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# Improving the Effectiveness of the Method of Conducting Physical Education Classes for Students of Grades 5-9 in Hot Climates

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## ABSTRACTS

Physical education is a formal content area of study in schools that is standards-based and encompasses assessment based on standards and benchmarks. It is defined as "a planned sequential K-12 standard-based program of curricula and instruction designed to develop motor skills, knowledge, and behaviors of healthy active living, physical fitness, sportsmanship, self-efficacy, and emotional intelligence." As a school subject, physical education is focused on teaching school-aged children the science and methods of physically active, healthful living. This article provides a perspective on physical education in the context of schooling; (2) elaborates on the importance of physical education to child development; (3) describes the consensus on the characteristics of quality physical education programs; (4) reviews current national, state, and local education policies that affect the quality of physical education; and (5) examines barriers to quality physical education and solutions for overcoming them.



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## 1. INTRODUCTION

Physical education became a subject matter in schools (in the form of German and Swedish gymnastics) at the beginning of the 19th century (Hackensmith, 1966). Its role in human health was quickly recognized. By the turn of the 20th century, personal hygiene and exercise for bodily health were incorporated into the physical education curriculum as the major learning outcomes for students. The exclusive focus on health, however, was criticized by educator Thomas Wood as too narrow and detrimental to the development of the whole child. The education community subsequently adopted Wood's inclusive approach to physical education whereby fundamental movements and physical skills for games and sports were incorporated as the major instructional content. During the past 15 years, physical education has once again evolved to connect body movement to its consequences (e.g., physical activity and health), teaching children the science of healthful living and skills needed for an active lifestyle It is an avenue for engaging in developmentally appropriate physical activities designed for children to develop their fitness, gross motor skills, and health.

Physical education is education content using a “comprehensive but physically active approach that involves teaching social, cognitive, and physical skills, and achieving other goals through movement” (p. 126). Physical education is education through the physical. Two main goals of physical education: (1) prepare children and youth for a lifetime of physical activity and (2) engage them in physical activity during physical education. These goals represent the lifelong benefits of health-enhancing physical education that enable children and adolescents to become active adults throughout their lives.

## 2. METHODS

The research methodology applied in this study involves a qualitative analysis of the data excerpted by improving the methods of conducting physical education of school children of grades 5-9 grades examined with accessible instruments of concordances and their frequencies as well as relevant collocations. In some of the cases, in which new meanings relevant to our discussion of persuasive emotionality have recently emerged, our corpus results indicate diachronic trends such forms underwent from less to more marked meanings. Similarly, in some of the examples – although not in all, due to their boxing skills– the analysis indicates the ideological framing and usage methods of a segment of boxing training to be more effective than the tacit persuasive tactics used by using modern methods of training. The data and materials used in the present study were derived from field training at boxing schools. The textual data in the corpus is timestamped and annotated.

## 3. RESULTS AND DISCUSSION

### 3.1. Physical Education as Part of Education

In institutionalized education, the main goal has been developing children's cognitive capacity in the sense of learning knowledge in academic disciplines. This goal dictates a learning environment in which seated learning behavior is considered appropriate and effective and is rewarded. Physical education as part of education provides the only opportunity for all children to learn about physical movement and engage in physical activity. As noted, its goal and place in institutionalized education have changed from the original focus on teaching hygiene and health to educate children about the many forms and benefits of physical movement, including sports and exercise. With a dramatic expansion of content beyond the original Swedish and German gymnastics programs of the 19th century, physical education has evolved to become a content area with diverse learning goals that facilitate the

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holistic development of children. To understand physical education as a component of the education system, it is important to know that the education system in the United States does not operate with a centralized curriculum. Learning standards are developed by national professional organizations such as the National Association for Sport and Physical Education (NASPE) and/or state education agencies rather than by the federal Department of Education; all curricular decisions are made locally by school districts or individual schools in compliance with state standards. Physical education is influenced by this system, which leads to great diversity in policies and curricula. According to NASPE and the American Heart Association (2010), although most states have begun to mandate physical education for both elementary and secondary schools, the number of states that allow waivers/exemptions from or substitutions for physical education increased from 27 and 18 in 2006 to 32 and 30 in 2010, respectively. These expanded waiver and substitution policies (discussed in greater detail later in the chapter) increase the possibility that students will opt out of physical education for non-medical reasons. Given that curricula are determined at the local level in the United States, encompassing national standards, state standards, and state-adopted textbooks that meet and are aligned with the standards, physical education is taught in many different forms and structures. Various curriculum models are used in instruction, including movement education, sports education, and fitness education. In terms of engagement in physical activity, two perspectives are apparent. First, programs in which fitness education curricula are adopted are effective at increasing in-class physical activity (Lonsdale et al., 2013). Second, in other curriculum models, physical activity is considered a basis for students' learning skills or knowledge that the lesson is planned for them to learn. A paucity of nationally representative data is available with which to demonstrate the relationship between the actual level of physical activity in which students are engaged and the curriculum models adopted by their schools.

