

SEVENTH EDITION

Integrating Educational Technology into Teaching

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Teaching and Learning with Technology in Health and Physical Education

Learning Outcomes

After reading this chapter and completing the learning activities, you should be able to:

1. Identify implications for technology integration of each current issue faced by health and physical education teachers. (ISTE Standards•T 4, 5)
2. Select technology integration strategies that can meet various needs for instruction in health and physical education. (ISTE Standards•T 2, 5)
3. Design a strategy for how to build teacher knowledge and skills in technology integration for health or physical education. (ISTE Standards•T 5)

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TECHNOLOGY INTEGRATION IN ACTION

DEVELOPING A PERSONAL FITNESS AND NUTRITION PLAN

GRADE LEVELS: 9–12 • CONTENT AREA/TOPIC: Biology, health, physical education, technology • LENGTH OF TIME: Three weeks

PHASE 1 ANALYSIS OF LEARNING AND TEACHING NEEDS



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Step 1: Determine relative advantage.

Mr. Martinez, a high school health/physical education teacher, was concerned that data from national studies of physical activity and nutrition have indicated that the majority of high school students do not participate in adequate levels of physical activity, and many struggle to make appropriate nutritional choices. To address his concerns, he talked to a biology teacher and technology education (TE) teacher in his school about an interdisciplinary project that would meet academic learning requirements for courses in physical education, health, biology, and technology. They decided that the project would have more impact if it could be presented in the form of instructional video and involve self-analysis. Video would allow the content to be presented easily in a visually compelling format and serve as a resource for future classes. Self-analysis would also give students a basis for making informed personal choices concerning physical activity and nutrition.

The teachers decide to use a combination of physical activity monitoring devices, Web-based applications, and video design for the project. Students will apply knowledge of the musculoskeletal system and nutrition gained from the biology course in conjunction with exercise program design principles learned in physical education to design, choreograph, and record a 10-minute exercise video during their technology class. Mr. Martinez plans to use physical activity simulations to increase students' understanding of fitness and nutritional concepts as well as pedometers to monitor students' physical activity levels, activity intensity, and calories burned over a two-week period. In addition, he will have students use the MyFitnessPal website or mobile application to record and track their progress and document caloric intake and nutrient values.

Step 2: Review required resources and skills.

Mr. Martinez has good background knowledge of technology interventions for health and physical education. He has been a leader in

implementing physical activity monitoring devices and using Web applications to enhance student learning. However, he still searches for ways to connect and integrate his subject with other content areas. The technology teacher is a relatively new practitioner with limited knowledge of health, physical education, or biology curriculum, but is eager to explore ways to assist other teachers with integrating technology in their classrooms. The biology teacher has extensive teaching experience but is just beginning to explore the integration of technology into courses. All three teachers, therefore, saw this project as a great opportunity to improve instruction and develop their own teaching skills.

In order to familiarize the biology teacher and technology teacher with the content-specific technology in physical education, Mr. Martinez issued the other two teachers an activity monitor to wear as they went through the project to facilitate their knowledge of their use. He also introduced them to the MyFitnessPal website and mobile application the students would be using to track and monitor their dietary intakes. The biology teacher provided an overview of the specific content related to the musculoskeletal system and nutrition that would be presented as part of the biology curriculum, and the technology teacher provided training to the other two teachers on the software that would be used to develop the exercise videos, including iMovie from Apple and Camtasia Studio from TechSmith.

PHASE 2 PLANNING FOR INTEGRATION

Step 3: Decide on objectives and assessments.

The teachers decided on three outcomes and assessments:

Outcome: Development of exercise routine instructional video.

Objective: Students will demonstrate audio/video production and collaboration skills by choreographing and producing an instructional exercise performance video, achieving at least an 85% rubric score.

Assessment: Student learning will be assessed using a rubric for components of the instructional video and collaboration skills.

Outcome: Knowledge of the function of the musculoskeletal system and nutritional concepts.

Objective: All students will demonstrate knowledge of the structure and function of the musculoskeletal system and nutritional concepts by achieving at least 90% on a written assessment of content knowledge.

Assessment: Series of questions reviewing musculoskeletal system content presented in instructional sessions.

