HOSTED BY
ELSEVIER
Check for updates
Available online at www.sciencedirect.com
ScienceDirect
Journal of Sport and Health Science 10 (2021) 308–322

Invited commentary

Conceptual physical education: A course for the future

Charles B. Corbin

College of Health Solutions, Arizona State University, Phoenix, AZ 85004, USA

Received 30 June 2020; revised 19 August 2020; accepted 8 September 2020
Available online 14 October 2020

Abstract

The conceptual physical education (CPE) innovation began in the mid-20th century as an alternative approach to college-level, activity-only basic instruction classes. In addition to physical activity sessions, CPE courses (classes) use text material and classroom sessions to teach kinesiology concepts and principles of health-related fitness and health-enhancing physical activity. CPE courses are now offered in nearly all college programs as either required or electives classes. Two decades later, the high school CPE innovation began, and Kindergarten-8 programs followed. In this commentary, I argue that historian Roberta Park was correct in her assessment that physical education has the potential to be the renaissance field of the 21st century. Scientific contributions of researchers in kinesiology will lead the way, but science-based CPE and companion fitness education programs that align with physical education content standards and fitness education benchmarks will play a significant role. CPE courses have been shown to be effective in promoting knowledge, attitudes, and out-of-school physical activity and have the potential to elevate physical education as we chart the course of our future.

Keywords: Conceptual physical education; Fitness education; Secondary school physical education

1. Introduction

In 2008 Corbin and Cardinal[1] cited historian Roberta Park,[2] who suggested that physical education has the potential to become the renaissance field of the 21st century. Her thorough historical account describes the emergence of physical education in the 1800s and traces its development as a science-based profession. Park[2] notes that medicine was an emerging field during the 1800s but became the renaissance field of the 20th century largely because of research that provided a scientific basis for medical education and the profession. I believe that Park was correct in her suggestion that what was true of medicine in the 20th century can become true for physical education in the 21st century. We can become a renaissance profession, but not without changing our course. The purpose of this article is to articulate the importance of knowledge, especially higher-order knowledge, and conceptual physical education (CPE) as a program central to the delivery of knowledge and other aspects of physical literacy in the future.

2. A brief history

The dominant focus of 19th-century physical education in the USA was formal activities imported from European countries (e.g., gymnastics and regimented exercise).[2] By the mid-19th century, physical education teacher preparation programs were established in the USA, and in 1885 the Association for the Advancement of Physical Education was formed. The profession of physical education was becoming a force in American education. Buoyed by research in psychology (e.g., Hall) and education theory (e.g., Dewey), leaders put forth theories of play, games, sport, and the "recreative" value of physical activity.[2]

Through the early years of the 20th century, the debate about how best to prepare physical educators and the nature of the content of school physical education programs continued. Over time the "new physical education" of Cassidy, Nash, Williams, Wood, and others provided direction for programs of the 1900s.[3] Expanded objectives for physical education programs, such as leadership, teamwork, and sportspersonship, based on uniquely American "democratic values" found their way into school programs. Physical education became much less regimented, and sports and games became a significant part of the physical education curriculum.

Peer review under responsibility of Shanghai University of Sport.
E-mail address: chuck.corbin@asu.edu

https://doi.org/10.1016/j.jshs.2020.10.004
Cite this article: Corbin CB. Conceptual physical education: A course for the future. *J Sport Health Sci* 2021;10:308–22.

The European physical education of the 19th century morphed into the sports-dominated physical education of the 20th century. By the mid-1900s the science movement had begun and prompted Park to suggest a new look for the 21st century. She details the new science within physical education (kinesiology) and documents the great strides that have been made in our multiple sub-disciplines. This excerpt characterizes her thoughts:[3]

> There is a "great need for well-trained and dedicated professional practitioners in areas ranging from the health and fitness industry, to public school physical education, to exercise programs for older populations, to the management of recreational and sporting agencies, and much, much more. The attitude that prizes systematized knowledge, constant questioning, and the ability to forge logical links and see interdependencies, however, must infuse the work of the teacher, coach, and clinician as much as that of the exercise physiologist and biomechanist, sport psychologist, sport sociologist, and sport historian" (p. 20).

The new science outlined by Park[2] sparked many changes within physical education and kinesiology and was an important factor in the emergence of CPE and fitness education (FE) programs.

3. Definitions: CPE and FE

CPE originally referred to physical education programs (typically a semester-long class or shorter units in a class) that focused on teaching concepts, principles, self-management, and consumer skills to promote healthy lifestyles (e.g., regular physical activity, sound nutrition, making good consumer choices) and the outcomes associated with healthy lifestyle adoption (e.g., fitness, health, wellness). Unique features of CPE include classroom sessions and the use of a textbook or text-based materials.[4] Knowledge gained in the classroom and from text materials is reinforced in physical activity sessions specifically planned for CPE.

Although not initially labeled as such, early CPE programs became known as FE programs because they were developed for use with fitness assessment.[5,6] As health-related fitness testing gained traction, the programs were expanded to help students understand the reasons for testing and to help them learn to plan physical activity programs effectively to build health-related fitness. More than 40 years after the introduction of CPE, FE was formally included in the Society of Health and Physical Educators (SHAPE America) Fitness Education Framework[7] as "a subcomponent of the total physical education program, focusing on helping students acquire knowledge and higher-order understanding of health-related physical fitness, the product, as well as habits of physical activity and other healthy lifestyles, the process, that lead to good health-related physical fitness, health and wellness" (p. 1).[7]

In the years since their inception, CPE and FE programs have evolved significantly. Some examples are used to illustrate. Fitness for Life[8] as an example of a CPE program (e.g., text, classroom and activity sessions) that is also considered to be an FE program because of its extensive fitness-related content. However, over time, it has expanded to include content related to all physical education standards (see later sections). Physical Best[9] is an FE program that focuses on health-related fitness content. Because it does not use a student text or classroom sessions, it is considered to be an FE program but not a CPE program. Science of Healthful Living[3,10] uses text-based materials but does not use classroom sessions. Its authors refer to it as a concepts-based physical education[10] program. For the purposes of this article, concepts-based physical education programs will be included as CPE programs.

4. The CPE innovation

4.1. The college CPE innovation

CPE became widely adopted during an era of change. Originally conceived as a physical education offering, college classes are now offered in departments with a variety of names (e.g., kinesiology, exercise science, sport science, health and human performance) and many course titles (e.g., Fitness for Life, Personal Fitness, Concepts of Fitness and Wellness). Regardless of the academic unit or class name, CPE captures the spirit of Park's call for physical education to take its place as an enlightened or renaissance field.

At the time of its introduction, CPE was not well received.[11] However, the CPE innovation that began at the college level in the mid-20th century became an offering, as either a required class or an elective, at virtually all institutions of higher learning.[1,12,13] CPE "merges the practice and science of the field through a lecture-laboratory approach" (p. 467).[1] As CPE grew in popularity, the accompanying science movement provided evidence of the link between physical activity and public health. The epidemiological evidence helped to push performance-based youth fitness testing of the late 1950s toward health-fitness testing by the end of the century. Social movements (e.g., civil rights, rights for women, student rights) spurred change as students became active in affecting societal change. They fought for student choice in course and curriculum options. These movements aided the college CPE innovation because CPE provided an alternative to traditional required physical education classes.[1] CPE classes offered a science-based personalized approach as an alternative for all students, especially for those who did not relate to the traditional sports-based physical education offerings. In addition, evidence of the effectiveness of CPE in promoting knowledge, attitudes, and physical activity behaviors provided support for its inclusion.[1] CPE programs, and the evidence supporting them, have saved physical education requirements at many institutions since inception.[1]

4.2. The secondary school CPE innovation

Many of the same factors that led to the college CPE innovation fueled the growth of both CPE and FE programs at the high school level. Particularly influential were the growth of the science base within kinesiology and the associated public health approach to physical education.[14–22] Knowledge in

kinesiology expanded rapidly and provided a platform for advancing the profession of physical education. The shift from performance-fitness to health-fitness testing[6] occurred simultaneously with the science boom. Practical considerations also contributed to the rationale and need for CPE programs. Kinesiology was accepted in the mainstream of science, but physical education was gradually being marginalized in schools. Survey data from the Youth Risk Behavior Surveillance System[23] indicate that daily physical education attendance decreased from 41.6% in 1991 to 25.4% in 1995. It has remained stable since 1995, but attendance is well below what it was early in the 1900s.[24] Facing the challenge of being sidelined or eliminated, many schools adopted CPE as an evidence- and standards-based option that helped protect physical education requirements.[25] Furthermore, those who advocated for CPE at the high school level pointed out that not all high school students go to college and that non-college-bound students deserve to participate in effective CPE programs.