### 3.2. Theoretical Framework

The movement has been a cornerstone of physical education since the 1800s. Early pioneers (Francois Delsarte, Liselott Diem, Rudolf von Laban) focused on a child's ability to use his or her body for self-expression. Exemplary works and curriculum descriptions include those by Laban himself and others. Over time, however, the approach shifted from concern with the inner attitude of the mover to a focus on the function and application of each movement. In the 1960s, movement education intended to apply four movement concepts to the three domains of learning (i.e., cognitive, psychomotor, and affective). The four concepts were body (representing the instrument of the action); space (where the body is moving); effort (the quality with which the movement is executed); and relationships (the connections that occur as the body moves—with objects, people, and the environment). The importance of movement in physical education is evidenced by its inclusion in the first two NASPE standards for K 12 physical education. These standards emphasize the need for children to know basic movement concepts and be able to perform basic movement patterns. It is imperative for physical educators to foster motor success and to provide children with a basic skill set that builds their movement repertoire, thus allowing them to engage in various forms of games, sports, and other physical activities.

### 3.3. Findings

One prevalent physical education model is the sports education curriculum designed by Daryl Siedentop. The goal of the model is to “educate students to be players in the fullest sense and to help them develop as competent, literate, and enthusiastic sportspersons”. The

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model entails a unique instructional structure featuring sports seasons that are used as the basis for planning and teaching instructional units. Students are organized into sports organizations (teams) and play multiple roles as team managers, coaches, captains, players, referees, statisticians, public relations staff, and others to mimic a professional sports organization. A unit is planned in terms of a sports season, including preseason activity/practice, regular-season competition, playoffs and/or tournaments, championship competition, and a culminating event (e.g., an awards ceremony or sport festivity). Depending on the developmental level of students, the games are simplified or modified to encourage maximum participation. In competition, students play the roles noted above in addition to the role of players. A sports education unit thus is much longer than a conventional physical education unit.

Findings from research on the sports education model have been reviewed twice. Evidence is insufficient to support the conclusion that the use of the model results in students' developing motor skills and fitness and learning relevant knowledge; some evidence suggests that the model leads to stronger team cohesion, more active engagement in lessons, and increased competence in gameplay. In a more recent review, Hastie *et al*., (2011) report on emerging evidence suggesting that the model leads to improvement in cardiorespiratory fitness (only one study) and mixed evidence regarding motor skills development, increased feeling of enjoyment in participation in physical education, increased sense of affiliation with the team and physical education, and positive development of fair-play values. The only study on in-class physical activity using the model showed that it contributed to only 36.6 percent of activity at the vigorous- or moderate-intensity levels. Hastie and colleagues caution, however, that because only 6 of 38 studies reviewed used an experimental or quasi-experimental design, the findings must be interpreted with extreme caution. The model's merits in developing motor skills, fitness, and desired physical activity behavior have yet to be determined in studies with more rigorous research designs.

Instead of focusing exclusively on having children move constantly to log activity time, a new curricular approach emphasizes teaching them the science behind why they need to be physically active in their lives. The curriculum is designed so that the children are engaged in physical activities that demonstrate relevant scientific knowledge. The goal is the development and maintenance of individual student fitness. In contrast with the movement education and sport education models, the underlying premise is that physical activity is essential to a healthy lifestyle and that students' understanding of fitness and behavior change result from engagement in a fitness education program. The conceptual framework for the model is designed around the health-related components of cardiorespiratory fitness, muscular strength and endurance, and flexibility. A recent meta-analysis (Lonsdale *et al*., 2013) suggests that physical education curricula that include fitness activities can significantly increase the amount of time spent in vigorous- or moderate-intensity physical activity.