Outcome: Personal fitness and nutritional levels

Objective: Students will achieve at least an 85% on their plan with specific and appropriate recommendations for lifestyle changes, exercises, and eating habits.

Assessment: Rubric to assess appropriateness of activity levels and plan details.

Step 4: Design integration strategies.

The three teachers agreed on the following sequence of instruction and activities:

- **Week 1:** Assign the project and collect information. In each class, the teacher describes and discusses the requirements for the project and the learning activities that will take place.
 - Biology class:** Assign readings and hold class discussions about body systems. To review concepts, use assignment sheets for the InnerBody Works website and the 3D Muscle System Pro and iMuscle (online and/or mobile applications) to assist students in selecting appropriate exercises for each muscle group.
 - Physical Education/Health class:** Show the video *Personal Fitness: Looking Good/Feeling Good* (Kendall-Hunt). Review concepts about diet and exercise. Introduce activity monitors and the online MyFitnessPal application for recording and tracking data from exercise sessions. Students begin daily recording their activity levels and dietary intake utilizing application.
 - Technology class:** The teacher works with the whole class to design and choreograph the exercise videos and then forms small groups with each group given the task of developing a video.
- **Week 2:** Prepare information and materials.
 - Biology class:** The teacher assists as students finish working on their simulation assignments and as they take notes and gather materials to answer the biology and nutrition questions.
 - Physical Education/Health class:** Students continue to engage in their physical activity simulations monitoring and tracking their data on their pedometers. They also document and record their caloric intake for week two of the project and begin to analyze their results and prepare fitness plans using health-related fitness software (Mohnsen, 2013).
 - Technology class:** The small groups work on video production techniques and learning the video editing software.
- **Week 3:** Prepare and display video products.
 - Technology class:** The small groups storyboard their videos and prepare scripts based on information obtained from their study of systems and selection of exercises. They complete work on their videos and edit them as needed. Students present their videos to each of the classes, and teachers use their checklists and rubrics to assess the work.
 - Physical Education/Health Class:** Students develop their health-related fitness plans based on the results of their activity and caloric intake tracking from the two-week simulation.

Step 5: Prepare instructional environment.

The teachers checked out the software and videos from the media center and gathered assignment sheets to be used with them. Each teacher prepared copies of the rubrics and checklists. The TE teacher agreed to put these on the website so that students can look at them online. The biology teacher placed simulations

at the computer lab and scheduled times for it. Mr. Martinez coordinated which students can work in pairs or small groups and prepared materials to communicate this information to the students.

PHASE 3 POST-INSTRUCTION ANALYSIS AND REVISIONS

Step 6: Analyze results.

After they completed the unit, the three teachers reviewed the exercise videos, looked at summary data from the checklists and rubrics, and discussed how the activities progressed.

Step 7: Make revisions.

The teachers agreed that the project worked well and discussed how they might share class time in the future to make the work easier to coordinate. They also found that some groups took more time with script writing than was originally planned, so their videos took more than a week to complete; this would need to be built into the plan for next time.



CHAPTER 14 BIG IDEAS OVERVIEW

Before you begin reading the rest of this chapter, listen to the [Chapter 14 Big Ideas Overview](#). It will give you a two-minute audio overview of main concepts to look for and help prepare you to work through information and exercises to achieve this chapter's outcomes.

ISSUES AND CHALLENGES IN PHYSICAL AND HEALTH EDUCATION

Increasing evidence indicates that the health-related behaviors that children and adolescents choose to adopt can have an impact on their health and well-being as adults (Biro & Wein, 2010). It is estimated that fewer than 30% of students participate in recommended levels of physical activity and nearly 14% are considered sedentary. Only one-half of U.S. students attend physical education classes; only 31.5% attend daily. Over 30% of U.S. students use computers and watch television more than three hours per day, sedentary activities that have been suggested to contribute to childhood obesity. Currently, it is estimated that 13% of adolescents are considered obese and over 15% overweight (Centers for Disease Control and Prevention, 2012a).