Fitness for Life[26] was the first high school CPE program. A number of others followed, including Personal Fitness and You,[27] Personal Fitness: Looking Good—Feeling Good,[28] and Foundations of Personal Fitness.[29] Fitness for Life (6th ed.) is the most widely used model.[8] Middle school CPE programs include Fitness for Life: Middle School[30] and Science of Healthful Living.[3,10] The implementation in secondary schools has been substantial[25,31] but has yet to reach the level of college programs. It should be noted that the CPE movement is not unique to the United States. For example, CPE programs have been implemented in the United Kingdom[32] and Brazil,[33] and CPE texts have been translated into other languages and/or published in other countries.[34–36]

5. Theory meets practice

5.1. Higher-order objectives

Consistent with Park's[2] call for a scientific foundation for physical education, CPE programs are based on sound education theories that provide a foundation for building higher-order learning. Promoting confidence, intrinsic motivation, and autonomy (social cognitive theory and self-determination theory); promoting the belief that these factors can help in overcoming barriers (health beliefs model); and providing information about moving through several stages of behavior change (transtheoretical model) all set the stage for helping students achieve higher-order objectives in CPE.[37]

The Stairway to Lifetime Fitness, Health, and Wellness, as illustrated in Fig. 1, provides a visual description that illustrates how theory meets practice in moving students from dependence (in elementary school) to independence and autonomy in middle and high school.[8] Central to the "stairway" metaphor is the notion that learning (achieving literacy) is vertical, not horizontal. Early learning provides a foundation for later learning. Accordingly, the stairway emphasizes the importance of addressing higher-order objectives in physical education through teaching about independent thinking and autonomy. Ennis[38] based on her work and the work of her colleagues, suggests that conceptual learning at a particular grade level provides a foundation for learning in subsequent grades—or, to put it another way, it helps students learn how to learn.

At Steps 1 and 2 (level of dependence), young students are dependent on us, the teachers. They typically lack fitness and physical activity knowledge and benefit from a direct teaching style. They participate as directed and benefit as the directed activities allow. At Steps 3 and 4 (level of decision making), students begin to understand and apply concepts and principles and to use self-management skills (e.g., self-assessment, goal setting, self-monitoring, self-planning). They begin to analyze and evaluate their own behaviors. At Steps 5 and 6 (level of independence), students become independent and autonomous (Fig. 1). They become problem solvers capable of making decisions that can enhance their long-term fitness, health, and wellness.[8]

5.2. Physical education content standards

National physical education content standards provide a basis for establishing student objectives and outcomes, including higher-order objectives. The first national physical

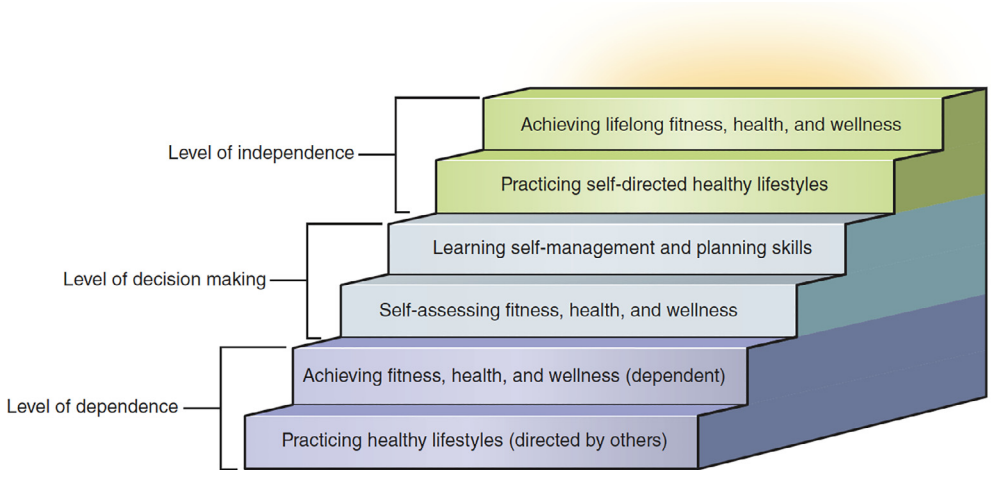

Fig. 1. The Stairway to Lifetime Fitness, Health, and Wellness from Corbin and Le Masurier[8] with permission.

education content standards were published by the National Association for Sport and Physical Education (NASPE, now SHAPE America) in 1995.[39] The standards were revised in 2004[40] and again in 2013.[41] The current standards are shown in Table 1. Early CPE programs focused on the parts of health-related physical fitness, health-related fitness self-assessments and interpretation, the types of physical activities that promote health and health-related fitness, the FITT (frequency, intensity, time, and type) formula for building fitness through physical activity, and steps in program planning. Coverage of nutrition and stress management were also included, as were self-management skills (e.g., goal setting, self-monitoring, overcoming barriers). They focused primarily on standards that specifically identify knowledge, concepts, and principles as important student outcomes (Standards 2 and 3) and the standard related to health-related fitness (Standard 3).

CPE continues to provide its original FE function, but, as suggested by Mohnsen,[42] it now covers concepts and principles related to expanded sub-disciplinary content as well as all 5 physical education content standards. Beyond content that focuses on exercise physiology concepts and principles, programs now typically include biomechanical and motor learning principles to help students in their efforts to demonstrate competency in motor skills and movement patterns (Standards 1 and 2) and sociological and psychological concepts and principles that underlie the development of self-management skills and social emotional learning (Standards 4 and 5). Correlation tables have been created to show that programs comprehensively address standards and to indicate which materials and lesson plans address which standards.[43]

5.3. *FE benchmarks*

As noted earlier, in 2012 NASPE/SHAPE America developed a framework (with benchmarks) for FE for Kindergarten−16 (K−16).[7] The framework acknowledged the importance of teaching content commonly associated with CPE and FE programs and provided benchmarks for student achievements in these programs. Many of the benchmarks (Table 1) were derived from longstanding CPE content. For this reason, many CPE programs met all, or most, of the FE framework benchmarks prior to the development of the framework. Now, many CPE programs have expanded beyond the FE framework to include content from all physical education content standards. As we move forward, physical education standards and FE benchmarks will need to evolve consistently with the new knowledge that can serve our students in the future.

6. CPE and physical literacy

In recent years the term physical literacy has gained traction.[44,45] The International Physical Literacy Association describes a physically literate person as one who has "the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life" (p. 1).[46] SHAPE America has adopted this definition but operationalized it to refer to a physically literate person as one who meets national physical education content standards (Table 1). In a separate paper,[45] I have expressed my concerns about the many different definitions of physical literacy and the use of the term. These concerns will not be revisited here.

Both the International Physical Literacy Association definition and the SHAPE America standards demonstrate that the development of knowledge is an important characteristic of physical literacy. As we move toward the future, I encourage physical educators to expand their view of knowledge development (especially higher-order knowledge) to include concepts central to current definitions of health literacy. Health literacy, as defined by the Institute of Medicine (now the National Academy of Medicine), "is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (p. 1).[47] CPE is a program designed to help students to obtain, process, and understand information about physical activity and its health benefits. CPE content centers

Table 1
Physical education content standards[41] and fitness education benchmarks.[7]

National physical education content standards	Fitness education instructional framework[a]
Standard 1: The physically literate individual demonstrates competency in a variety of motor skills and movement patterns Standard 2: The physically literate individual applies knowledge of concepts, principles, strategies, and tactics related to movement and performance Standard 3: The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness Standard 4: The physically literate individual exhibits responsible personal and social behavior that respects self and others Standard 5: The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression, and/or social interaction	Technique: Demonstrate competency in techniques needed to perform a variety of moderate to vigorous physical activities Knowledge: Demonstrate understanding of fitness concepts, principles, strategies, and individual differences Physical activity: Participate regularly in fitness-enhancing physical activity Health-related fitness: Achieve and maintain a health-enhancing level of health-related fitness Responsible personal and social behaviors: Exhibit responsible personal and social behaviors in physical activity settings Values and advocates: Value fitness-enhancing physical activity for disease prevention, enjoyment, challenge, self-expression, self-efficacy, and/or social interaction Nutrition: Strive to maintain healthy diet through knowledge, planning, and regular monitoring Consumerism: Access and evaluate fitness information, facilities, products, and services

[a] Some fitness education instructional benchmarks were edited for brevity.

on providing the knowledge to assist students in making well-informed decisions about physical activity, nutrition, and stress management. As Ennis[3] aptly notes, content "transcends the physical, relying on a sound foundation of knowledge to guide and lead physical activity choices and participation across one's lifetime"(p. 122). She further emphasizes that "knowledge is at the heart of physical literacy" and that physical literacy "includes not only knowledge for performance but also the ability to apply knowledge and use knowledge for innovation" (p. 119).[3]

7. CPE/FE implementation

7.1. CPE content

CPE began at the high school level in the late 1970s with a health-related fitness focus. The content was organized in several major strands, as depicted in the first column of Table 2. Over time, the CPE content expanded based on user demand and alignment with standards and benchmarks (see the second column of Table 2). Today's middle school CPE content is similar to early high school programs, with representative content indicated by the note alongside topics in Table 2. Lately, energy balance has also been an area of study in middle school CPE.[48]

7.2. CPE organization

The original model for high school CPE[43] included an 18-week program (a one-semester class) that met in the classroom 2 days a week and in activity sessions 3 days a week. In the USA, Florida's required personal fitness class was implemented in the 1980s using this model.[49] As was the case when the Florida CPE was implemented, the one-semester CPE class is often coupled with a second semester of a "required elective" to fulfill a one-year physical education requirement. Various states and districts have followed this model, but other alternative schedules are common. For example, some high schools have integrated CPE classroom and activity sessions with traditional activity units, thus extending the class over a full school year.[43]

At the middle school level, the three-unit, nine-chapter Fitness for Life model (taking half a semester) has been widely adopted.[30] In the half-semester plan, 2 textbook lessons are studied, with 2 classroom sessions and 3 activity sessions. However, distributing units over different grade levels is a common alternative plan. Portfolio sheets are used for recording student data. The Science of Healthful Living curriculum is designed to increase middle school students' knowledge and interest in health-related science.[50] It consists of 120 lessons in 2 units over Grades 6, 7, and 8.[3,10] The curriculum, also referred to as "Science in the Gym", emphasizes a 5E system (engagement, exploration/experiment, explanation, elaboration, and evaluation) to integrate cognitive and physical tasks. Students use workbooks and journals as guides to learning tasks. Research on the Science of Healthful Living curriculum indicates that using workbooks is an effective way of promoting knowledge development in physical education.[51,52]

Table 2
Early *vs*. current conceptual physical education (CPE) high school content.

