching experience. Both teachers graduated from an accredited PE program from a university in the Southwestern United States and earned a PE teaching K–12 certification.

Prior to the collection of data, permission was obtained from the university institutional review board, school district, the school administration, and the teachers. Students and parents provided written informed consent prior to participation in this study.

Instrumentation

ActiGraph GT1M (Pensacola, FL) accelerometers monitored PA levels of the participants participating in four tactical game units during their PE class. Several studies have reported favorable validity of ActiGraph accelerometers by comparing the ActiGraph outputs with direct observation of the participants during activity and/or with direct measures of energy expenditure (Corder et al., 2007; Kelly et al., 2004; Puyau, Adolph, Vohra, & Butte, 2002). In this study, the Puyau et al. (2002) 30-s epoch cut-point equations were applied to the data as a method of determining the intensity classification of percentage of class time spent in MVPA. The cut-point for the MVPA classification is moderate + vigorous = ≥ 1600 (Puyau et al., 2002). Thirty-second epochs were used and controlled for underestimation of activity levels (Welk, Blair, Wood, Jones, & Thompson, 2000; Welk, Corbin, & Dale, 2000). The percentage of class time spent in MVPA was derived for each student from each lesson.

Tactical game lesson plans for the basketball, soccer, and volleyball units for this study were selected from the textbook *Teaching Sport Concepts and Skills: A Tactical Approach* (Mitchell et al., 2006). The flag football unit and the Ultimate Frisbee mini unit (practice unit) lesson plans were designed by the primary investigator and checked by the primary author of *Teaching Sport Concepts and Skills: A Tactical Approach*. A progression of tactical levels from 1 to 3 was used in the eight lesson plans for each unit. A progression of levels was used based on the fact that PE students in this region of the United States where the study occurred may not have had a required PE class in elementary school and may have been limited in certain foundational skills required for game execution.

Research Design

A quasi-experimental design was used as a method for examining the effect of coed and same-sex settings using the tactical games approach on the percentage of class time spent in MVPA of junior high school PE students.

Procedures

Prior to the beginning of data collection, the two PE teachers went through two sessions (approximately 6 hr) of tactical games

training conducted by the primary investigator. Training consisted of lectures, readings, and watching video clips of other teachers using the TGM. The teachers were provided with all of the lesson plans for each unit being taught during this training. The same lesson plans were used by each teacher, which ensured similarity among all classes. To ensure fidelity of all lessons between the two PE teachers, the primary researcher reviewed the lessons the day prior to the lesson being taught and was present for all lessons. Based on observation, the PE teachers did not deviate from the written lessons. After completing the training, the PE teachers taught one mini unit (four lessons) of Ultimate Frisbee at the beginning of the semester. During this time, the primary investigator evaluated each teacher on performance of teaching tactically and ability to follow the lesson plans.

Before data collection began, the primary investigator assigned a number and an accelerometer with the same number to the PE students and taught the PE students how to wear their assigned accelerometer. All accelerometers were worn around the waist on the right hip. Each accelerometer was labeled with a number, and the students wore that same accelerometer for all four units. Prior to data collection, the students practiced picking up, wearing, and returning their accelerometer during the Ultimate Frisbee mini unit. At the beginning of each class, the primary investigator and teachers observed students putting on the accelerometer to ensure they were wearing the accelerometer properly. Once data collection began, at the completion of each week the primary investigator downloaded the accelerometer data and checked that each accelerometer was working properly. All accelerometers were recharged at the end of each week.

The data collection period spanned 32 days. Data collection occurred during all regularly scheduled PE classes. Each PE student participated in two sport units in a coeducational setting and two sport units in the same-sex setting. There was a total of six class periods, with one male and one female PE class per period (12 PE classes). There were four seventh grade, four eighth grade, and four ninth grade PE classes. Classes were randomly determined as coeducational or same-sex. For example, first period was selected as same-sex. The male teacher taught the all-male class, and the female teacher taught the all-female class. Second period was determined

as coeducational. The all-male and all-female classes were integrated and divided in half, and the male teacher taught half the class and the female teacher the other half. After two of the sport units were taught, the coeducational classes were separated back into same-sex classes and the other same-sex classes were integrated and split into coeducational classes. This allowed all participants to participate in either type of setting. However, not every participant participated in each sport unit in each setting. Each teacher taught six classes a day (three coeducational and three same-sex).

Data Analysis

Data from the accelerometers were downloaded according to the manufacturer's instructions using ActiLife Lifestyle Monitoring software (Version 1.0.54, Actigraph, LLC, Pensacola, FL) and exported into an Excel file at the end of each week. After completing this for all students, the primary and secondary researchers entered formulas in the Excel program to calculate the percentage of time spent in MVPA and then calculated the average for all eight lessons of each sport unit. Once that was completed, all of the information of each student was put into one Excel file and imported into the SPSS statistics program.

Preliminary analyses included descriptives, frequencies, reliabilities, and correlations. Alpha coefficients were computed as a method of determining the internal consistency between lessons for MVPA for each sport unit. Alpha coefficients ranged from .80 to .95, showing a high reliability between the lessons for each sport unit and PA categories. This justified use of all data regardless of days attended by each student during each unit, and the average MVPA of each unit was used rather than the MVPA from each lesson.

Because type of sport and setting were not completely crossed, four three-way between-subjects analyses of variance evaluated the effect of gender, class setting (coeducational or same-sex), and grade on PE students' PA levels for each sport unit. The dependent variable was the percentage of time spent in MVPA. The between-subjects factors were setting (with two levels: coeducational and same-sex), gender (with two levels: male and female), and grade (with three levels: seventh, eighth, and ninth grade). An alpha level of .05 was used for all statistical tests.

Results

Results of the ANOVA indicated significant differences among gender, grade, and setting in MVPA within basketball, volleyball, and soccer sport units. However, results for flag football indicated no significant differences among gender, grade, and setting in MVPA. Tables 1 and 2 show percentage of time spent in MVPA, means, and standard deviations for each sport unit. Statistically significant data were organized and presented according to sport unit.