These statistics are more an indication of the U.S. population overall. As of 2010, there was not a state in the country with less than 20% of its population classified as obese (Centers for Disease Control and Prevention, 2010b), and statistics have indicated that obese children are more likely to become obese adults (Biro & Wein, 2010). Because strong evidence exists that participation in health and physical education can facilitate healthy behavioral choices, many schools are trying to find ways to engage all students in school-related physical education and integrate health and physical education content across the curriculum. As the chapter-opening example shows, technologies are available that can help teachers inform and empower students to make appropriate health choices. In addition, new gaming technologies are integrating entertainment with activity requiring players to actively participate in the games challenges. Due to the unique environment of health and physical education, K–12 teachers in these and related areas face vastly different challenges than other subject areas when integrating technology. These issues will be further discussed in the sections that follow.

Instructional Time and Quality Physical Education Programs

Appropriate physical education courses are those that have a clear learning sequence and are taught by certified professionals who focus upon developing student skills and knowledge to help students become physically literate (American Alliance for Health, Physical Education, Recreation, and Dance, 2013; National Association for Sport and Physical Education, 2012; American Heart Association, 2012). Various demands placed on schools are having an impact on the instructional priority of physical education and the ability of schools to offer programs that meet these outcomes. In some areas, the status of physical education in public schools is improving. There has been a slight increase since 2010 in the number of middle schools nationally requiring physical education courses. Currently, nearly 85% of elementary schools have state mandates for physical education. However, requirements for high school physical education have shown a 4% decrease, with fewer states requiring physical education courses to be completed for graduation.

The number of instructional minutes offered by schools varies widely ranging from 30–150 minutes per week at the elementary level to between 45 and 225 minutes at middle and high school levels (National Association for Sport and Physical Education, 2012). Over 64% of school districts allow students to substitute other activities for physical education and over half allow students to waive coursework entirely (National Association for Sport and Physical Education, 2012; American Heart Association, 2012). These trends seem in contrast with current initiatives. The “Let’s Move” campaign spearheaded by First Lady Michelle Obama refocused attempts to improve physical education and nutrition programs in public schools (White House Task Force on Childhood Obesity, 2010). The American Academy of Pediatrics, the U.S. Department of Health and Human Services, the U.S. Department of Education, President’s Council on Physical Fitness and Sport, and the Centers for Disease Control and Prevention (CDC) have indicated the need for more physical education in public schools. In recent years, instructional time for physical education was reduced in public schools to provide additional instruction for other academic subjects with the goal of increasing student test scores (Center on Educational Policy, 2007; Trost & Van Der Mars, 2009). However, the results of this movement may have not been successful. Results from the Trends in International Mathematics and Science Study (TIMSS) have shown a decrease in the performance of U.S. students in math and science, dropping from 19th to 37th place and from 18th to 35th place, respectively, in the rankings of countries in the last 10 years (National Center for Educational Statistics, 2008). The trend of decreasing physical education time in schools is also in contrast to the growing body of research showing positive associations between school-based physical education programs and academic achievement (Centers for Disease Control and Prevention, 2010a; Center on Educational Policy, 2007; Trost & Van Der Mars, 2009).

The Link Between Physical Inactivity and Obesity

It has been estimated that childhood obesity levels could reach the 30% level by 2030 if current trends continue (Wang, Beydoun, Laiang, Caballero, & Kumanyika, 2008). The treatment of obesity-related conditions has placed a huge burden on the U.S. medical system, with an estimated \$344 billion dollars to be spent on its treatment by 2018 and projected to attribute to approximately 21% of health care spending (United Health Foundation, American Public Health Association, & Partnership for Prevention, 2009). An increasingly greater proportion of these dollars are beginning to be spent on treatment of conditions in children and adolescents. The rates of obesity among children ages 2–19 reached 17% by the time Ogden, Carroll, Curtin, Lamb, and Flegal wrote about the problem. Data from the Pediatric Nutrition Surveillance reveals that obesity levels for children under the age of five reached 12% by 2012 (Dalenius, Boreland, Smith, Polhamus, & Grummer-Strawn, 2012).