Early high school CPE content[26]	Current high school CPE content[8]
Fitness for all	Fitness and wellness for all
Parts of fitness[a]	Adopting healthy lifestyles
Threshold of training	Self-management skills
Cardiovascular fitness	Goal setting and program planning
Strength	Getting started in physical activity
Muscular endurance	How much is enough? Health benefits
Flexibility	Skill learning and injury prevention
Exercise and fat control	Moderate physical activity[a]
Exercise and good health[a]	Cardiorespiratory endurance
Skill-related fitness	Vigorous physical activity[a]
Physical activity for a lifetime	Muscle fitness basics[a]
Fitness through sports	Muscle fitness applications
Planning your exercise program[a]	Flexibility[a]
Attitudes about fitness	Body composition and energy balance[a]
	Physical activity program planning
	Making consumer choices
	Choosing nutritious foods[a]
	Stress management
	Planning for health and wellness
	Strategies for active living
	Strategy, tactics, and careers
	The science of active living
	Biomechanical principles
	Lifelong activity, social interactions, and community opportunities

[a] Content typically covered at the middle school level.

8. The evolution of CPE and FE

Fitness tests have been around since the 1950s[53] and were developed primarily to test youth fitness. The early skill-related fitness test batteries gradually gave way to health-related fitness tests beginning with the development of the American Alliance for Health Physical Education, Recreation, and Dance (AAHPERD, now SHAPE America) health-related fitness test in 1980. After years of debate about various fitness tests, FITNESSGRAM® created at the Cooper Institute for Aerobics Research (Cooper Institute), morphed from a fitness report into a full health-related test battery with computer-based fitness reports.[6]

Critics have long suggested that tests by themselves do little to encourage fitness improvement and activity participation and may lead some youths to avoid engaging in physical education altogether.[54] CPE programs were employed to address this concern. Although there was no formal collaborative agreement, the Fitness for Life program was endorsed by the Cooper Institute as an educational program complementing FITNESSGRAM®.[55] The HELP (health, everyone, lifetime, and personal) philosophy that originated with Fitness for Life, by agreement, also became the philosophy of FITNESSGRAM®. The test items were included in Fitness for Life as self-assessments providing the basis for building a personal fitness profile in program planning. Professional development sessions were conducted at the Cooper Institute for both FITNESSGRAM® and Fitness for Life to help teachers implement the programs and to prepare instructor trainers to conduct workshops to help teachers implement both programs.

To fulfill the need for programs for K-8, a variety of FE programs were developed. Smart Choice, included in the first

FITNESSGRAM® test manual, was an early FE program.[8] It included an award for keeping activity logs and meeting goals. In 1994, Its Your Move activity booklets were created for elementary school students; and in 1995, You Stay Active was published jointly by AAHPERD and the Cooper Institute.[6] You Stay Active included teacher materials and student handouts for use in physical education to help students better understand why they were taking fitness tests and how fitness test scores can be used to set goals and aid in program planning. The Cooper Institute currently offers online instructional materials, called SmartCoach, for teachers.[55] In 1994 FITNESSGRAM® became the health-related fitness test battery and fitness-reporting system endorsed by SHAPE America.[6] AAHPERD's Physical Best health-related fitness test battery was converted into an educational program that supported FITNESSGRAM®.[6] During the 1990s, AAHPERD sponsored pre-convention instructor trainer sessions for Physical Best, Fitnessgram, and Fitness for Life.

Physical Best is currently "a program of resources and training for K-12 physical educators. . .to implement health-related fitness education, including curriculum development and health-related fitness activities" (p. 1).[9] Physical Best activity guides are available for elementary, middle school, and high school teachers.[9] Other programs—such as the Presidential's Youth Fitness Program, which features FITNESSGRAM® test items.[56] Comprehensive School Physical Activity Programs, which encourages before-, during-, and after-school physical activity.[57] the Active and Healthy Schools program, which encourages activities throughout the day[58] and Fitness for Life: Elementary School,[59] which encourages whole-school "Wellness Weeks" and uses video and health messages—can also be considered FE.

CPE, as defined in this article, is not something that I recommend for elementary schools. I do not recommend spending limited elementary school physical education time in the classroom. Because of different reading levels, books for elementary school students are not practical. Quality elementary programs such as The SPARK Programs[60] and *Dynamic Physical Education for Elementary School Children*[61] have become quite effective in using sound management strategies[60,61] for keeping students active while promoting learning consistent with physical education content standards and FE benchmarks. These programs are often very well conducted by dedicated teachers. I do endorse the inclusion of activities that teach concepts and principles because they can help move students up the stairway to lifetime fitness, health, and wellness (Fig. 1) and prepare students for secondary CPE programs. I also endorse whole-school or comprehensive school physical activity programs[57] that create and foster healthy and active school cultures. The remainder of this article focuses on secondary school CPE rather on than elementary school programs.

9. Changing course for the future

The formal exercise that characterized physical education in the 19th century gave way grudgingly to the "new physical education" in the 20th century. However, it was well into the 1900s before the "American" model that emphasized sports and games became firmly established. By 1994 the model was dominant. Data from the School Health Policies and Practices Study (SHPPS) reveal that team sports were the most commonly offered activities in secondary schools.[23] Basketball, volleyball, baseball/softball, football, and soccer were the top 5 activities for both middle schools and high schools. Dodgeball and kickball were also commonly included in programs.

The team-sport approach of the 1900s is still dominant now, at least in the USA. Table 3 provides data from the SHPPS.[62] The results look familiar. Four of the team sports that ranked in the top 5 in 1994 are still in the top 5 for both high schools and middle schools, and sports (mostly team sports) are among the most commonly offered physical education activities. It is important to point out that the data reflect the number of schools offering the activities—not the amount of time spent on the activities. Still, the statistics indicate that the same sports activities are repeatedly offered from year to year in secondary school physical education. This can lead to the administrative policy of dumping—mixing lower-grade students in the same classes as upper-grade students, resulting in repeating the same instruction and same activities again for upper-grade students. See McCullick et al.[63] and Lounsbery et al.[64] for more information about physical education and physical activity policies and common barriers to successful programming.

Contrast the activities most frequently taught in schools with the activities in which most adults participate[65] (Fig. 2). Team sports that are dominant in school physical education rank well below such activities as individual sports, outdoor activities, and fitness activities. My own observations suggest that fitness activities most common among adults are often not available to all students in secondary schools. Many high schools, for example, have fitness facilities; but elective resistance-training classes using these facilities are open primarily to athletes. Physical education classes, required or elective, often cannot use these facilities for classes for non-athletes.

Additional statistics are revealing. SHPPS data indicate that 78.8% of middle schools and 95.5% of high schools require

Table 3
Activities most commonly included in secondary physical education.

Activity	Rank in high school	Rank in middle school
Basketball	1	7
Volleyball	2	5
Football	3	1
Frisbee	4	2
Soccer	5	2
Baseball, softball	6	8
Running/jogging	7	8
Kickball	8	4
Martial arts	9	6
Golf	10	11

Notes: The rank for each activity is based on the percentages of schools offering the activity. Adapted from School Health Policies and Practices Study (SHPPS) data.[62]

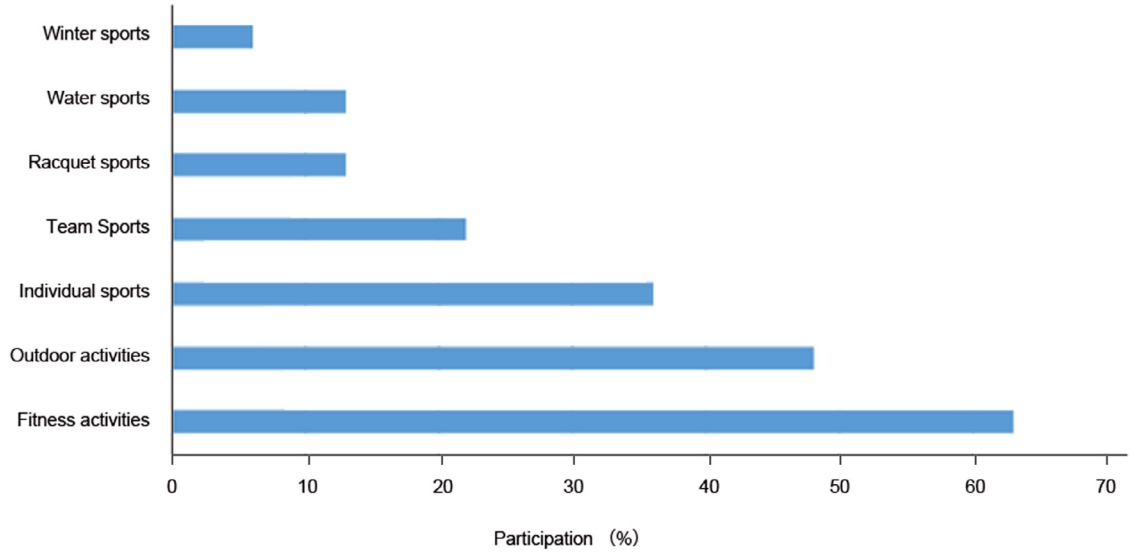

Fig. 2. Adult participation in physical activities. Based on data from the Sports and Fitness Industry Association (data available by paid subscription).[65]

students to take physical education as a graduation requirement or for promotion.[61] At first glance, it would appear that most students are required to take secondary physical education. But the same survey data show that the percentage of schools that require physical education in each grade ranges from 34% to 26% for Grades 6–8 and from 21% to 9% for Grades 9–12. The percentage of students taking physical education 3 days a week is 9.1%.[62]

As we plan physical education for the future, we should consider these questions. Is it necessary to repeat the same activities over and over again, especially activities that are often not used after the school years? Can all youth become proficient in all sports and activities? Do they want to? Would it be more productive to focus on activities that are more likely to be performed later in life? Should students at least have a choice? How does repetition of the same activities contribute to all content standards and benchmarks? Is the traditional sports-based model the best model for the future?