Basketball Unit

Results of the ANOVA for basketball indicated a significant main effect of Setting, Wilks's lambda, $F(2, 405) = 15.48$, $p < .01$, $\eta^2 = .07$, as well as Gender, Wilks's lambda, $F(2, 405) = 51.09$, $p < .01$, $\eta^2 = .07$, and Grade, Wilks's lambda, $F(4, 810) = 2.63$, $p < .033$, $\eta^2 = .01$. The Setting × Gender interaction effect was significant, Wilks's lambda, $F(2, 405) = 20.42$, $p < .01$, $\eta^2 = .09$. An independent-samples t test determined the specific difference between settings for each gender. Results indicated a significant difference between settings for female students for percentage of time spent in MVPA, $t(193) = 4.18$, $p = .01$. A Tukey's post hoc analysis for Grade indicated a significant difference in MVPA between the seventh ($M = 20.70$, $SD = 12.98$) and ninth ($M = 17.64$, $SD = 12.59$) grades.

Volleyball Unit

Results of the ANOVA for volleyball indicated a significant main effect of Setting, Wilks's lambda, $F(2, 406) = 4.21$, $p < .02$, $\eta^2 = .02$. The Setting × Grade interaction effect was significant, Wilks's lambda, $F(4, 812) = 2.58$, $p = .04$, $\eta^2 = .01$. An independent-samples t test determined the specific difference between settings for each grade level. Results indicated a significant difference between settings for MVPA for seventh graders, $t(135) = 1.62$, $p = .03$. The seventh graders in a same-sex setting spent more time in MVPA than the seventh graders in a coeducational setting.

Table 1
Percentage of Class Time Spent in MVPA in Each Sport Unit by Grade and Gender for Each Setting

		Coed class			Same-sex class		
Sport unit	**Grade level**	**Males *M* (*SD*)**	**Females *M* (*SD*)**	**Both *M* (*SD*)**	**Males *M* (*SD*)**	**Females *M* (*SD*)**	**Both *M* (*SD*)**
Basketball	7th	28.20 ± 11.32	12.69 ± 6.60	19.46 ± 11.80	27.22 ± 13.27	15.67 ± 12.70	22.09 ± 14.15
	8th	21.71 ± 11.77	8.96 ± 4.86	15.08 ± 10.89	23.19 ± 11.86	19.11 ± 10.46	21.78 ± 11.48
	9th	23.69 ± 13.04	10.15 ± 7.94	17.20 ± 12.79	21.04 ± 13.87	14.07 ± 9.06	18.05 ± 12.47
	All	24.37 ± 12.29	*10.65 ± 6.68	17.23 ± 11.93	23.58 ± 13.18	*15.91 ± 10.83	20.45 ± 12.82
Volleyball	7th	11.62 ± 7.97	5.97 ± 3.28	*8.49 ± 6.46	13.76 ± 9.34	6.50 ± 4.20	*10.53 ± 8.29
	8th	11.40 ± 7.82	5.54 ± 1.72	8.39 ± 6.28	10.05 ± 6.58	6.70 ± 2.83	8.92 ± 5.79
	9th	10.32 ± 8.39	5.89 ± 4.38	8.17 ± 7.06	9.29 ± 7.70	5.35 ± 2.54	7.53 ± 6.26
	All	11.10 ± 8.01	5.80 ± 3.24	8.35 ± 6.57	10.88 ± 8.04	6.08 ± 3.28	8.90 ± 6.91
Football	7th	27.26 ± 11.62	13.95 ± 7.00	21.53 ± 11.87	28.78 ± 9.92	12.27 ± 6.03	19.65 ± 11.47
	8th	24.76 ± 10.23	11.65 ± 6.65	20.32 ± 11.06	27.34 ± 9.92	12.54 ± 5.89	19.64 ± 10.94
	9th	25.19 ± 13.09	9.11 ± 5.42	18.27 ± 13.16	30.63 ± 11.18	12.51 ± 7.39	22.05 ± 13.17
	All	25.67 ± 11.71	11.38 ± 6.57	19.91 ± 12.17	29.00 ± 10.40	12.43 ± 6.39	20.46 ± 11.91
Soccer	7th	27.35 ± 9.28	16.81 ± 7.20	22.47 ± 9.87	26.56 ± 7.93	16.02 ± 5.69	20.64 ± 8.53
	8th	26.35 ± 10.69	14.35 ± 6.89	22.22 ± 11.09	26.20 ± 12.22	16.80 ± 7.27	21.30 ± 10.95
	9th	23.95 ± 11.88	12.29 ± 5.76	*18.42 ± 11.10	30.36 ± 10.00	17.89 ± 8.88	*24.45 ± 11.32
	All	25.82 ± 10.73	14.35 ± 6.78	20.86 ± 10.83	27.88 ± 10.34	16.87 ± 7.32	22.18 ± 10.45

*$p < .05$.

Table 2
Percentage of Class Time Spent in MVPA in Each Sport Unit by Grade and Gender With Both Settings Combined

Sport unit	Grade level	Coed and same-sex settings combined		
		Males *M* (*SD*)	Females *M* (*SD*)	Both *M* (*SD*)
Basketball	7th	27.68 ± 12.31	13.92 ± 9.62	*20.70 ± 12.98
	8th	22.50 ± 11.76	12.57 ± 8.76	18.13 ± 11.61
	9th	22.27 ± 13.47	12.05 ± 8.67	*17.64 ± 12.59
	All	23.95 ± 12.75	12.86 ± 9.03	18.78 ±12.46
Volleyball	7th	12.72 ± 8.71	6.18 ± 3.66	9.43 ± 7.40
	8th	10.68 ± 7.17	5.95 ± 2.23	8.63 ± 6.05
	9th	9.76 ± 7.99	5.61 ± 3.56	7.83 ± 6.64
	All	10.98 ± 8.01	5.92 ± 3.25	8.61 ± 6.74
Football	7th	27.99 ± 10.79	12.94 ± 6.44	20.52 ± 11.65
	8th	25.94 ± 10.11	12.22 ± 6.13	19.95 ± 10.96
	9th	27.75 ± 12.46	10.86 ± 6.68	20.12 ± 13.26
	All	27.23 ± 11.21	12.00 ± 6.47	20.20 ± 12.03
Soccer	7th	26.98 ± 8.62	16.36 ± 6.35	21.52 ± 9.21
	8th	26.28 ± 11.35	15.93 ± 7.17	21.72 ± 10.99
	9th	27.15 ± 11.38	15.09 ± 7.95	21.43 ± 11.57
	All	*26.81 ± 10.57	*15.78 ± 7.18	21.55 ± 10.64

*$p < .05$.