One cannot discuss childhood obesity without considering the technology use of children and the potential contribution it makes to sedentary behaviors. By the time today’s group of students enter kindergarten, they are spending five to nine hours per day using some form of technology, with the average middle school student using technology forms for over 15 hours per day through multitasking activities (Mears, 2012; Rosen, 2010). In addition, it has been estimated that 25% of adolescents use a computer and/or play video games for over three hours per day (Centers for Disease Control & Prevention, 2010c; Hersey & Jordan, 2007; Mears, 2012).

Though technology use has not been identified as the primary cause of childhood obesity, it has been determined to have a potential effect related to two key factors. The first factor is that screen time, be it using a computer, watching television, or playing video games, is replacing more active pursuits in which the child could engage. The second factor is that children and adolescents have been shown to consume more calories while engaging in technology use and tend to make poor food choices (Crespo et al., 2001; Gortmaker et al., 1996; Mears, 2012; Robinson, 1999).

However, technology integration can also be effective for enhancing physical education. The Society of Health and Physical Educators (SHAPE) (formally known as the National Association of Sport and Physical Education, NASPE) developed appropriate practice guidelines to ensure technology is effectively integrated into physical education settings. These guidelines indicate that technology: 1) can be an effective tool for enhancing instruction; 2) should not replace but provide a supplement to instruction; 3) should provide opportunities for all students to receive equal exposure and benefits to the technology; 4) can be a valuable tool for maintaining student data and documenting progress (Mears, Hansen, Fine, Lawler & Mason, 2009). Thus, even though technology use has been postulated as a potential contributor to childhood obesity, it can effectively enhance instruction and provide rich learning experiences for students in physical education settings.

Accuracy of Internet Information on Health and Physical Education

When young people search for information related to health and physical education topics, they must have a sufficient level of technological literacy to know how to locate, evaluate, and use the information obtained. The National Health Education Standards indicate that students should be able to identify valid health information, products, and services, and for today's "iGeneration" a great deal of this information comes via the Internet (Joint Committee on National Health Education Standards, 2007; Rosen, 2010). The Common Core State Standards reinforce this need indicating that students should be able to use the Internet for obtaining information when producing and publishing writing as well as for collaboration (Common Core State Standards Initiative, 2012). Because anyone can post anything on the Web, students need to become good consumers of health and fitness products and information. Specifically, they must be able to differentiate between accurate and inaccurate information. Without this ability, they are unsuspecting consumers of misleading and potentially harmful advice.

Addressing Physical Education and Health Standards

School physical education has come far from its early emphasis on physical training and calisthenics. The subject area has evolved into an academic discipline with the goal of producing "physically literate" individuals. Students who demonstrate physical literacy have learned the skills to participate, know the benefits of participating, and value physical activity and its contribution to living a healthy lifestyle (American Alliance for Health, Physical Education Recreation, and Dance, 2013). This shift is evident with the 2013 release of the new *National Standards and Grade Level Outcomes for K-12 Physical Education*. These provide a sequential curricular focus for what students should know and be able to do in physical education and outline student learning outcomes in cognitive, psychomotor, and affective domains (American Alliance for Health, Physical Education Recreation, and Dance, 2013). This has been coupled with the release of *Appropriate Practice Guidelines* that outline acceptable instructional practice parameters for practitioners and the *Physical Education Teacher Evaluation Tool* for school administrators (National Association for Sport and Physical Education, 2007, 2009). A system of standardized assessments entitled "PE Metrics" has also provided extensive guidance for K-12 practitioners for evaluating student learning (National Association for Sport and Physical Education, 2008, 2010). The National Health Education Standards (Joint Committee on National Health Education Standards, 2007) have also established a scope and sequence for health education focusing upon the development of health literacy—the capacity of individuals to obtain, interpret, and understand basic health information along with the competence to use such information to enhance health.

Handling Controversial Health Issues

Coordinated school health education programs consist of eight components: health education; physical education; health services; nutrition services; counseling, psychological, and social services; healthy and safe school environment; health promotion for staff; and family and community involvement (Centers for Disease Control and Prevention, 2014b). At the core of this program is a curriculum aligned to the National Health Education Standards (Joint Committee on National Health Education Standards, 2007), which outlines curricular content strands for K–12 health education programs. These consist of content related to helping students understand ways to promote their personal health and prevent disease; understand the influence that family, peers, culture, media, and technology have on health behaviors; develop skills to access valid health information, products, and services; develop and use interpersonal communication skills to enhance health and avoid health risks; use goal setting skills to enhance health; practice health-enhancing behaviors and avoid risks; and advocate for personal, family, and community health. At the core of this program is a recommendation for adequate time and effective instruction provided by instructors who are knowledgeable about health education curriculum and have effective instructional strategies to facilitate student learning (Centers for Disease Control and Prevention, 2014a).