Several concept-based fitness education curriculum models exist for both the middle school and senior high school levels. They include Fitness for Life: lifelong physical activity (Corbin *et al*., 2002), Personal Fitness: Looking Good, Feeling Good, and Foundations of Fitness. Activities in the curriculum are designed for health benefits, and the ultimate goal for the student is to develop a commitment to regular exercise and physical activity. It is assumed that all children can achieve a health-enhancing level of fitness through regular engagement in vigorous- or moderate-intensity physical activity. Randomized controlled studies on the impact of a science-based fitness curriculum in 15 elementary schools showed that, although the curriculum allocated substantial lesson time to learning cognitive knowledge, the students were more motivated to engage in physical activities than students in the 15 control

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schools experiencing traditional physical education (Chen *et al*., 2008), and they expended the same amount of calories as their counterparts in the control schools (Chen *et al*., 2007). Longitudinal data from the study reveal continued knowledge growth in the children that strengthened their understanding of the science behind exercise and active living. What is unclear, however, is whether the enthusiasm and knowledge gained through the curriculum will translate into the children's lives outside of physical education to help them become physically active at home.

To incorporate standards and benchmarks into a fitness education model, a committee under the auspices of NASPE in 2012 developed the Instructional Framework for Fitness Education in Physical Education. It is suggested that through this proposed comprehensive framework, fitness education be incorporated into the existing physical education curriculum and embedded in the content taught in all instructional units. Today, active gaming and cell phone/computer applications are a part of physical activity for both youth and adults. Accordingly, fitness education in school physical education programs is being enhanced through the incorporation of active video games, also known as exergaming. Examples of active gaming programs with accompanying equipment include Konami Dance Dance Revolution (DDR), Nintendo Wii, Gamebikes, Kinect XBOX, Xavix, and Hopsports. These active games have been incorporated into school wellness centers as high-tech methods of increasing student fitness levels to supplement the traditional modes for attaining vigorous- or moderate-intensity physical activity. Bailey and McInnis (2011) compared selected active games with treadmill walking and found that each game—DDR, LightSpace (Bug Invasion), Nintendo Wii (Boxing), Cyber Trazer (Goalie Wars), Sportwall, and Xavix (J-Mat)—raised energy expenditure above that measured at rest. Mean metabolic equivalent (MET) values for each game were comparable to or higher than those measured for walking on a treadmill at 3 miles per hour. Graf *et al*. (2009), studying boys and girls aged 10-13, found that both Wii boxing and DDR (level 2) elicited energy expenditure, heart rate, perceived exertion, and ventilatory responses that were comparable to or greater than those elicited by moderate-intensity walking on a treadmill. Similar results were found by Lanningham-Foster *et al*. (2009) among 22 children aged 10-14 and adults in that energy expenditure for both groups increased significantly when playing Wii over that expended during all sedentary activities.

Greater and more sustained energy expenditure over time and noted that players' various intrinsic motivations to play also influenced their level of energy expenditure. Mellecker and McManus (2008) determined that energy expenditure and heart rate were greater during times of active play than in seated play. Fawkner *et al*. (2010) studied 20 high school–age girls and found that dance simulation games provided an opportunity for most subjects to achieve a moderate-intensity level of physical activity. The authors conclude that regular use of the games aids in promoting health through physical activity. Haddock *et al*., (2009) conducted ergometer tests with children aged 7-14 and found increased oxygen consumption and energy expenditure above baseline determinations. Maddison *et al*. (2007), studying children aged 10-14, found that active video game playing led to significant increases in energy expenditure, heart rate, and activity counts in comparison with baseline values.

They conclude that playing these games for short periods is comparable to light- to moderate-intensity conventional modes of exercise, including walking, skipping, and jogging. Ni Mhurchu *et al*. (2008) also conclude that a short-term intervention involving active video games is likely to be an effective means of increasing children's overall level of physical activity. Additionally, the effects of active gaming among 10-year-old children in Hong Kong, found the children to be significantly more physically active while playing interactive games compared with screen-based games. Exergaming appears to increase acute physical activity

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among users and is being used in school settings because it is appealing to students. Despite active research in the area of exergaming and physical activity, however, exergaming's utility for increasing acute and habitual physical activity specifically in the physical education setting has yet to be confirmed. Further, the results of studies conducted in nonlaboratory and nonschool settings have been mixed (Baranowski *et al*., 2008). Moreover, any physical activity changes that do occur may not be sufficient to stimulate physiologic changes. The effects of Nintendo Wii on physiologic changes. Although energy expenditure was raised above resting values during active gaming, the rise was not significant enough to qualify as part of the daily 60 minutes or more of vigorous-or moderate-intensity exercise recommended for children.

While collecting data on the effects of Nintendo Wii on 11-year-olds in New Zealand, active video games generated higher energy expenditure than both resting and inactive screen watching. They determined, however, that active gaming is a “low-intensity” physical activity. Therefore, it may help reduce the amount of sedentary behavior, but it should not be used as a replacement for more conventional modes of physical activity. Active gaming can increase student motivation to engage in physical activity, but the motivation may decrease as a result of prolonged exposure to the same games. This study also found that exergaming lessons provided a less physical activity for children than regular conventional physical education. For inactive children, however, the exergaming environment is conducive to more active participation in game-based physical activities than in conventional physical education (Fogel *et al*., 2010). Finally, among school-age children the use of active gaming added to postural stability, an important component of motor skills development.