Soccer Unit

Results of the ANOVA for soccer indicated a significant main effect for Setting, Wilks's lambda, $F(2, 417) = 6.37$, $p < .01$, $\eta^2 = .03$, as well as Gender, Wilks's lambda, $F(2, 417) = 86.32$, $p < .01$, $\eta^2 = .3$, and Grade, Wilks's lambda, $F(4, 834) = 3.19$, $p < .01$, $\eta^2 = .02$. The Setting × Grade interaction effect was significant, Wilks's lambda, $F(4, 834) = 6.22$, $p < .01$, $\eta^2 = .03$. An independent-samples t test determined the specific difference between settings for each grade. There was a significant difference between ninth grade students for percentage of time spent in MVPA, $t(154) = 3.36$, $p = .001$. These results suggest that ninth grade students in the same-sex setting spent more time in MVPA than ninth grade students in the coeducational

setting. In regard to gender, males (M = 26.81, SD = 10.57) spent significantly more time in MVPA than females (M = 15.78, SD = 7.18, p = .01). These results indicated that during the soccer unit males spent more time in MVPA than females.

Discussion

The primary aim of this study was to determine MVPA, as measured by accelerometers, of junior high school PE students participating in coeducational and same-sex PE classes that follow the TGM in basketball, soccer, flag football, and volleyball units. However, the effect of environmental factors, such as the sex of the participant, the setting (same-sex or coeducational), grade level, and instructor's choice of activity on the level of MVPA was so variable that the discussion will be broken down by activity.

Activity Levels in Coeducational Versus Same-Sex Settings

Results from this study indicated that male junior high PE students accumulated similar amounts of MVPA in coeducational and same-sex PE settings for all sport units. Results of this study are comparable to those reported by McKenzie et al. (2004), who examined 26 males only, 32 females only, and 240 coeducational lessons in 24 middle schools over a 2.5-year investigation. Their findings revealed that males accumulated similar amounts of MVPA in male-only and coeducational class settings. Similarly, Hannon and Ratliffe (2005) examined male high school PE students' PA in same-sex and coeducational settings during gameplay of several invasion games (flag football, Ultimate Frisbee, and soccer). Their findings revealed that male students had similar amounts of PA in same-sex and coeducational settings. McKenzie et al.'s (2004) and Hannon and Ratliffe's (2005) studies were different than this study in that they used different methods to measure PA (pedometers, direct observation) and did not follow a particular instructional model. Although basketball and volleyball were not investigated or reported by either study, one could assume that basketball would be similar to soccer, flag football, and Ultimate Frisbee because all four are team sports and are classified as invasion games. Fromel, Formankova, and Sallis (2002) reported that male students preferred team sports, and when these team sports were played in a coeducational setting, males would

dominate gameplay. Thus, one would assume the males would receive the same amount of activity in either setting because females would not hinder them in a gameplay situation. The current study was the first to examine PA levels of males participating in volleyball in coeducational and same-sex settings. Results were somewhat surprising since volleyball is not a preferred sport by middle school male PE students (Hill & Hannon, 2008); it was expected that females might have dominated the gameplay opportunities in the coeducational setting. However, as reported by Griffin (1981) and Solomons (1980), in team games males tend to have more opportunities to touch the ball and females tend to give their opportunities to touch the ball and to score to males, thus potentially affecting their PA levels.

In this study, female students had higher levels of MVPA in a same-sex setting than in a coeducational setting during the basketball unit. There were no differences in time spent in MVPA among females in the volleyball, football, or soccer unit in the coeducational and same-sex setting. Contradictory to the findings of this study, McKenzie et al.'s (2004) results showed that females had higher levels of PA in a coeducational setting. However, the lesson context was unknown. Similar to the football and soccer results of this study, Hannon and Ratliffe's (2005) results showed that high school females had no difference in levels of PA in either setting during invasion games. No coeducational and same-sex setting studies have examined PA in basketball and volleyball units. The MVPA levels during the volleyball unit among females in both settings were not surprising. Volleyball is more of a female-specific sport (Hannon, Soohoo, Reel, & Ratliffe, 2009), and it was assumed that no matter the setting the female students would have an equal percentage of time spent in MVPA.

Results of this study showed several differences in time spent in MVPA regarding grade and setting across volleyball and soccer. Results indicate that seventh graders spent more time in MVPA in the same-sex setting than the coeducational setting during the volleyball unit, and ninth graders had a higher percentage of time spent in MVPA in the same-sex setting than the coeducational setting for the soccer unit. Although there was no significance in the percentage of time spent in MVPA specifically between males and females, PE

teachers should be mindful of these result when selecting coeducational and same-sex settings for these sport units.

Activity Levels by Grade

Results indicate that during the basketball unit, seventh graders spent more time in MVPA than ninth graders. The U.S. Department of Health and Human Services (1996) indicates that student PA levels decline with increasing age and grade level during adolescence. Gao et al. (2009) examined 146 middle school PE students' average heart rate and percentage of time spent above their target heart zone. Results indicated that students' average heart rate and percentage of time spent above their target heart zone declined from sixth grade to eighth grade. Similarly, Parish and Treasure (2003) examined middle school PE students and also found that PA levels declined from sixth grade to eighth grade. Hodges-Kulinna et al. (2003) examined mean heart rates of PE students from Grades 3 to 12. They did not analyze mean heart rates of PE students in seventh and ninth grade specifically. However, the overall results indicated that PE students in elementary and high school spent more time in the target heart rate zone than middle school students. Results of this study during the basketball unit support previous research findings indicating that PA levels decline with age and grade level. However, The U.S. National Youth Risk Behavior Survey (CDC, 2014) indicated that more adolescents met the recommended levels of PA participation in the ninth grade than in the school years following ninth grade. This possibly indicates that younger students value or like activity more. This could be the same reasoning for seventh graders having spent a higher percentage of time in MVPA than ninth graders during a basketball unit. Further research needs to explore activity levels of PE students in specific grades, specifically seventh to ninth grades.