10. What education could be

10.1. PEAK (purpose, essentials, agency, and knowledge) principles

Dintersmith, in his book *What Schools Could Be*,[66] quotes John Dewey: "If we teach today's students as we taught yesterday's, we rob them of tomorrow" (front matter). Dintersmith[66] further states that American schools are operating with "a nineteenth-century model and it's a twenty-first-century dynamic world" (p. 1). Prior to writing his book, Dintersmith traveled country-wide, visiting all 50 states and more than 200 schools. Based on his experiences, he outlined "4 common principles" for moving American education forward. His PEAK principles include the following (p. xvi):[66]

- **P**urpose—Students attack challenges they know to be important, that make their world better.
- **E**ssentials—Students acquire the skills sets and minds sets needed in an increasingly innovative world.
- **A**gency—Students own their learning, becoming self-directed, intrinsically motivated adults.
- **K**nowledge—What students learn is deep and retained, enabling them to create, to teach others.

Dintersmith does not address physical education, but his principles can be applied to "what physical education could be". Certainly there are many outstanding teachers that currently apply the PEAK principles in their programs. However, a variety of statistics call into question the universal application of PEAK principles in secondary physical education.

10.2. CPE and PEAK

CPE has purpose. In CPE, students are challenged to learn concepts, principles, and self-management skills that can be used throughout life. Results of Project Active Teen indicate that students who took CPE as 9th graders use the information 20 years after high school graduation (see later Section 11.2). CPE develops essential skills (e.g., self-management, consumer, performance) that are useful in the 21st-century world. CPE programs promote physical literacy that provides a foundation for later innovative learning. CPE builds agency. As shown in Fig. 1, students learn to become intrinsically motivated independent (autonomous) problem solvers and decision makers while in school and in later life. CPE enhances knowledge. As Park[2] indicated decades ago, the science base (kinesiology) is significant and growing. CPE focuses on higher-order objectives, enabling students to learn to learn. This enables them to continue their learning throughout life.

11. CPE: The evidence

Green[67] labels the "PE Effect" as physical education's ability to promote lifelong participation in physical activity. He

further indicates that despite the belief that physical education produces a "PE Effect", there remains a dearth of evidence to support this supposition. Green[67] states that physical educators often "take-for-granted" the positive effects of physical education programs (p. 1) and cites the need for more longitudinal research into the PE Effect. The evidence for CPE is described in this section, including the longitudinal research that Green recommends.

11.1. College research

The early research related to CPE was conducted at the college level and provided evidence of the effectiveness of programs in building knowledge, attitudes, and active behaviors. Based on this evidence, and the cumulative evidence showing the health benefits of physical activity, Sparling[68] concluded that CPE programs can "make important contributions in the primary prevention of inactivity-related chronic diseases and to the general education of college students" (p. 579). An overview of the college CPE research is provided by Corbin and Cardinal.[1]

11.2. High school: Longitudinal research

Researchers have noted the drop in regular physical activity as teens transition to adulthood.[69,70] But can physical education stop the drop? Is there a PE Effect? Longitudinal studies suggest that there is. Project Active Teen (PAT) began in 1991.[71] High school 9th graders took a yearlong CPE course using the Fitness for Life model. Students used a textbook and had classroom sessions 1 day a week. They participated in activity sessions that focused on health-related fitness, and the activity sessions were coordinated with classroom content as well as traditional physical education activities. Teachers participated in regular professional-development sessions that provided training in CPE content and methods, and detailed lesson-plan notebooks were provided.

Over the 24 years of the study, 3 different progress reports were published. The first study, PAT1, assessed activity patterns of participants as juniors and seniors in high school.[71] Results indicated that students who took CPE in the 9th grade had lower levels of inactivity and were more likely to meet physical activity guidelines than both those who took traditional physical education and a national sample of age-matched peers. The second study, PAT2, found similar results several years after participants graduated from high school CPE.[72]

The third study, PAT3, was conducted 20 years after the CPE students graduated from high school. As with the first 2 studies, results indicated that the CPE students were more active and less likely to be inactive than national peers, and they maintained high levels of physical activity 20 years after graduation.[73] Questionnaire data[73] showed that "56% of respondents indicated that they remembered content from the class, 50% indicated that they still used the information, 47% indicated that they found the class useful after graduation, and 92% indicated that they currently consider themselves to be well informed about physical fitness and physical activity" (p. 3). In the 3 PAT studies, 50 tests for statistical differences were conducted. All of the 12 significant differences favored those who took CPE. The authors of PAT3[73] suggest that CPE "can be a vital part of a total quality physical education program that promotes lifelong physical activity and complements quality traditional physical education programs" (p. 5).

11.3. Middle school: Longitudinal research

Ennis, Chen, and colleagues[3,10,50] created a middle school CPE program that was used in a multi-year, federally funded intervention study (Science of Healthy Living). Students in Grades 6–8 in the intervention schools participated in a curriculum based on health, fitness, and nutrition that consisted of 120 lessons in 2 units and associated physical-activity sessions. The results were similar to those for the PAT project. Two years after the initiation of the study, participants in the Science of Healthy Living group had higher out-of-school physical activity levels than the participants taking traditional physical education. They also scored better on knowledge tests.[10]

11.4. Knowledge research

Research indicates that secondary school students often lack knowledge and/or hold misconceptions concerning healthy behaviors (e.g., physical activity, physical fitness, and nutrition).[74–76] Other studies document a positive relationship between fitness knowledge and participation in physical activity.[77–80] There is also evidence that CPE programs can improve physical fitness and physical activity knowledge.[81–84] Furthermore, research has shown that knowledge from lower grade levels enhances learning of knowledge at later grade levels, which is evidence of vertical learning.[84]

Based on the evidence, Wang and Chen[85] offer a hypothesis that knowledge is a pathway to motivation for physical activity and, ultimately, to increased out-of-school physical activity. Collectively, the evidence is clear: fitness knowledge—and the resulting knowledge improvement—is an important benefit that results from a well-delivered secondary CPE program. These results support the value of knowledge, especially higher-order knowledge, as a powerful factor that can be the glue that cements together the many benefits of physical education.[86]

12. CPE: A foundation course for the future

As we move to the future, a strong case can be made for including CPE as a foundation physical education course in secondary schools. CPE programs are based on a sound philosophy (the HELP philosophy), a whole-person orientation, and sound learning theory. CPE program objectives align with national physical education content standards (physical literacy) and FE benchmarks. They address higher-order objectives that are consistent with the PEAK principles.[66] CPE programs also address school re-entry considerations that are very important during the coronavirus disease 2019 (COVID-19) pandemic.[87] In addition, CPE has the support of the National

Academy of Kinesiology[88] and members[89] of the medical community. CPE program content is based on kinesiology's sub-disciplinary sciences that Park[2] championed as the basis for moving physical education forward in the 21st century.

Most important, CPE programs work. The evidence is considerable and growing (see previous section). And there is more. In addition to the factors described above, advocates suggest that CPE provides academic connections that benefit students in other subject-matter areas (e.g., math, science, English language arts); provide formative and summative assessment tools, including student-centered assessments in the cognitive, affective, and physical domains; and enhance teacher self-esteem and program reputation.[25,37]

13. Expanding physical education in the future

A quality physical education experience could look like the following for K-12 education. After completing a high-quality elementary school experience that includes FE, middle school students complete CPE units that provide them with a foundation for entry into a one-semester or one-year high school CPE program. The high school CPE experience, in turn, provides a foundation for practicing lifelong healthy lifestyles (e.g., active living, eating well); for becoming a good fitness, health, and wellness consumer; and for making informed decisions about additional high-quality physical education and later life experiences. The CPE content is streamlined and coherent, from elementary school to high school, with a vertical sequence. Some of the opportunities for expanding physical education beyond the CPE foundation are listed in Fig. 3, and the sections below illustrate the diverse and adaptive CPE programming for different school settings and situations as demanded for a 21st-century education.