From the research cited above, as well as ongoing research being conducted by the Health Games Research Project funded by the Robert Wood Johnson Foundation, active gaming is promising as a means of providing young children an opportunity to become more physically active and helping them meet the recommended 60 or more minutes of vigorous- or moderate-intensity physical activity per day. Different types of games may influence energy expenditure differentially, and some may serve solely as motivation. Selected games also appear to hold greater promise for increasing energy expenditure, while others invite youth to be physically active through motivational engagement. The dynamic and evolving field of active gaming is a promising area for future research as more opportunities arise to become physically active throughout the school environment. While several evidence-based physical education programs—such as the Coordinated Approach to Child Health (CATCH) and Sports, Play, and Active Recreation for Kids (SPARK)—are being implemented in schools, many innovative programs also have been implemented nationwide that are motivating and contribute to skills attainment while engaging youth in activities that are fun and fitness oriented. These programs include water sports, involving sailing, kayaking, swimming, canoeing, and paddle boarding; adventure activities such as Project Adventure; winter sports, such as snow skiing and snowshoeing; and extreme sports, such as in-line skating, skateboarding, and cycling.

### 3.4. Differences Among Elementary, Middle, and High Schools

Instructional opportunities vary within and among school levels as a result of discrepancies in state policy mandates. Although the time to be devoted to physical education (e.g., 150 minutes per week for elementary schools and 225 minutes per week for secondary schools) is commonly included in most state mandates, actual time allocation in school schedules is uncertain and often left to the discretion of local education officials. Concerning content, in both elementary and secondary schools, physical activity is an assumption rather than an intended outcome except in the fitness education model. The goals of skill development and

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knowledge growth in physical education presumably are accomplished through participation in vigorous- or moderate-intensity physical activity. Data are lacking, however, to support the claim that physical activity offered to further the attainment of skills and knowledge is of vigorous or moderate intensity and is of sufficient duration for children to reap health benefits.

### 3.5. Children in Nontraditional Schools

Research on physical education, physical activity, and sports opportunities in nontraditional school settings (charter schools, home schools, and correctional facilities) is extremely limited. Two intervention studies focused on charter schools addressed issues with Mexican American children. In the first (Johnston *et al*., 2010), 10- to 14-year-old children were randomly assigned to either an instructor-led intervention or a self-help intervention for 2 years. The instructor-led intervention was a structured daily opportunity for the students to learn about nutrition and to engage in structured physical activities. The results indicate that the children in the instructor-led intervention lost more weight at the end of the intervention than those in the self-help condition. In the second study, 11- to 16-year-old Mexican American children from low-income families participated in a 5-week, 10-lesson, hip-hop dance physical activity intervention. In comparison with data collected before the intervention, the children reported greater frequency of vigorous- or moderate-intensity physical activity, lower perceived community barriers to physical activity, and stronger self-efficacy for physical activity. Collectively, the results of these two studies suggest that a structured physical activity intervention can be effective in enhancing and enriching physical activity opportunities for Mexican American adolescents in charter schools. Research on physical activity among home-schooled children is also limited.

The only study found was published in 2004. It describes differences in physical fitness, psychosocial correlates of physical activity, and physical activity between home-schooled children and their public-school counterparts aged 9-16. No significant differences were found between the two groups of children on the measures used, but the researchers did note that the home-schooled children tended to be less physically active. Research on physical education and physical activity in juvenile correction institutions is equally scarce. The use of physical activity programs as a behavior mediation intervention strategy and compared their impact on juvenile delinquents' behavior change with that of other intervention strategies. They found that physical activity did not have a stronger impact than other programs on change in delinquent behavior.

### 3.6. Fitness Assessment

All states except Iowa have adopted state standards for physical education. However, the extent to which students achieve the standards is limited since no accountability is required. An analysis of motor skills competency, strategic knowledge, physical activity, and physical fitness among 180 4th- and 5th-grade children demonstrated that the physical education standards in force were difficult to attain (Erwin & Castelli, 2008). Among the study participants, fewer than a half (47 percent) were deemed motor competent, 77 percent demonstrated adequate progress in knowledge, only 40 percent were in the Healthy Fitness Zone on all five components of the Fitnessgram fitness assessment, and merely 15 percent engaged in 60 or more minutes of physical activity each day. Most of the children failed to meet benchmark measures of performance for this developmental stage.