Conclusions

Even though there was statistically significant Gender × Setting interactions and statistically significant Setting × Grade interactions, none of the patterns of interaction were similar in terms of optimizing PA levels. The variability of the results is not totally unexpected given the developmental changes occurring among junior high students. The issue of whether a coeducational or same-sex setting is most effective for student outcomes in PE continues to be debated at

school district, state, and national levels. However, more studies need to be conducted and added to the limited body of research before any evidence-based decision is made. This study has added to the limited amount of research that has examined student PA levels in coeducational and same-sex settings. This study was unique in that it is the only study that has measured PA levels (via accelerometers) of students for the entire class period for four sport units in coeducational and same-sex settings. The accelerometer data were valuable to this study, providing information in regard to MVPA in a PE setting. Regardless of setting, gender, grade level, or sport, the national recommendation of 50% MVPA in PE was not met. Thus, many other factors must be considered in terms of PA levels in PE settings. Factors not measured in this study but worth examining and considering in the future include student motivation and attitudes toward PE and PA, skill competency in the sport being played, tactical and game knowledge, teacher–student interactions, self-efficacy, and possibly cardiovacular fitness levels of students engaging in invasion games. All of these factors are magnified given the age group (middle school), many of whom are going through many physical, emotional, and social change issues.

Additionally, this study was also unique from the perspective that the lessons were based on the TGM. No other studies examining PA in coeducational and same-sex settings have controlled for the type of instruction. Further research needs to examine the PA of students in coeducational and same-sex settings using other instructional models and activities.

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SPORT EDUCATION

Moral Development in Sport Education: A Case Study of a Teaching-Oriented Preservice Teacher

Benjamin Schwamberger and Matthew Curtner-Smith

Abstract

***Purpose*:** *The occupational socialization literature suggests that teaching-oriented teachers are more likely to deliver Sport Education (SE) in its purest form and so provide conditions in which fair play and sporting behavior can be developed. The purpose of this study was to determine the extent to which Derrick, a teaching-oriented preservice teacher, promoted moral and sporting behavior while teaching 38 middle school boys within two SE seasons of team handball.* ***Method*:** *The theoretical perspectives employed were structural development theory and social learning theory. Data were collected with eight qualitative methods and analyzed with standard interpretive techniques.* ***Results*:** *Many of the students gained a more sophisticated understanding of fair play and sporting behavior during the study. On numerous occasions, students were observed playing fairly and acting in a sporting manner. Derrick's teaching orientation, his own concept of sporting behavior and fair play, his delivery of a pure version of SE, and his pedagogy had much to do with these positive outcomes. However, many of the more skilled students' willingness to engage in sporting behavior was context specific. As gameplay became more competitive,*

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some of these more skilled students engaged in more unsporting behaviors. Conversely, many of the less skilled students maintained a universal concept of sporting behavior and fair play when the competition became fiercer. ***Conclusion*****:** *The results of the study confirm that the pure form of the SE model is an excellent medium through which sporting behavior and fair play can be developed.*

The development of moral and sporting behavior and playing fairly are key overarching objectives of the Sport Education (SE) curriculum model (Siedentop, Hastie, & van der Mars, 2011). In addition, the model aims to develop *enthusiastic* and *literate* sportspeople (Siedentop, 1994). Literacy, in this context, involves students being able to comprehend what is good and bad sporting behavior and understanding and valuing the traditions of sport including its rules and rituals. Enthusiasm involves students learning to preserve and protect the good in sporting culture (Siedentop et al., 2011).

The limited amount of research in this area has indicated, however, that those using the SE model have had mixed results in realizing these objectives and goals. Holding students accountable for playing fairly within competitive phases of an SE season, for example, yielded positive results (Hastie & Sharpe, 1999). Moreover, some data suggest that students' use of destructive behaviors decreases over an SE season (Vidoni & Ward, 2009) and that students recognize that fair play includes supporting fellow players and officials and providing equal amounts of game time for all players (Brock & Hastie, 2007). In contrast, other data indicate that students struggle to define fair play during SE (Sinelnikov & Hastie, 2008) and that as a season progresses and becomes more competitive, students are less keen to support elements of fair play (Brock & Hastie, 2007) and do not increase their use of constructive behaviors (Vidoni & Ward, 2009).

Critical analysis of the SE model provides a possible explanation for these mixed results. Several scholars, for example, have pointed out that the version of SE normally delivered in schools is conservative in nature and so reflects, includes, and passes on all that is bad about institutionalized sport including poor moral and sporting behavior (Parker & Curtner-Smith, 2012; Penney, Clarke, & Kinchin, 2002). In contrast, teachers who deliver a version of SE in tune with the spirit of the Siedentop et al. (2011) text are more

likely to influence students positively (Chen & Curtner-Smith, 2013; Harvey, Kirk, & O'Donovan, 2014), including the development of their moral and sporting behavior.

Work within more traditional physical education (PE) curricula (Figley, 1984; Shields & Bredemeier, 1995) also suggests that the purest form of SE would be a good medium through which teachers can promote moral and sporting behavior. Teachers working within traditional curricula have had some success in nurturing this kind of behavior through modeling, praise (Giebink & McKenzie, 1985), discussion (Giebink & McKenzie, 1985; Hassandra, Goudas, Hatzigeorgiadis, & Theodorakis, 2007; Romance, Weiss, & Bockoven, 1986), the use of a points/reward system (Giebink & McKenzie, 1985), and fostering a task-involving climate (Mouratidou, Goutza, & Chatzopoulos, 2007). These teachers have employed indirect teaching styles, which give students the opportunity to make decisions about their own learning, solve problems, make choices, and take part in cooperative activities (Gibbons, Ebbeck, & Weiss, 1995; Hassandra et al., 2007; Mouratidou et al., 2007; Romance et al., 1986). They have also asked students to face and respond to moral dilemmas (Gibbons et al., 1995; Romance et al., 1986). The "curricular scaffolding" of SE (Ennis, 1999), it could be argued, provides teachers with more options and opportunities to provide this nurturing environment, employ indirect teaching styles, and construct moral dilemmas for their students to tackle.