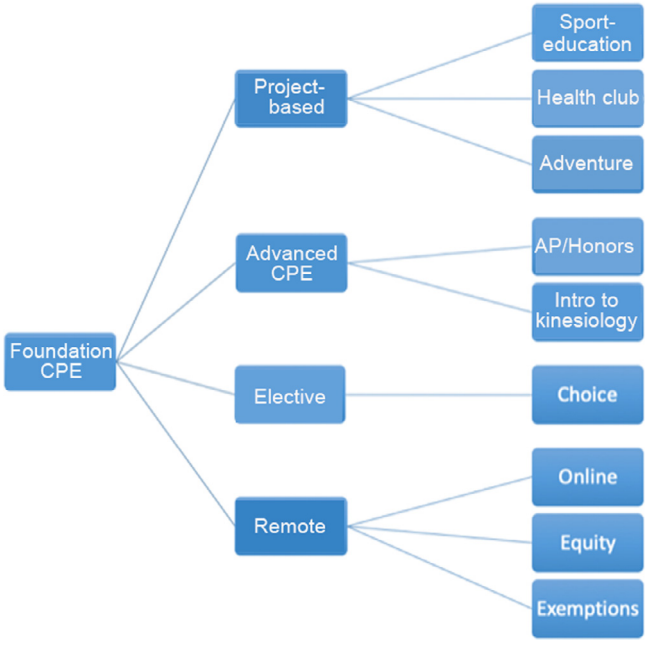

Fig. 3. Expanded opportunities for secondary physical education. AP = advanced placement; CPE = conceptual physical education; Intro = introduction.

13.1. Elective CPE

As McCullick et al.[63] have shown in their study of school policies, there is a lack of legislative support for physical education requirements. The lack of support is one reason why most teens are not enrolled in physical education in secondary schools.[90] When physical education is required, it is typically for a limited time (1 or 2 years in high school). Enrollment is most prevalent among 9th graders, and by Grades 11 and 12, fewer than 10% of students are enrolled. Middle school teens are more likely to be enrolled than those in high school, but less than one-third of all students are enrolled in Grades 6–8.[62] CPE electives offer students opportunities to continue physical education after the foundation stage to keep learning and maintain in-school physical activity and can be an effective method for increasing enrollment in elective physical education.

13.2. Choice electives

Research has shown that students who have completed CPE have a good knowledge base, as well as self-management, consumer, and decision-making skills. They can use these skills to make their own decisions about elective options. If we teach students to make good decisions, we must allow them to make their own choices. In a school that requires 1 year of high school physical education, a one-semester CPE course could be followed by a required elective course. Students choose the activities that they want to pursue. For this to be a legitimate option, schools must offer what students want to take—not what teachers want to teach. If students want yoga, Tai Chi, resistance training, self-defense, and dance, we must be prepared to offer these activities and be prepared to teach them. In schools with no requirement, we must offer attractive options that will entice students to take elective physical education. We must also consider ways to reduce barriers to participation.

13.3. Elective CPE, advanced CPE, honors CPE, and advanced placement (AP) CPE

There are obstacles to the introduction of new offerings in secondary schools that are often not easy to overcome. Nevertheless, several options are proposed here. The work of teachers in the San Francisco Unified School District (SFUSD) to create an advanced CPE class is an example of how change is possible. It goes without saying that professional development opportunities will be necessary to help physical education teachers implement the proposed options.

13.3.1. Elective CPE

In schools that do not require physical education, a CPE class can be offered as an elective option. If the option is offered, interested students will take advantage of it.

13.3.2. Advanced CPE

Advanced CPE can also be an elective option. For example, SFUSD has a high school CPE requirement for all students.[91] Upon completion, students can continue CPE by electing to take an advanced class (Fit for Life 2). This SFUSD class is

unique in that it meets University of California admission requirements for electives.[91] The class expands on the content included in the required CPE class. Another advanced option is an Introduction to Kinesiology class. Offering an Introduction to Kinesiology class as a science course is defensible and opens doors for students who want careers in fitness, health, wellness, and allied health occupations.

13.3.3. Honors CPE

Irwin and colleagues[92] recommend that honors classes be offered in physical education. They describe honors classes as courses designed for high-achieving students that include greater depth of coverage.[92] Irwin et al.[92] maintain that physical education is a legitimate education domain, and it is appropriate that honors classes be available just as they are in other academic areas. Advanced CPE and Introduction to Kinesiology classes are excellent options for honor classes at the secondary level.

13.3.4. AP CPE

AP classes offer students the opportunity to pursue advanced study in an academic area and allow students to earn college credit in advance of college enrollment. As Irwin et al.[92] indicate, "Our profession is undergoing a critical dialogue to initiate a much-needed paradigm shift or rebranding of who we are and how society regards us. There is work to be done if we are to increase respect for what we do. We all know that our content can be exceptionally rigorous and just as important to student success as other academic content areas. AP classes can also provide opportunities for students who have a passion for our subject matter to challenge themselves. Therefore, we are proposing that it is time to begin the process of creating and launching an AP course focused on our subject matter" (p. 8). CPE and Introduction to Kinesiology courses provide good AP options in physical education.

13.4. Project-based learning

In describing "What School Could be", Dintersmith[66] places great emphasis on project-based learning using PEAK principles. He describes project-based classes in the schools that he visited and suggests that innovative project-based classes can be part of an effective 21st-century educational system. Project-based learning is often structured so that groups of students work together on a specific project (e.g., building a robot in science class). However, students can also work on projects individually. Key elements are innovation, student choice and decision making, the use of 21st-century skills and, most important, a relevant reason or goal that drives the project.

CPE classes are, in many ways, project-based. Students gain higher-order knowledge and decision-making skills driven by the opportunity to create their own lifetime program plan. The outcome can be student portfolios that are exhibits of a healthy-living project based on personal needs and interests. Beyond CPE, other project-based physical education opportunities can be offered. Sport-education classes[93] are, in my view, project-based classes. Elective sport-education classes in a variety of activities are consistent with PEAK principles and allow students (in groups) to play many different roles in sport and physical-activity settings. Likewise, adventure/outdoor education classes have potential as project-based classes, with students doing the planning and organizing. The health-and-fitness club model[94,95] can also provide opportunities for project-based learning when students are doing the planning, organizing, and administering. This option can be especially rich when students are offered the opportunity to apply their special talents in carrying out a project. For example, student musicians can create music (and background music) for exercise routines, student dancers can choreograph, student artists can create art, and students with computer and other technical skills can create active exergames and apps that encourage active living.

13.5. Online learning

Schools have been reluctant to offer fully online physical education courses partly because of concerns about how to monitor physical activities and partly because of a lack of digital skills and resources for offering such classes. In 2018, SHAPE America published Guidelines for K-12 Online Physical Education.[96] The guidelines offer direction for distance/remote learning of many types (e.g., blended learning, fully online learning, synchronous learning, asynchronous learning). As more and more states and school systems mandate classes in all academic areas, online physical education has become more widespread.[86] CPE classes have been more frequently offered than traditional physical education because CPE's content is more easily adapted to an online format due to its knowledge-centered approach to physical-activity promotion.

The COVID-19 pandemic amplified the value of online learning, especially through CPE. Teachers and school districts scrambled to provide remote physical education as schools closed. Physical education teachers were tasked with providing alternatives to face-to-face learning for students. More than a few teachers and administrators contacted me to get help with materials and training (e.g., webinars, granting access to resources). Those who had already been conducting CPE courses made an easy transition when remote learning became imperative. Those who had not made the transition embraced CPE because it was a defensible alternative that administrators could accept. All of the benefits of CPE described in this article have been used to support it during the pandemic. However, questions remain. If CPE is defensible as the "goto" program during the pandemic, why has it not been more universally implemented? Will it continue to be implemented post-pandemic?

As schools adopt online programs, we must answer the following question: "How do we know that students are active in their remote classes?" The answer is: "We don't." Face-to-face classes are much better for teaching skills and monitoring physical activity. However, video, activity monitors, and other creative options can help us when remote learning is the only option. In the meantime, student activity logs and reported activities on portfolio sheets can be used. Students can design their own activity plans and perform them. No doubt, some may not

actually do what they describe in their logs. However, students would learn how to plan and what to include in a program. Concepts of personal responsibility can be discussed to help students develop ownership of content. They can learn what to do later in life if they choose to do so.

A positive outcome of online CPE is the ability of students to do activities in a non-threatening environment, with none of the baggage of locker-room bullying, embarrassing shower room events, and lack of time for personal grooming. For some, online programs can be a good option. On the negative side, we have work to do related to testing and ensuring that the students enrolled in online classes are actually doing the work. Using hybrid options that require students to do some activities face-to-face, especially assessments, would go a long way in solving this problem.

The COVID-19 pandemic also helped to expose the fact that not all students have equal access to the Internet and to the computer tools necessary to take advantage of online classes. For example, 14% of K-12 students have no Internet access, 17% have no access to a home computer, and as many as 42% face barriers to connectivity.[97] Equality options are necessary to make sure that all students have an opportunity to learn remotely. Although there is much more that needs to be done in this regard, when access is available, CPE programs provide digital texts and student resources that can facilitate online learning. Print materials can be distributed by mail, delivered, or picked up from the school, thus assuring that all students can have access to at least some of the same experiences.

The pandemic also has made obvious the lack of equity in providing resources for teaching in physical education. Schools that transitioned to the CPE approach often had large class sizes (sometimes 50 or more) and lacked computers, whiteboards, and other digital tools available to teachers in other subjects. Texts, student resources, and teacher resources are also required. Physical education programs often have limited budgets, but it should be noted that text materials and student/teacher resources for CPE programs are less expensive than purchasing typical sports equipment. It is my contention that CPE provides us with the ammunition to demand instructional equity (e.g., resources).