The variability between state and national policies and perceptions of the controversial nature of some subject matter has proven a challenge for health education programs. Over the years, special interest groups have pressed for either the inclusion of particular content strands or the elimination of topics based upon the group's individual moral and/or value systems. A topic that has faced substantial scrutiny is human sexuality. It is currently estimated that 22 states require sexual education in schools, with 20 of those states mandating instruction in sexuality as well as HIV/AIDS. Policies for states vary widely, making the adoption of the National Health Education Standards difficult (National Conference of State Legislatures, 2013). Topics such as rape, suicide, drugs use and abuse, violence, and character education have also been questioned. Health educators are constantly faced with the challenge of how to provide valid and reliable content information to students while staying within the legal parameters of their state or individual school districts. Directing students to valid Web-based sources can assist in this area.



TECHNOLOGY LEARNING CHECK

Complete **TLC 14.1** to review what you have learned from this section about issues in health and physical education that determine how technology is integrated.



TECHNOLOGY INTEGRATION STRATEGIES FOR HEALTH AND PHYSICAL EDUCATION

As discussed previously, the high degree of technology use by children adolescents has been identified as a potential contributing factor to sedentary behavior and the level of childhood obesity (Hersey & Jordan, 2007; Mears, 2012; Rosen, 2010). However, technology can also enrich instruction in health and physical education. In order to effectively address the changing learning styles of a new generation of learners entering today's public schools, physical educators must integrate technology throughout the curriculum (Mears, 2012b; Rosen, 2010). Technology can enhance instruction by providing strategies for assisting in the development of physical fitness, improving motor skill performance, supporting students' development of rhythmic movement skills, helping students assess and enhance personal their personal development, helping students obtain valid health information, and supporting interdisciplinary instruction. Table 14.1 summarizes some potential strategies and benefits of integrating technology into health and physical education, as well as resources to assist the practitioner with implementation. Technology Integration Example 14.1 also describes how these strategies can be implemented in a classroom.

TABLE 14.1 Summary of Technology Integration Strategies for Physical Education and Health Education

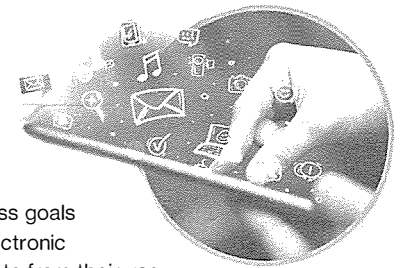
Technology Integration Strategies	Benefits	Sample Resources and Activities
Supporting improved physical fitness	<ul style="list-style-type: none"> Physical activity monitoring devices help provide data for analyzing, monitoring, and improving fitness Exercise equipment offers exercise options while providing feedback on performance Computer-based fitness planning and portfolios and nutrition programs help students set health and fitness goals and track achievement Synchronization of computer-based applications with physical activity–monitoring devices integrate nutrition with physical activity interventions Exergaming provides low-intensity fitness development and skill acquisition 	<ul style="list-style-type: none"> Heart rate monitors Blood pressure devices Pedometers/Accelerometers Spirometers Treadmills Stair steppers Stationary bikes Portfolio programs and websites Nutritional analysis programs such as DINE Healthy (http://www.dinesystems.com), FitBit, Jawbone Nintendo Wii, Sony PS3 iMove; Xbox Kinect
Developing and improving motor skill performance	<ul style="list-style-type: none"> Tablets assist with monitoring students' progress in the field Recording and analyzing performance via digital video Instructional video providing exercise performance guidance and/or models of performance 	<ul style="list-style-type: none"> Tablet PCs Digital video cameras Ubersense and CoachMy Video mobile applications Video editing software SportsCAD motion analysis program (http://www.sportscad.com/) Dartfish Video Analysis software
Assessing student learning in the context of teaching	<ul style="list-style-type: none"> Allows students and teachers immediate feedback on performance; allows assessment of all students to be performed efficiently without reducing time for the participation in physical activities Allows teachers to record and manage student data quickly and easily; allows immediate feedback to students on performance 	<ul style="list-style-type: none"> PollEverywhere.com or TopHat.com allows teachers to design and assess student learning with polls and short-response and multiple-choice questions through the use of smartphones, laptops or tablet devices Student response systems provide student remote controls for answering questions and track data using learning analytics Google Forms for assessment Wufoo.com form builder with Pico mobile application Numbers or Microsoft Excel data sheets
Supporting student work in dance	<ul style="list-style-type: none"> Streaming video, mobile applications, MP3 players, digital video recorders, and other types of technology can enhance dance instruction and the development of choreography 	<ul style="list-style-type: none"> Mobile apps such as Tap, Salsa, Ballet for Beginners, Dance Choreography
Shaping students' beliefs and interactions related to physical activity	<ul style="list-style-type: none"> Instructional video via the Web can provide prompts to facilitate students' writing and discussions about healthy behaviors to assist with meeting Common Core State Standards in English and Language Arts Websites such as the ePals Global Community offer ways for students in various locations to do joint projects on health issues 	<ul style="list-style-type: none"> KidsHealth website (look for movies under Kids and Teenagers buttons) ePals Global Community