The occupational socialization literature suggests that "teaching-oriented" teachers more interested in curricular PE than extracurricular sport (Curtner-Smith, Hastie, & Kinchin, 2008; Lawson, 1983a, 1983b) are more likely to deliver SE in its purest form and, if our hypothesis is correct, provide conditions in which moral and sporting behavior can be developed. The purpose of this study, therefore, was to test this hypothesis and determine the extent to which one teaching-oriented teacher promoted moral and sporting behavior while teaching within the SE curriculum model. The specific questions we attempted to answer were (a) To what degree did the students taught by the teacher play fairly and display moral and sporting behavior? and (b) To what extent did the teacher employ pedagogies that promoted fair play and moral and sporting behavior?

Theoretical Framework

In congruence with past research of moral development in PE (Hassandra et al., 2007; Mouratidou et al., 2007), this study used the two theoretical perspectives of *structural development theory* (Kohlberg, 1976; Piaget, 1965) and *social learning theory* (Bandura, 1977) in data collection and analysis.

Structural Development Theory

Structural development theory argues that to develop morally, individuals must first develop cognitively (Mouratidou et al., 2007). Specifically, a person must form an organized core cognitive structure of values and beliefs against which new social contexts and situations are evaluated and through which they are filtered (Shields & Bredemeier, 1995). In addition, this core cognitive structure is modified, shaped, and developed when individuals *accommodate* values and beliefs that are very different from their own and *assimilate* views and thoughts that are like their own through a process of *equilibration* (Shields & Bredemeier, 1995).

If an individual's core cognitive structure becomes more sophisticated, the person can pass through the three levels of moral development identified by Kohlberg (1976). At the first of these, the *preconventional* level, an individual is incapable of understanding moral and ethical norms and follows societal or group rules through fear of punishment (Shields & Bredemeier, 1995). An example of behavior at this level of development in SE is a student who decides not to foul an opponent who is certain to score in a game of soccer, because the student is worried about the chances of receiving a red card. Individuals who progress to the *conventional* level of moral development comprehend societal or group values and beliefs and behave accordingly. They do not, however, have the capacity to question the morality of these values and beliefs (Shields & Bredemeier, 1995). An example of behavior at this level of development within an SE season is a student arguing with and attempting to intimidate an official because this is also how his teammates behave. Individuals who get to the *postconventional* level of moral development have a superior comprehension of what is morally good and bad and so can examine societal values and beliefs critically and may not follow cultural norms if they believe them to be immoral. Within SE,

an example of behavior at this level of development is a student who refuses to employ "trash talking" as a tactic even though it is a common practice among her teammates.

Social Learning Theory

The central concept of social learning theory is that significant persons and institutions within an individual's culture and environment have a considerable effect on their values, beliefs, and consequent behavior (Shields & Bredemeier, 1995). By espousing and modeling specific values (Hassandra et al., 2007), these individuals and institutions shape the views of youth as to what is morally wrong or right (Rest, Narvaez, Bebeau, & Thoma, 1999). Individuals with high status (e.g., coach, teacher, gang leader) and of a similar background (e.g., gender, race, and class) have more influence on youth than those with low status and differing backgrounds (Shields & Bredemeier, 1995). Therefore, individuals whom youth hold in high regard (i.e., teachers and/or coaches) tend to have a greater effect, whether positive or negative, on a child's moral behavior.

Method

Participants

The primary participant in this study was Derrick[1], a purposefully selected teaching-oriented preservice teacher who was enrolled in a PE teacher education (PETE) program at a large public university in the southeastern United States. Thirty-eight middle school boys taught by Derrick within SE seasons during his culminating internship also participated in the study. Derrick and his students and the students' parents signed consent and assent forms, in line with the requirements of the university's policy on human participants in research.

Derrick was a 22-year-old Caucasian male identified by his PETE faculty as possessing a strong teaching orientation and showing much promise. In line with other teaching-oriented PE teachers (Curtner-Smith et al., 2008), he had played relatively little organized youth and school sport at a modest level. Moreover, his motivation for entering PETE was his elementary PE teacher, Ms. Curtis, who "had a passion for teaching and cared about her profession" and

"wasn't someone who would roll out the ball." Further, she "was really good [because] she taught . . . a lot of different things . . . was very well organized, and did skill stuff." Consequently, Derrick was not interested in "coaching right away." Rather, he wanted to focus on "learning how to teach."

Derrick's Training for and Experience of Sport Education

Before the study commenced, Derrick completed three semesters of coursework that trained him to use the SE model. During the first semester, he watched SE being taught on film, read the Siedentop et al. (2011) text, was lectured about and engaged in discussion of the model, and taught a 13-lesson soccer season of SE to middle school students. During the second semester, Derrick delivered three mini-seasons of SE on volleyball, tennis, and rugby to middle school students. Within the third semester, he taught one full-length season of SE on batting-fielding games to students in the upper elementary grades.

Setting

Data were collected during Derrick's 7-week secondary teaching internship at a local middle school. During this experience, he was supervised by a cooperating teacher and a university supervisor. For the purposes of the study, he was observed teaching two 20-lesson seasons of team handball. The first of these SE seasons was taught to a class of 20 seventh grade boys (aged 12 to 13 years). The second season was taught to a class of 18 eighth grade boys (aged 13 to 14 years). Lesson length was 45 min. Both seasons consisted of three organizational lessons, five lessons of preseason practices and games, eight lessons of regular season play, three lessons of postseason playoffs leading to the championship game, and awards ceremony. During the two seasons, Derrick asked the boys to perform the roles—in addition to player—of coach, captain, warm-up leader, official, and scorekeeper.

Data Collection

Data were collected with eight qualitative techniques. This ascertained the extent that Derrick's delivery of SE promoted moral and sporting behavior within his students. These techniques included four types of interviewing. Derrick was formally interviewed prior

to and immediately following the completion of the internship. Pertinent demographic information and data indicating the degree to which he was teaching oriented were collected during the first formal interview. Moreover, Derrick was asked about his views on fair play and moral and sporting behavior. Questions posed in the second formal interview were designed to elicit reflections about his ability to promote fair play and moral and sporting behavior during his respective SE seasons. Derrick also engaged in one stimulated recall interview in which he observed film of his teaching and was asked to comment on his specific actions. Groups of two to four students participated in focus group interviews. In the interviews, they were asked about their views on fair play and moral and sporting behavior, and how their SE unit may have contributed to their moral and sporting development. They were also asked to react to fictional sporting dilemmas. For example, students were asked whether they would voluntarily tell an official they had trapped a ball that was ruled caught in a game of baseball. Formal, stimulated recall and focus group interviews were recorded verbatim and transcribed. Whenever the opportunity presented itself, Derrick was also informally interviewed. The contents of these interviews were recorded as soon as possible after they occurred.