14. Challenges and solutions: Delivering the course of the future

14.1. Effective delivery

"How you do it" matters when delivering a course of instruction. CPE offers many tools for use by professionals as they facilitate student learning. Knowing how to use the tools is as important as selecting the appropriate tool for meeting a specific learning objective. Some important factors relating to delivery are listed and briefly described in Table 4.

Table 4
Factors relating to effective delivery of CPE.

Factor	Description
Mastery environment	In a mastery environment, the teacher reinforces efforts toward achieving specific learning goals. Consistent with the HELP philosophy, there is an emphasis on the individual (personal learning). Students learn and use self-management skills to make personal decisions related to class content.
Appropriate assessment	In CPE, fitness assessments are self-assessments and are used as a basis for personal program planning. Criterion-referenced, health-based fitness standards provide the basis for personal rather than comparative assessments. Additional established assessment guidelines (e.g., confidentiality, not using fitness scores for grading) are adhered to. Portfolios (print or digital) that include fitness and physical activity profiles provide evidence of student accomplishment.
Avoiding duplication	Instruction focuses on higher-order objects as students advance. Students in CPE use previously learned information as a basis for future learning (vertical learning). Some repetition is planned to foster mastery. Horizontal learning, such as repeating instruction in the same activities, is contraindicated.
Program fidelity	When committing to a CPE model and adopting materials to carry out program goals, fidelity is important. Staying on task is important for program success.

Note: The 2020 coronavirus pandemic accentuated inequities when many schools used online platforms for remote learning.
Abbreviations: CPE = conceptual physical education; HELP = health, everyone, lifetime, and personal.

14.2. Classrooms and text materials

As noted in Section 3, CPE is differentiated from other FE programs by its use of classroom sessions and text materials. Why classroom sessions? Different objectives require the use of different methods. When providing instruction with knowledge as the goal, the classroom offers opportunities for best practices for doing presentations (white boards, computers, vetted text materials, and videos) and encouraging student discussions. Blocks of time are available for in-depth study of content. Because conceptual material is covered in the classroom, students avoid standing and listening during activity.

Textbooks and text materials provide opportunities to learn in all educational settings: in the classroom (texts), in activity sessions (portfolio sheets or workbooks), out of school (e.g., readings, assignments), and online (digital materials). Effective middle school programs have used both textbooks and text-based materials (workbooks, portfolio sheets—print and digital), and effective high school programs have used textbooks (print and digital). One new innovation is interactive web text, which resides on the web and allows text material to be used on all digital devices (e.g., phones, tablets, computers) and virtually anywhere that an Internet connection can be made.[98] This is important in situations where students have a variety of digital devices. However, as noted earlier, for all students to benefit, they must have access to digital devices and the Internet.

14.3. The activity question

When teachers implement CPE, the most common question they ask is: "How can I justify having students sit in a classroom when so many students fail to meet national physical

activity guidelines?" I offer the following answer, using an excerpt from a previous publication:[37]

> "An overarching goal of physical education programs is to promote lifelong physical activity. To be sure, taking time from physical activity to be in a classroom reduces physical activity on those days. However, CPE is not meant to be all of physical education, rather it is one part of physical education conducted for a limited time period with a limited number of classroom days. The time spent in CPE yields more physical activity later in high school and later in life, more than compensating for the time lost in physical activity while the student is in the classroom. If, in CPE, we can teach students self-management and consumer skills that will help them to be active for a lifetime, the limited classroom time in CPE seems well worth it. The research supports this idea."(p. 46).

14.4. CPE alternatives for exemptions

One of the reasons for the low numbers of students taking physical education in secondary schools is exemptions (allowing alternative school activities to count for physical education credit). Proponents of alternatives for fulfilling physical education requirements (e.g., band, Junior Reserve Officer Training Corps, athletics) argue that these alternative programs provide activity and, therefore are equal to physical education and are acceptable substitutes. Physical educators argue that these alternative programs do not meet the criteria for quality physical education such those outlined in this article.

Regardless of the amount of activity students get in alternative programs, exempted activities such as band, Junior Reserve Officer Training Corps, and athletics do not meet physical education standards and physical literacy requirements. To fulfill a physical education requirement, an online CPE module can be an option. The online module provides the content for meeting all of the requirements for quality physical education (all standards) while allowing alternative activities to count toward physical activity requirements for the class. Physical education teachers conduct the online portion of the class and count students as enrolled. To meet the requirements for the CPE portion of the course, additional activities can be assigned to supplement the alternative programs that often provide relatively low amounts of activity.[99]

14.5. Pathways to success

History has shown that there are steps that can be taken to provide a pathway to success when implementing a CPE program. Three very important steps can be taken to ensure teacher commitment and administrative support, provide teachers with professional-development opportunities, and ensure the inclusion of all students.

14.5.1. Teacher commitment and administrative support

For any program to be effective, teachers must be committed to it. A program such as CPE typically requires teachers to attend professional-development sessions and to do extra planning and grading. For some, commitment can be difficult, especially for teachers who are also athletic coaches. Research indicates that when roles of coach and teacher conflict in terms of time and resources, priority is often given to the athletics portion of the job.[25] I readily recognized that many coaches are also high-quality physical education teachers or teachers of other subjects. However, the primary responsibility of teachers is fulfilling their duties as teacher, in this case, committing to carrying out a quality CPE program.

Administrative support is also essential. Based on my observations, too often the head of the physical education department is also the athletic director or the coach of a major sport. If innovative programs such as CPE are to be implemented effectively, it is my view that the department head should be a physical educator who does not have a coaching or other extracurricular assignment. Her/his/their assignment is to administer and direct quality physical education programs. Part of the administrative assignment must be holding teachers in the program accountable and making sure that they give a priority commitment to the teaching assignment for which the majority of the person's salary is paid.

14.5.2. Professional development

For those new to CPE, professional development is essential. Teachers need updates on new information, including CPE content, methods, assessments, and technology. My surveys from the 44 state conventions that I have keynoted indicate that few secondary school physical educators attend state conventions, often opting for coaching meetings instead. If CPE (and all of physical education, for that matter) is to move forward, it is essential that secondary physical educators attend state conventions and other physical education professional-development meetings. For students enrolled in physical education teacher-education programs, a special course designed specifically to help them implement CPE should be offered. Recommended content for teacher professional development and physical education teacher-education courses includes CPE instruction methods, content knowledge instruction, methods for overcoming barriers to success (e.g., teacher resistance, teacher workload, coach/teacher role conflict, and student resistance).[25]

14.5.3. Commitment to inclusion

The HELP philosophy emphasizes physical education for everyone and allows students to plan personal programs. To be consistent with this philosophy, programs must offer options for all students. CPE programs, for example, are planned using the Universal Design for Learning guidelines.[100] The framework helps to "improve and optimize teaching and learning for all people based on scientific insights into how humans learn" (p. 1).[100] In addition, programs and program planners can commit to diversity, equity, and inclusion consistent with statements such as the following from the American College of Sports Medicine: "We implore every human to go about their responsibilities and every other aspect of their daily lives, making decisions with social justice in their hearts and minds. The future of a pluralistic and just world depends on it!" (p. 1).[101]

15. Summary comments

Park[2] notes that, as physical education develops in the future, "it may be useful to remember that medicine, an ancient and honored profession that many contend is the most valuable and venerated of the 20th century, was in a general state of disarray at the end of the 19th century" (p. 20). Like medicine, the field of kinesiology was in disarray in the mid-20th century but has made great strides in this century. A robust scientific base has been established, including, but not limited to, evidence that regular physical activity not only enhances fitness and performance but also reduces risk of chronic diseases and conditions (e.g., heart disease, diabetes, some cancers, osteoporosis, obesity). The 2020 COVID-19 pandemic accentuated the fact that risk of serious complications and death from the virus are substantially higher among those with hypokinetic conditions. Other benefits of physical activity (chronic and acute) include enhanced cognitive function, mental health, and wellness. We also have learned much about the science of human performance (mechanical, physiological, psychological, and sociological) and the science of physical education (sport) pedagogy.

Those of us who did our undergraduate study in health and physical education in the 1950s did not benefit from the science now available to current and future teachers. Texts in many of the subdisciplines did not become available until years later. Scientific societies and many important journals were just being founded. Earlier generations, however, did lay the groundwork for the dissemination of the new science.

The modern profession of physical education, if built on a sound disciplinary foundation, has the opportunity to make strides similar to those made by medicine in the last century. It is interesting that the word doctor is derived from the Latin word for teacher, docēre. Physical educators do not practice medicine, but they do teach. Like medical doctors, it is important that they have a strong science background and the ability to pass what they know on to their students. CPE provides an effective platform for them to do so.

In my 60 years as an educator and researcher, and especially my years as an advocate for CPE, I have often been criticized and labeled as an opponent of skill learning and other worthy physical education objectives. I have also been accused of wanting to take the "physical" out of physical education. To be clear, while I do advocate for CPE as one important component of a total quality physical education program, I also support participation in physical activities of all kinds. I support all of the objectives of physical education. I applaud quality skills instruction and instructional methods that foster moderate to vigorous physical activity in physical education. I believe in the importance of social-emotional learning programs that foster diversity and social justice. I endorse programs that help students to find meaning and enjoyment in movement and sport. There is room for them all.