(Continued)

TABLE 14.1 Summary of Technology Integration Strategies for Physical Education and Health Education (continued)

Technology Integration Strategies	Benefits	Sample Resources and Activities
Helping students assess and enhance personal health	<ul style="list-style-type: none"> Websites offer teenagers compelling tutorials to increase social-emotional learning Nutritional analysis programs such as DINE Healthy or mobile applications such as MyFitnessPal and Fat 2 Fit assist students with assessing dietary intake and goal setting 	<ul style="list-style-type: none"> Ripple Effects DINE Healthy nutritional analysis software Fat 2 Fit App calculates body mass index, basal metabolic rate, and other calculations to assist with tracking and goal setting
Helping students obtain valid health information	<ul style="list-style-type: none"> Websites offer up-to-date information to aid student research on health issues Instructional media offers a variety of formats to match any student's interests and preferred learning format 	<ul style="list-style-type: none"> KidsHeath website Core Learning Family Health and Health for Kids series (under Health on menu) BARN DVD series on health topics
Influencing health behaviors	<ul style="list-style-type: none"> Videos and collaborative projects allow students to see health issues in real-life settings and view models of healthy behaviors Internet sites provide helpful information to children and teens 	<ul style="list-style-type: none"> Webquests (search on addiction and other keywords) KidsHealth website (look for movies under Kids and Teenagers buttons)
Supporting interdisciplinary instruction	<ul style="list-style-type: none"> Shows links between physical education/health topics and other content areas Sources to connect physical education to Common Core State Standards 	<ul style="list-style-type: none"> Technology Integration Example 14.1 Society of Health and Physical Educators webinar series
Offering physical education and health education online	<ul style="list-style-type: none"> Provides materials to support flexible learning schedules Offers information in a highly visual format 	<ul style="list-style-type: none"> Distance courses WikisCourse Management Systems—Edmodo, Canvas, Blackboard Vodcasts

TECHNOLOGY INTEGRATION



Example 14.1

TITLE: Interdisciplinary Activities for Physical Education Concepts

CONTENT AREA/TOPIC: Physical education in content areas: mathematics, biology, history, geography

GRADE LEVELS: 6–8

ISTE STANDARDS+S: Standard 2—Communication and Collaboration; Standard 4—Critical Thinking, Problem Solving, and Decision Making; Standard 6—Technology Operations and Concepts