Nonparticipant observation involved watching Derrick teaching his SE seasons and taking copious notes focused on pedagogies related to fair play and moral and sporting behavior. Derrick supplied his season plans, lesson plans, and evaluations at the conclusion of his SE seasons for document analysis. Finally, Derrick made entries into an electronic journal and weekly completed critical incident reports. In both cases, he focused his comments on moral and sporting behavior and fair play.

Data Analysis

During Stage 1 of the analysis process, data indicating the extent to which Derrick promoted fair play and moral and sporting behavior were identified, as were data revealing the degree to which students in his SE seasons played fairly and displayed moral and sporting behavior. Analytic induction and constant comparison (Goetz & LeCompte, 1984) were employed in Stage 2 as a method of coding, categorizing, and sorting these data sets into meaningful

themes. Methods that established trustworthiness and credibility of the data included member checking, searching for negative cases, and triangulation (Goetz & LeCompte, 1984).

Results and Discussion

Student Perceptions and Behaviors

Three themes emerged from the analysis of the data set related to the first research question of the study. These were *student conceptions of fair play and sporting behavior*, *context-specific versus universal fair play and sporting behavior*, and *improvement in understanding/decline in action*.

Student conceptions of fair play and sporting behavior. Throughout the study, the students saw fair play and sporting behavior as synonymous. They defined both constructs by providing real-world examples. These included avoiding unsporting behaviors (e.g., cheating; purposefully fouling; and arguing with teammates, the opposition, and officials) and engaging in sporting behaviors (e.g., being scrupulously fair and honest when officiating, respecting the opposition, enjoying the camaraderie created by the team environment, and making sure all teammates participated in gameplay for equal amounts of time). These definitions were like those expressed by students in past research (Brock & Hastie, 2007):

> If you're the refs, you need to be honest. We have had that problem in the past where the refs would cheat or make calls to benefit the teams their friends were on. You also can't be too aggressive, like fouling all the time. (Alex, focus group interview)

> Not knocking the ball out of someone's hands during a game. You know, play defense but don't get all up on them. Give them some space and stuff. Play good defense, play good offense, try not to foul much. (Jason, focus group interview)

> I think fair play is not arguing, getting along with your teammates, having a fair game, no fouling, and having a fun time. Just playing how you would play with your family.

> Teamwork. Also play well with the other team and both teams being able to play together. . . . All of us are friends here. We don't need to get mad at each other. (Reggie, focus group interview)

Context-specific versus universal fair play and sporting behavior. Higher skilled students viewed sport in PE as "different" from the organized youth and school sport. Many of this group noted that they were willing to participate in a sporting manner within PE, but that they would not transfer this attitude and these actions to "sport outside of PE":

> See in competitive sport, fair play, I honestly don't do any of that. . . . On the court when I'm playing basketball, I'm in other people's ears talking a lot of trash. I know last year I was playing in a league at the YMCA. I was standing at the free throw line, talking to the free throw shooter, and talking trash. I'd talk smack during the game, I'd push people, hold on to their jerseys to make them mad. (Jason, focus group interview)

> That's the same with all competitive sports, the other teams don't show any sportsmanship and we don't either. In school, like in PE class, I think this whole unit is to really teach you sportsmanship. . . . But I think outside of school it's about winning. (Emanuel, focus group interview)

Conversely, many of the students with less skill and little or no experience of organized youth and school sport did not share this view. For them, behaving in a sporting manner was a universal concept:

> Without fair play and sportsmanship, the game's not really the game. It's just people arguing. . . . The game would just be another reason to argue, and without fair play it wouldn't be any fun. It would just be crazy. (Jack, focus group interview)

> I think sportsmanship and fair play are more important than winning because . . . if we just want to win the whole time it can get boring. But if people show good sportsmanship and fair play, people will like it more. Like when I played my game

against Aaron's team we had a good game, but we lost by like one point and we liked it. (Reggie, focus group interview)

These contrasting attitudes displayed by more and less able boys were also often reflected in responses to the moral dilemmas presented in the focus group sessions. For example, when asked if they would deliberately foul an opposing player about to score a winning layup, more skilled boys gave responses such as this:

> For me it depends. Like if it's at school, I'd probably just let him make the layup, 'cause it's just school [i.e., PE]. But if it's out of school, I'd foul him or trip him up 'cause I want to win the game. (Emanuel, focus group interview)

In contrast, lower skilled boys gave responses such as this:

> I wouldn't try and foul. I'd do my best to delay him, but I wouldn't foul, because if I was going foul it would go against everything I just said about fair play. It's no fun if you don't play fairly. (Aaron, focus group interview)

In addition, the response that Payton, a more skilled boy, gave for the layup dilemma indicated that some of the more athletic boys had at least modified their perspective on how they would behave in organized sport during the SE season:

> I kind of want to say that I would just let them shoot it, in case they missed. I guess with my moral code, I would let them go. . . . It would depend on the environment. In this kind of environment [i.e., PE] you would be learning from it and be able to go forth, but if it was like the state championship, you would probably want to be competitive and go for the aggressive block. (Payton, focus group interview)

Improvement in understanding/decline in action. At the beginning of the seasons, students were more likely to define sporting behavior and fair play in terms of avoiding unsporting actions. Conversely, by the conclusion of the season, they were more likely to strike a balance between avoiding unsporting behaviors and engaging in sporting behaviors, which signals a growing sophistication in their understanding of the two constructs. Moreover, instances of

unsporting behavior, such as those portrayed in the following field note extracts, declined from the beginning of the season to the end of the regular season:

> Standing in the gym, waiting for the seventh grade students to come out of the locker room, I overhear Malik and Andrew talking to each other. As they walk out into the gym, Malik states, "Man, my team sucks, we don't have any athletes." At which point Andrew nods his head in agreement, stating, "Yeah, I wouldn't want to be on your team." (Field notes, seventh grade season, lesson 5)