CPE is not an opponent of these efforts; it is an important partner. CPE programs that emphasize a knowledge base and that are consistent with PEAK principles do not distract from other programs—they complement them. Students who have "learned to learn" are not only more likely to use what they have learned—they can generate their own new knowledge that will guide them in the future. As Ennis[102] suggests, "engaging students in a quest for knowledge about the effects of exercise on their bodies requires coordinated efforts by scientists and practitioners to build from kinesiology to society" (p. 16).

As outlined in this article, there are many reasons for including CPE as part of a high-quality physical education program. Simply put, if secondary physical education is to thrive in the future, we can and should make knowledge-based CPE programs a central component. If we are to become the renaissance profession of the 21st century, we must be strong in our trust in our science (knowledge) and strong in our conviction to chart a new course for the future based on our science. The advice of Robert F. Kennedy[103] can guide us: "Some people see things as they are and say why? I dream things that never were and say, why not?"

Acknowledgments

My thanks to Ang Chen, Pam Kulinna, Bryan McCullick, and Hans van der Mars for their reviews of early versions of this manuscript. Their time commitment and constructive comments are sincerely appreciated.

Competing interests

The author is the co-author of several conceptual physical education textbooks.

References

1. Corbin CB, Cardinal BJ. Conceptual physical education: The anatomy of an innovation. *Quest* 2008;**60**:467–87.
2. Park RJ. The second 100 years: Or, can physical education become the renaissance field of the 21st century? *Quest* 1989;**41**:1–27.
3. Ennis CD. Knowledge, transfer, and innovation in physical literacy curricula. *J Sport Health Sci* 2015;**4**:119–24.
4. Corbin CB, Laurie DR. Exercise for a lifetime: An educational effort. *Physician Sportsmed* 1978;**6**:50–5.
5. American Alliance for Health, Physical Education, Recreation and Dance. *Health-related physical fitness test manual*. Reston, VA: AAHPERD; 1980.
6. Plowman SA, Sterling CL, Corbin CB, Meredith MD, Welk GJ, Morrow Jr JR. The history of FITNESSGRAM®. *J Phys Act Health* 2006;**3**(Suppl. 2): S5−20.
7. Society of Health and Physical Educators. *Instructional framework for fitness education in physical education*. Available at: https://www.shapeamerica.org/upload/Instructional-Framework-for-Fitness-Education-in-Physical-Education.pdf. [accessed 06.16.2020].
8. Corbin CB, Le Masurier GC. *Fitness for life*. 6th ed. Champaign, IL: Human Kinetics; 2014.
9. Society of Health and Physical Educators. *Physical Best FAQs*. Available at: https://www.shapeamerica.org/prodev/workshops/physicalbest/physicalbestfaq.aspx. [accessed 06.16.2020].
10. Wang Y, Chen A. Effects of a concept-based physical education on middle-school students' knowledge, motivation, and out-of-school physical activity. *J Teach Phys Educ* 2020;**39**:407–14.
11. Zhu WA. "Concept", more than 30 editions, and a half-century of effort! An interview with Dr. Charles B. (Chuck) Corbin. *Res Q Exerc Sport* 2018;**89**:389–402.
12. Cardinal BJ, Sorensen SD, Cardinal MK. Historical perspective and current status of the physical education graduation requirement at American 4-year colleges and universities. *Res Q Exerc Sport* 2012;**83**:503–12.
13. Kulinna PH, Warfield WW, Jonaitis S, Dean M, Corbin CB. The progression and characteristics of conceptually based fitness/wellness

courses at American universities and colleges. *J Am Coll Health* 2009;**58**:127–31.
14. Corbin CB. Youth fitness, exercise and health: There is much to be done. *Res Q Exerc Sport* 1987;**58**:308–14.
15. Cureton KJ. Commentary on Children and fitness: A public health perspective. *Res Q Exerc Sport* 1987;**58**:315–20.
16. LeMasurier GC, Corbin CB. Health-based physical education. *Int J Phys Educ* 2002;**39**:4–13.
17. McKenzie TL, Lounsbery MAF. The pill not taken: Revisiting physical education teacher effectiveness in a public health context. *Res Q Exerc Sport* 2014;**85**:287–92.
18. Pate RR, Corbin CB. Impact on schools: Implications for curriculum. *J Phys Educ Recreat* 1981;**52**:36–8.
19. Pate RR, Corbin CB, Simons-Morton BG, Ross JG. Physical education and its role in school health promotion. *J Sch Health* 1987;**57**:445–50.
20. Sallis JF. A commentary on children and fitness: A public health perspective. *Res Q Exerc Sport* 1987;**58**:326–30.
21. Sallis JF, McKenzie TL. Physical education's role in public health. *Res Q Exerc Sport* 1991;**62**:124–37.
22. Simons-Morton BG, O'Hara NM, Simons-Morton DG, Parcel GS. Children and fitness: A public health perspective. *Res Q Exerc Sport* 1987;**58**:295–303.
23. Simons-Morton BG, Eitel P, Small ML. School physical education: Secondary analysis of the school health policies programs study. *J Health Educ* 1999;**30**(Suppl. 1):S21−7.
24. National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. *Trends in the prevalence of physical activity and sedentary behaviors national YRBS: 1991−2017*. Available at: https://www.cdc.gov/healthyyouth/data/yrbs/pdf/trends/2017_physical_trend_yrbs.pdf. [accessed 08.18.2020].
25. Corbin CB, Kulinna PH, Yu H. Conceptual physical education: A secondary innovation. *Quest* 2020;**72**:33–56.
26. Corbin CB, Lindsey R. *Fitness for life*. Glenview, IL: Scott, Forseman and Company; 1979.
27. Stokes R, Moore C, Schultz SL. *Personal fitness and you*. Winston-Salem, NC: Hunter Textbooks Inc.; 1986.
28. Williams C, Johnson DJ, Harageones EG, Smith CD. *Personal fitness: looking good−feeling good*. Dubuque, IA: Kendall-Hunt; 1986.
29. Rainey DL, Murray TD. *Foundations of personal fitness*. St. Paul, MN: West Publishing; 1997.
30. Corbin CB, Le Masurier GC, Lambdin D. *Fitness for life: Middle school*. 2nd ed. Champaign, IL: Human Kinetics; 2018.
31. Jahn JA, Kulinna PH, Corbin CB. A state level update on secondary physical education policies (abstract). *Res Q Exerc Sport* 2010;**81**:A54−5.
32. Fox KR. Teaching physical lifeskills: Practical ideas on health-related fitness. *Brit J Phys Educ* 1983;**14**:14–8.
33. Nahas MV, Corbin CB. Aptidao fisica e saude nos programas de educacao fisica: Desenvolvimentos recentes e tendencias internacionais. *Revista Brazil Ciencia Mov* 2008;**6**:47–58. [in Portugese].
34. Carre FA, Corbin CB, Lindsey R. *Fitness for Life: Physical education concepts*. Toronto: Gage Publishers; 1981.
35. Corbin CB, Lindsey R. *Fitness for life*. 5th ed. Seoul: Daehan Media; 2009. [in Korean].
36. LeMasurier GC, Corbin CB, Baker K, Byl J. *Fitness for life Canada: Preparing teens for healthy, active lifestyles*. Champaign, IL: Human Kinetics; 2017.
37. Corbin CB, Kulinna PH, Sibley BA. A dozen reasons for including conceptual physical education in a secondary program. *J Phys Educ Recreat Dance* 2020;**91**:40–9.
38. Ennis CD. Educating students for a lifetime of physical activity: Enhancing mindfulness, motivation, and meaning. *Res Q Exerc Sport* 2017;**88**:241–50.
39. National Association for Sport and Physical Education. *Moving into the future: National standards for physical education, a guide to content and assessment*. Reston, VA: National Association for Sport and Physical Education; 1995.
40. National Association for Sport and Physical Education. *Moving into the future: National standards for physical education*. 2nd ed. Reston, VA: National Association for Sport and Physical Education; 2004.
41. Society of Health and Physical Educators. *National standards and grade level outcomes for K-12 physical education*. Champaign, IL: Human Kinetics; 2013.
42. Mohnsen BS. *Concepts of physical education: What every student needs to know*. Reston, VA: National Association for Sport and Physical Education; 1998.
43. Le Masurier GC, Corbin CB. *Fitness for life: Teacher's guide*. Champaign, IL: Human Kinetics; 2014.
44. Cairney J, Dudley D, Kwanm M, Bulten R, Kriellaars D. Physical literacy, physical activity and health: Toward an evidence-informed conceptual model. *Sports Med* 2019;**49**:371–83.
45. Corbin CB. Implications of physical literacy for research and practice: A commentary. *Res Q Exerc Sport* 2016;**87**:14–27.
46. International Physical Literacy Association. *Choosing physical activity for life*. Available at: https://www.physical-literacy.org.uk/about. [accessed 06.16.2020].
47. Institute of Medicine. *Health literacy: A prescription to end confusion*. Washington, DC: National Academies Press; 2004.
48. Chen S, Chen A. Ninth graders' energy balance knowledge and physical activity aehavior: An expectancy-value perspective. *J Teach Phys Educ* 2012;**31**:293–310.
49. Harageones M. Impact of education reforms: The quality of Florida's high school physical education programs. *J Phys Educ Recreat Dance* 1986;**58**:52–4.
50. Ennis CD. *The science of healthful living*. Available at: https://grantome.com/grant/NIH/R25-OD011063-04. [accessed 09.30.2020].
51. Sun H, Chen A, Zhu X, Ennis CD. Learning science-based fitness knowledge in constructivist physical education. *Elem Sch J* 2012;**113**:215–29.
52. Chen A, Zhang T, Wells SL, Schweighardt R, Ennis CD. Impact of teacher value orientations on student learning in physical education. *J Teach Phys Educ* 2017;**36**:152–61.
53. American Association for Health, Physical Education, and Recreation. *Youth fitness test manual*. Wsshington, DC: American Association for Health, Physical Education, and Recreation; 1958.
54. Corbin CB. Texas youth fitness study: A commentary. *Res Q Exerc Sport* 2010;**81**(Suppl. 3):S75−8.
55. FITNESSGRAM. The Cooper Institute. *SmartCoach*. Available at: https://help.fitnessgram.net/smartcoach-resources. [accessed 06.16.2020].
56. Presidential Youth Fitness Program. *Presidential youth fitness program*. Available at: https://pyfp.org. [accessed 06.16.2020].
57. Society of Health and Physical Educators. *Comprehensive school physical activity programs*. Available at: https://www.shapeamerica.org/cspap/what.aspx. [accessed 09.29.2020].
58. Active and Healthy Schools. *Active and healthy schools*. Available at: https://www.gophersport.com/curriculum/active-healthy-schools. [accessed 06.16.2020].
59. Corbin CB, Le Masurier GC, Lambdin DD, Greiner M. *Fitness for life: Elementary school. Guide for Wellness Coordinators*. Champaign, IL: Human Kinetics; 2010.
60. McKenzie TL, Sallis JF, Rosengard P, Ballard K. The SPARK programs: A public health model of physical education. *J Teach Phys Educ* 2016;**35**:381–9.
61. Pangrazi RP, Beighle A. *Dynamic physical education for elementary school children*. 19th ed. Champaign, IL: Human Kinetics; 2020.
62. U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. *Results from the school health policies and practices study*. Available at: https://www.cdc.gov/healthyyouth/data/shpps/pdf/SHPPS-508-final_101315.pdf. [accessed 06.16.2020].
63. McCullick BA, Baker T, Tomporowski PD, Templin TJ, Lux K, Isaac T. An analysis of state physical education policies in physical education. *J Teach Phys Educ* 2012;**31**:200–10.
64. Lounsbery MAF, McKenzie TL, Smith NJ. School physical activity policy. *Tran J ACSM* 2019;**4**:173–8.
65. Sports and Fitness Industry Association. *SFIA research overview*. Available at: https://www.sfia.org/reports. [accessed 06.16.2020].
66. Dintersmith T. *What schools could be*. Princeton, NJ: Princeton University Press; 2018.