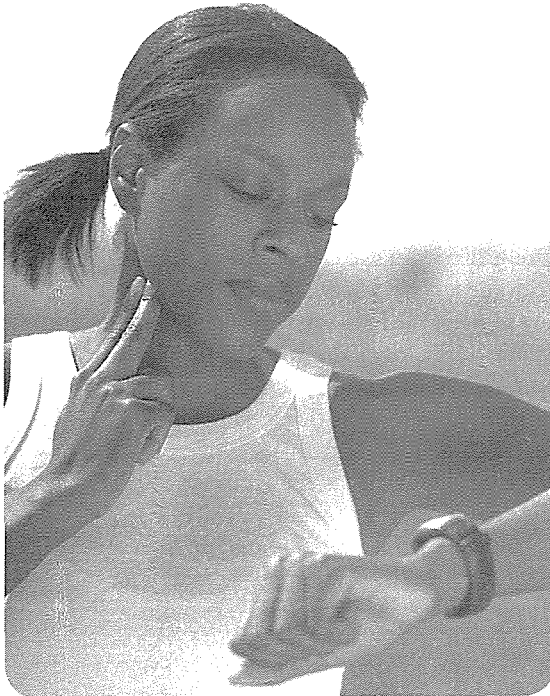
CCSS: Mathematics-6.NS.B.3, —7.RPA.3, —Language Arts-RI.6.1, —W.7.2, —W.8.4—(This is a sampling of potential standards and not all inclusive.)

DESCRIPTION: Technology-based strategies can help teachers integrate other content areas into physical education to create interdisciplinary lessons. Students can monitor and evaluate

progress towards personal fitness goals and achievements as part of electronic portfolios; analyze and graph data from their use of heart monitors and/or pedometers (mathematics); log participation and skill acquisition scores achieved while participating in exergaming; use tablets to video record and analyze individual and peer performance, develop instructional video projects, read QR codes to complete exercise circuits, or participate in orienteering or geocaching activities; view videos that demonstrate model performances, various sports, and other motor activities to learn more about how the body works (biology); use the Internet to research sports and physical activities in other countries and historical periods (history).

SOURCE: Based on Mohnsen, B. (2000). Vaughn, Nekomi, and Luis: What they were doing in middle school physical education. *Learning and Leading with Technology*, 27(5), 22–27. Also see Mears, 2010, 2012a; Mears & Hansen, 2010; Witherspoon, 2012.

FIGURE 14.1 Heart Rate Monitor



Russell Sadur/Dorling Kindersley, Ltd

FIGURE 14.2 Example Pedometer



Imagemore Co., Ltd

Supporting Improved Physical Fitness

Several technologies support interventions to assist and motivate youngsters to increase their levels of physical activity. Several of these strategies are described here.

Physical activity monitoring devices. Mears (2010) reviews devices to monitor body functions during sport and exercise activities. These include heart rate monitors (see Figure 14.1), **accelerometers**, which are devices for measuring rate of acceleration, and **pedometers** (see Figure 14.2), which are devices that count the number of steps one takes, calories burned, and exercise intensity minutes (New Lifestyles, 2013). Heart rate monitors are especially effective for providing students with feedback as to whether they are in their target heart rate zones and benefiting from the training effect for cardiorespiratory endurance (Nichols, Davis, McCord, Schmidt, & Slezak, 2009). Other monitoring devices students can use include electronic **blood pressure devices** (to monitor blood pressure), **body composition analyzers** (devices to determine the percent of body fat), and **spirometers** (devices to measure lung volume). Each device measures a different aspect of health and fitness, allowing students to use their own bodies for data collection and analysis.

Exercising with equipment and monitoring software. Technology devices and software are available to help analyze, monitor, and improve fitness. Exercise equipment, such as treadmills, stair steppers, and stationary bikes, are all technology devices designed to improve fitness. Used in combination with (usually built-in) monitors, these devices can show students the results of their efforts in terms of heart rate, speed, and power. Applications available on smartphones or Web-connected MP3 players allow for the use of GPS technology to track distance traveled or provide auditory cues for intervals.

Fitness plans and portfolios. Students also can be put in charge of their own learning along with the development of fitness goals and plans. For example, the Health-Related Fitness Tutorial/Portfolio (Bonnie's Fitware) guides students through the five areas of health-related fitness: flexibility, muscular strength, muscular endurance, body composition, and cardiorespiratory endurance. The electronic portfolio portion of this software allows students to enter fitness plans, exercises, drawings or video clips, journal entries, caloric input/output, and fitness scores, which are then analyzed by the software. **Nutritional analysis programs** (software that analyzes calorie intake and monitors portions of required food groups), fitness analysis programs, and spreadsheet applications can also be used to calculate and graph individual nutrition and fitness goals. These programs now integrate with many physical activity monitoring devices allowing the merging of nutrition data with caloric expenditure data to facilitate personal fitness development.