> During a regular season game between the Jaguars and the Vipers, Ryan (a Viper) begins complaining to the official, stating, "Come on Simon, he took more than three steps, you have to call that." Ryan repeatedly tries to get Simon (an official) to call the foul, but Simon ignores Ryan's request. Ryan then turns to Derrick (PT), stating, "Coach we need better officials because they are terrible, they're missing so many calls!" (Field notes, eighth grade season, lesson 10)

During the same time, exhibitions of sporting behavior increased:

> Standing on the sideline during a regular season game between the Cardinals and the Coyotes, Jimmy, a substitute for the Coyotes, witnesses Nathan (the Cardinals' goalkeeper) make a diving save. Jimmy shouts, "Great stop Nathan, nothing is getting by you today." (Field notes, eighth grade season, lesson 9)

> Watching a game between the Hawks and the Bulls, Justin (a Bull) takes a shot at goal. Jose (an official) indicates that it wasn't a goal, but Brandon (an official) indicates a score. Brandon and Jose come together, discuss the play, and end up making a joint decision that the goal was good. (Field notes, seventh grade season, lesson 15)

Once engaged in the playoffs, however, when every game was "important" in a sporting sense and the stakes were higher, many

of the higher skilled boys reverted to type and, in line with their views on participation in "real sport," began to engage in unsporting behaviors that they had previously jettisoned, because they thought this course of action might help them win:

> Jack makes a good defensive play during a team scrimmage, swatting the ball out of the air as Trevon tries to shoot at the goal. Trevon stares at Jack and says, "I wished that we would have been using a harder ball so that the ball would have jammed your finger." (Field notes, seventh grade season, lesson 17)

During a game between the Jaguars and Leprechauns, Jesse (a Jaguar) begins yelling unconstructively and aggressively at Alex, a teammate of his who is the goalkeeper: "Alex, stop getting out of the goalie box! You're losing the game for us! You need to stop some shots!" (Field notes, eighth grade season, lesson 18)

Regardless of these trends in their use of unsporting and sporting behaviors, at the end of the season, the majority of boys were adamant that, in general, they had become a more sporting group:

> I think it [i.e., sporting behavior and fair play] improved. I learned a lot more. We played team handball in fourth grade and it was wild. We argued a lot then. I also think in this unit, there are people who aren't as good, but, like, we take that into account. . . . Our sportsmanship, I think, has been a lot better. I think it's very important to show the other team that they're not bad, especially if they are down. You know you can give them a pat on the back and try and cheer them up because . . . you got the whole rest of the day and if you're upset you're going to be pouty. And then you're going to ruin other people's day. (Sam, focus group interview)

Derrick's Perceptions and Pedagogies

Two themes were identified from the analysis of the data set related to the second research question of the study. These were *Derrick's conception of fair play and sporting behavior* and *implementing a pure form of SE*.

Derrick's conception of fair play and sporting behavior. Derrick possessed a relatively sophisticated conception of fair play that was universal, like that of his lesser skilled students, and crossed the boundaries of different types and levels of sport. Also in congruence with his students, Derrick noted that playing in a fair and sporting manner involves not using unsporting behaviors and engaging in sporting ones:

> I think sporting behavior and fair play have to do with being a good sport to your team, as well as others like opponents and referees, like helping an opponent up during a game and not ignoring them. Looking at the aspect of negative sporting behavior or fair play would be like arguing with a teammate, an opponent, or the officials. (Derrick, formal interview 1)

For Derrick, however, the former condition was a prerequisite for the latter, and he was interested in moving his students toward the realization that to be truly sporting, they needed to engage in positive behaviors:

> I tried to always point out the good behavior students would show. Like, for example if a student was good about cheering on his teammates as well as his opponents, I would try to point that out during class to let him know, and the rest of the class know, that that was what I wanted to see. You know specifically if students were demonstrating poor sporting behavior . . . I would have them think about . . . how they could improve upon their behavior. . . . I would just talk to them one-on-one to let them know why the behavior was wrong and how they should correct it. (Derrick, formal interview 2)

Derrick was also quick to point out that to have an influence on his students, he needed to model positive sporting behavior:

> I knew this group might be a handful, so I always try to be very conscious of what I say and do in class and even out of class. I always talk about being a good sport and treating others like you want to be treated, so I really try to also copy

that behavior for the students by my own actions. (Derrick, stimulated recall interview)

Implementing a pure form of SE. Derrick did not "water down" or pick and choose elements of the SE model to employ, as coaching-oriented teachers have been shown to do (Curtner-Smith et al., 2008). Rather, he delivered a unit that included all the elements that Siedentop et al. (2011) suggested comprise a pure season of SE. This allowed him to take full advantage of the structure of SE to improve his students' understanding of fair play and sporting behavior and their ability to behave in a fair and sporting manner.

Derrick's early lessons were characterized by direct instruction, as he laid a managerial and organizational foundation for the seasons to come. After establishing these, he shifted to a blend of direct and indirect teaching styles. For example, like the teachers described by other researchers (Giebink & McKenzie, 1985; Hassandra et al., 2007; Romance et al., 1986), he frequently held discussions with his students at the end of lessons to explore their sporting behavior (or lack of it) in the previous lesson:

> Following the lesson, Derrick meets with his students and asks, "Looking at fair play and sportsmanship, how do you think y'all did today?" Jason raises his hand and responds, "Overall, I think it was pretty good, coach. Although there might have been a few too many arguments with the officials, nothing like serious, but you know." (Field notes, seventh grade season, lesson 13)

In addition, once students were engaged in practice or gameplay, Derrick constantly prompted them to engage in less unsporting behavior and more sporting behavior:

> At the end of the first set of 7th grade preseason games, Derrick has the class sit down in a half circle and begins talking to them: "I thought y'all did a pretty good job today. One thing I want you to really focus on and improve on is your sportsmanship. I noticed many of you were arguing with the refs. We don't need any of that! That's not part of being a good sport, do you all get that?" The students nod

their heads in agreement. (Field notes, seventh grade season, lesson 6)

Following the end of a game, Derrick calls Emanuel over to talk with him. Derrick says, "Emanuel I thought you played really hard during that first game, but you shoot every time you have the ball in your hand. Do you think that is being a good teammate?" Emanuel replies, "Mr. D, I just want to score the most goals that I can." Derrick responds, "I understand that, but you really need to try and get your teammates involved, be a team player." (Field notes, seventh grade season, lesson 12)

At the conclusion of their respective seasons, many of Derrick's students noted the positive effect of Derrick's prompts on them. They acknowledged that "the times when he [i.e., Derrick] talks about fair play and sportsmanship during class we tend to do better."