This evidence highlights the need for additional physical activity opportunities within and beyond physical education to enhance opportunities for students to achieve the standards.

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Relationships among these student-learning outcomes were further decomposed in a study of 230 children (Castelli & Valley, 2007). The authors determined that aerobic fitness and the number of fitness test scores in the Healthy Fitness Zone were the best predictors of daily engagement in physical activity relative to factors of gender, age, body mass index (BMI), motor skills competency, and knowledge. However, in-class engagement in physical activity was best predicted by aerobic fitness and motor skills competence, suggesting that knowledge and skills should not be overlooked in a balanced physical education curriculum intended to promote lifelong physical activity. As an untested area, student assessment in physical education has been conducted on many indicators other than learning outcomes. As reported in a seminal study, physical education teachers base learning assessment on participation (96 percent), effort (88 percent), attitude (76 percent), sportsmanship (75 percent), dressing out (72 percent), improvement (68 percent), attendance (58 percent), observation of skills (58 percent), knowledge tests (46 percent), skills tests (45 percent), potential (25 percent), and homework (11 percent). These data, while several years old, show that most learning assessments in physical education fail to target relevant learning objectives such as knowledge, skills, and physical activity behavior. The development of teacher-friendly learning assessments consistent with national and/or state standards is sorely needed.

Fitness assessment in the school environment can serve multiple purposes. On the one hand, it can provide both teacher and student with information about the student's current fitness level relative to a criterion-referenced standard, yield valid information that can serve as the basis for developing a personal fitness or exercise program based on current fitness levels, motivate students to do better to achieve a minimum standard of health-related fitness where deficiencies exist, and possibly assist in the identification of potential future health problems. On the other hand, an overall analysis of student fitness assessments provides valuable data that can enable teachers to assess learner outcomes in the physical education curriculum and assess the present curriculum to determine whether it includes sufficient fitness education to allow students to make fitness gains throughout the school year. Fitness assessment also provides a unique opportunity for schools to track data on students longitudinally. The ultimate goal of assessing student fitness in the school environment should be to educate students on the importance of maintaining a physically active lifestyle throughout their life span. When administering fitness assessments in the school setting, caution is essential to ensure the confidentiality of the results. The results and their interpretation should be shared with students and parents/guardians to have the greatest impact. To ensure the greatest benefits from fitness assessment, NASPE (2010) developed a position statement on "Appropriate Uses of Fitness Measurement." which outlines appropriate and inappropriate practices related to fitness testing in schools and other educational settings.

## 4. CONCLUSION

Physical education is a formal content area of study in schools, it is standards-based, and it encompasses assessment according to standards and benchmarks. Select curriculum-based physical education programs have been described in this chapter to show the potential of high-quality physical education in developing children into active adults. Such models provide the only opportunity for all school-age children to access health-enhancing physical activities. Curriculum models for physical education programs include movement education, which emphasizes the importance of fundamental motor skills competence as a prerequisite for engagement in physical activity throughout the life span; sports education, which emphasizes helping students become skillful players in lifetime sports of their choosing; and fitness

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education, which imparts physical fitness concepts to students, including the benefits and scientific principles of exercise, to develop and maintain individual fitness and positive lifestyle change. The emergence of a technology-focused fitness education curriculum and the new Presidential Youth Fitness Program offers further motivational opportunities for students to engage in lifelong physical activities. Because quality physical education programs are standards-based and assessed, they are characterized by (1) instruction by certified physical education teachers, (2) a minimum of 150 minutes per week for elementary schools and 225 minutes per week for middle and high schools, and (3) tangible standards for student achievement and high school graduation. Quality professional development programs are an essential component for both novice and veteran teachers to ensure the continued delivery of quality physical education.

An analysis of datasets from NASPE, NASBE, and Bridging the Gap reveals that the implementation of supportive physical education policies varies from state to state and from school to school. Since the passage of the No Child Left Behind Act in 2001, several studies and reports have identified a decline in physical education resulting from the shifting of time to academic subjects. Because physical education is not a high-stakes tested content area, the implementation of supportive policies often is hindered by other education priorities. Although the above analysis indicates that 30 states (74.5 percent) mandate physical education, most policies do not require specific amounts of instructional time, and more than half allow for waivers or exemptions. In addition, an unintended consequence of the No Child Left Behind Act has been disparities in access to physical education and physical activity opportunities during the school day for Hispanic students and those of lower socioeconomic status. In high school, relying on students to elect physical education after meeting the minimum required credit hours (one credit in all states but one) appears to be unfruitful.

## 5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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