67. Green K. Mission impossible? Reflecting upon the relationship between physical education, youth sport and lifelong participation. *Sport Educ Soc* 2014;**19**:357–75.
68. Sparling PB. College physical education: An unrecognized agent of change in combating inactivity-related diseases. *Perspec Biol Med* 2003;**46**:579–87.
69. Cullen KW, Koehly LM, Anderson C, et al. Gender differences in chronic disease risk behaviors through the transition out of high school. *Am J Prev Med* 1999;**17**:1–7.
70. Raustrop A, Fröberg A. Tracking pedometer-determined physical activity: A 16-year follow-up study. *J Phys Act Health* 2018;**15**:7–12.
71. Dale D, Corbin CB, Cuddihy TF. Can conceptual physical education promote physically active lifestyles? *Ped Exerc Sci* 1998;**10**:97–109.
72. Dale D, Corbin CB. Physical activity participation of high school graduates following exposure to conceptual or traditional physical education. *Res Q Exerc Sport* 2000;**71**:61–8.
73. Kulinna PH, Corbin CB, Yu H. Effectiveness of secondary school conceptual physical education: A 20-year longitudinal study. *J Phys Act Health* 2018;**21**:1–6.
74. Keating XD, Chen L, Guan J, Harrison Jr L, Dauenhauer B. Urban minority ninth-grade students' health-related fitness knowledge. *Res Q Exerc Sport* 2009;**80**:747–55.
75. Kulinna PH. Physical activity and fitness knowledge: How much 1−6 grade students know? *Internat J Phys Educ* 2004;**41**:111–21.
76. Wells S, Chen A, Loflin JW, Schweighardt R, Moennich K, Zhang T. Physical activity and fitness knowledge in middle school physical education (Abstract). *Res Q Exerc Sport* 2014;**85**:A162–3.
77. Williams SM, Phelps D, Laurson KR, Thomas DQ, Brown DD. Fitness knowledge, cardiorespiratory endurance and body composition of high school students. *Biomed Human Kin* 2013;**5**:17–21.
78. Chen S, Liu Y, Schaben J. To move more and sit less: Does physical activity/fitness knowledge matter in youth? *J Teach Phys Educ* 2017;**36**:142–51.
79. DiLorenzo TM, Stucky-Ropp RC, Vander Wal JS, Gotham HJ. Determinants of exercise among children: II. A longitudinal analysis. *Prev Med* 1998;**27**:470–7.
80. Thompson A, Hannon JC. Health-related fitness knowledge and physical activity of high school students. *Phys Educator* 2012;**69**:71–8.
81. Brynteson P, Adams 2nd TM. The effects of conceptually based physical education programs on attitudes and exercise habits of college alumni after 2 to 11 years of follow-up. *Res Q Exerc Sport* 1993;**64**:208–12.
82. Lorenz KA, Stylianou M, Kulinna PH. Changes in healthy behaviour knowledge of rural pupils. *Euro Phys Educ Rev* 2019;**26**:465–80.
83. Rider RA, Imwold CH, Johnson D. Effects of Florida's personal fitness course on cognitive, attitudinal and physical fitness measures of secondary students: A pilot study. *Percept Mot Skills* 1986;**62**:548–50.
84. Wang Y, Zhang T, Schweighardt R, Chen A. Does cardiorespiratory fitness knowledge carry over in middle school students? *Learn Individ Diff* 2019;**75**:101762. doi:10.1016/j.lindif.2019.101762.
85. Wang Y, Chen A. Two pathways underlying the effects of physical education on out-of school physical activity. *Res Q Exerc Sport* 2020;**91**:197–208.
86. Wang Y, Chen A, Schweighardt R, Zhang T, Wells S, Ennis C. The nature of learning tasks and knowledge acquisition: The role of cognitive engagement in physical education. *Eur Phy Educ Rev* 2019;**25**:293–310.
87. Society of Health and Physical Educators. *School reentry considerations: K-12 physical education, health education, and physical activity*. Available at: https://www.shapeamerica.org/advocacy/K-12_School_Re-entry_Considerations.aspx. [accessed 06.19.2020].
88. American Academy of Physical Education (currently the National Academy of Kinesiology). *Conceptual physical education. A position statement*. Reston, VA: AAHPERD; 1983.
89. Boone JL. A new curriculum for fitness education. *Pub Health Rep* 1983;**98**:507–16.
90. Society of Health and Physical Educators. *2016 Shape of the Nation: Status of physical education in the USA*. Available at: https://www.shapeamerica.org/advocacy/son. [accessed 06.16.2020].
91. San Francisco Unified School District. *Physical education website*. Available at: http://www.pesfusd.com/high.html. [accessed 06.16.2020].
92. Irwin CC, Doig SR, Corbin CB. Advanced-placement physical education: An opportunity to act. *J Phys Educ Recreat Dance* 2017;**88**:7–9.
93. Siedentop D, Hastie P, van der Mars H. *A Complete Guide to Sport Education*. 3rd ed. Champaign, IL: Human Kinetics; 2020.
94. Bycura D, Darst PW. Motivating middle school students: A Health-Club Approach. *J Phys Educ Recreat Dance* 2001;**72**:24–6.
95. Houston J, Kulinna P. Health-related fitness models in physical education. *Strategies* 2014;**27**:20–6.
96. Society of Health and Physical Educators. *Guidelines for K-12 Online Physical Education*. Available at: https://www.shapeamerica.org/uploads/pdfs/2020/guidelines/Online-PE-Guidance-Document.pdf. [accessed 06.16.2020].
97. USA Facts. *More than 9 million children lack internet access at home for online learning*. Available at: https://usafacts.org/articles/internet-access-students-at-home. [accessed 08.18.2020].
98. Corbin CB, Le Masurier GC, Lambdin DD. *Fitness for life: Middle school interactive web text*. Champaign, IL: Human Kinetics; 2018.
99. Loensbury MAF, Holt KA, Monnat SM, Funk B, McKenzie TL. JROTC as a substitute for PE: Really? *Res Q Exerc Sport* 2014;**85**:414–9.
100. CAST. *The UDL Guidelines*. Available at: http://udlguidelines.cast.org. [accessed 06.26.2020].
101. American College of Sports Medicine. *The American College of Sports Medicine releases official statement on diversity, equity and inclusion*. Available at: https://www.acsm.org/read-research/newsroom/news-releases/news-detail/2020/06/02/the-american-college-of-sports-medicine-releases-official-statement-on-diversity-equity-and-inclusion. [accessed 06.26.2020].
102. Ennis CD. Physical education curriculum priorities: Evidence for education and skillfulness. *Quest* 2011;**63**:5–18.
103. Kennedy RF. *Speech at the University of Kansas*. Available at: https://www.jfklibrary.org/learn/about-jfk/the-kennedy-family/robert-f-kennedy/robert-f-kennedy-speeches/remarks-at-the-university-of-kansas-march-18-1968. [accessed 06.16.2020].