Another key to Derrick's success was that he gave those in leadership roles (i.e., coaches and captains) a lot of responsibility for their teammates' behaviors:

The most meaningful aspect of class today was seeing my class run the preseason game without my help. I have been really stressing with my students that they need to take on a lot of the responsibility. (Derrick, critical incident report, lesson 6)

During the second game between the Tigers and Sharks, Marvin (a Shark) begins arguing with Dennard (a Tiger) about stepping over the goal line while attempting a shot. Marvin shouts, "Dennard, quit stepping over the line, you're cheating!" Michael, the Sharks' coach, immediately goes over to Marvin and says, "Marvin, arguing with Dennard won't help us. You have to just move on. If the refs see it they will call it, but we don't need to lose fair play points dude." (Field notes, seventh grade season, lesson 19)

Moreover, following Hastie and Sharpe (1999), Derrick included his "fair play system" at the heart of his effort to improve his students'

understanding and exhibition of sporting behavior. This system involved the two officials of each game being able to award a maximum of 3 points for fair play and sporting behavior to each team. These points were added to those points that teams acquired for winning (3 points) and drawing (2 points) games and so counted toward teams' league positions during the regular season. As illustrated by the following field note extract, the system appeared to have the intended effect:

> The Wildcats and Huskies are engaged in a regular season game. Jack, one of the more athletic boys, steps out of the game. He tells Eric, his teammate, to "sub in" for him. Jack says, "I can't handle this! I need to take a break or I'm gonna lose it." I ask Jack what the problem is. He replies, "I thought the ref missed that traveling call on Lamar, and I almost went up to him to say something, but I held up 'cause I didn't want to lose my cool and cost our team fair play points." (Field notes, 7th grade season, lesson 12)

One feature of Derrick's teaching was his awareness of what was happening in his classes. He was quick to detect that "some of the more athletic students [had] become overly competitive" once the playoffs began and that, consequently, "poor sportsmanship and fair play" increased and some students became "overly aggressive." To counter this state of affairs, Derrick "decided to double the [number of] fair play points" officials could award "so they counted for more than a win." However, this strategy did not have the desired effect on many of the students. It did, however, positively influence some of them:

> I mean you have to demonstrate good sportsmanship and fair play if you seriously want to get to the championship game in order to get fair play points. You can't get to the championship game by simply winning. If you're a poor sport or you're arguing with the refs all the time, you won't get there. You have to represent your team positively and be a good sport. (Wyatt, focus group interview)

Derrick also tried a second strategy to counter the increase in unsporting behavior during the playoff phase of the season. He

required "the coaches to assess the refs on how they did during games." Specifically, the coaches of each team in a playoff game could award a maximum of 2 points to the teams who supplied the referees. The bases for this award were the standard of officiating and the degree to which the referees were perceived to be impartial. Again, although it was not a total success, Derrick and his students thought that the strategy positively affected some students:

> During the late part of the season, I noticed some students really focusing on their fair play. The fact that fair play points counted for more during the playoffs really seemed to push students to demonstrate good fair play and sportsmanship. If students got angry, I really noticed their teammates, like their coach, trying to calm each other down. I think it's coming more from the students than me towards the end of the unit. (Derrick, formal interview 2)

> Mr. D also started giving fair play points to the refs. Basically as a way to make sure they were focused on making the right calls and paying attention. The better they did, the more points they got, and I think it's really helped in getting them to pay attention and make the right calls. (Sam, focus group interview)

Conclusion

Data collected during the study indicated that many of the students gained a more sophisticated understanding of fair play and sporting behavior during the two seasons. That is, their conception of these constructs shifted along the continuum encompassing the preconventional, conventional, and postconventional levels of moral development (Kohlberg, 1976). In addition, on numerous occasions students' actions matched their enhanced understanding and they were observed playing fairly and acting in a sporting manner.

Derrick's teaching orientation, his own concept of sporting behavior and fair play, his delivery of a pure version of SE, and his pedagogy had much to do with these shifts and positive outcomes. Collectively, they allowed him to present new ideas about

sporting behavior and fair play, which the students assimilated and accommodated.

However, many of the more skilled students' willingness to engage in fair play and sporting behavior had boundaries and was context specific. These students noted that they were more inclined to act in a sporting fashion during PE than during "real" sport. Moreover, in line with past research (Brock & Hastie, 2007), this research shows that as gameplay became more competitive in the SE seasons and began to resemble the organized sport to which students were more accustomed, some of the more skilled students regressed to behaving at the preconventional or conventional levels of moral development. That is, they engaged in more unsporting behaviors and were prepared to play outside the rules of the game in accordance with what they viewed as societal norms, unless stopped by the officials for fear of sanction.

Conversely, many of the less skilled students maintained a universal concept of sporting behavior and fair play and so did not take the same backward step as their relatively skilled peers when the competition became fiercer. The different impact of Derrick's teaching on the more and less skilled boys, then, illustrates the powerful socializing force that organized youth and school sport has on students of this age.

The results of the study confirm that the SE model is an excellent medium through which to develop sporting behavior and fair play. They also suggest that PETE faculty training undergraduate preservice teachers or conducting professional development for in-service teachers would do well to stress that the best results are achieved when teachers deliver the pure form of the model as opposed to incorporating parts of the model within traditional multiactivity teaching. Moreover, the results of the study suggest that PETE faculty require preservice and in-service teachers to examine their own concepts of sporting behavior and fair play, warn them about the difficulty of changing the behaviors of students who have an extensive background in organized youth and school sport, and attempt to provide them with specific strategies for improving sporting behavior and fair play that are compatible with the SE model.

Future research detailing the extent to which the results of this study transfer to other preservice and in-service teachers would be

useful. Such work would be particularly helpful if carried out in different contexts and with different students in terms of gender and age.

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