Exergaming. Mears and Hansen (2009) say that **exergaming** is “video games that provide physical activity or exercise through interactive play” (p. 29). Popular games such as Dance Dance Revolution and game systems such as Nintendo Wii, Xbox Kinect, and Sony PS3 with the iMove interface require participants to be physically active and engaged (see Figure 14.3). Active gaming is seeking to replace the more traditional video games, which use merely a finger/thumb activated controller, and provide an avenue for physical activity interventions. Many new game forms are being merged with exercise machines such as

“exerbikes” or “exersteppers” which use traditional fitness machines with gaming. While exergaming will not provide a replacement for quality instruction in physical education, studies have shown that it can have a positive impact on motivation to engage in physical activity (Cordero, 2013; Shayne, Fogel, Miltenberger, & Koehler, 2012). Many physical education educators are beginning to find it to be a useful addition to their repertoire of tools (Hicks & Higgins, 2010). Companies are also developing

FIGURE 14.3 Example of Exergaming



Shutterstock

commercial grade machines designed to allow multiple players to simultaneously participate. Questions remain, however, about how to appropriately integrate exergaming into the physical education curriculum (see the Hot Topic for Debate feature).

Exercise and sport opportunities for students with special needs. The Special Olympics has long been a way to meet the needs of students whose disability requires modifications and adaptations be provided to facilitate their participation in sports and activities. Information on how to join this program is on the Special Olympics website shown in the Adapting for Special Needs feature. Many specialized pieces of hardware and software allow the practitioner to modify instruction to meet the individual needs of students. Mobile apps such as Tap To Talk (Assistix, 2013) allow students who have oral communication disabilities to communicate via tablet devices. Multiple research inquiries are exploring the concept

of exergaming as a form of therapeutic intervention for children with disabilities as well (Foulds, Adamovich, Gordon & Okita, 2010; Gasperetti et al., 2010; Hilton, et al., 2014; Morelli, Folmer, Foley & Lieberman, 2011; Taylor, McCormick, Shawis, Impson, & Griffin, 2011).

Developing and Improving Motor Skill Performance

Technology-based strategies are available to help students develop their motor skills. Types of strategies include those for monitoring, providing feedback, and self-analyzing performance. These include the use of video recording applications such as Ubersense and CoachMyVideo, which allow immediate review of skill performance and annotation. The use of digital video recorders combined with video cameras can also allow the student to perform a skill and watch immediate looped feedback and assess their performance using teacher designed scoring guides and rubrics.

Monitoring performance. Asking students to set personal goals and monitor progress is motivational to the student but can be a difficult management task for the physical educator. Tablets can assist in this task by helping the physical educator organize student performance data (e.g., grades, attendance, fitness scores) (Gubacs-Collins & Juniu, 2009). The influx of tablets including the iPad and other devices is a rapidly growing trend. Tablets have been referred to as the “physical educator’s new clipboard” (Nye 2010, p. 21). When combined with mobile sites and applications such as Edmodo, Wufoo, or Google Forms, the practitioner can design customized assessment instruments which can be used to record data in the context of teaching with feedback being immediate and easily accessible to the student. Digital portfolios can also put students in charge of collecting, recording, and analyzing

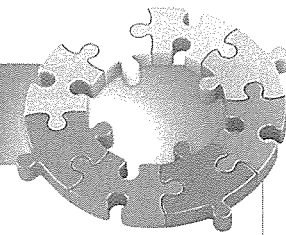
Hot Topic Debate Should Exergaming be Included in Physical Education Programs?

Take a position for or against (based either on your own position or one assigned to you) on the following controversial statement. Discuss it in class or on an online discussion board, blog, or wiki, as assigned by your instructor. When the discussion is complete, write a summary of the main pros and cons that you and your classmates have stated, and put the summary document in your Teacher Portfolio.

Technology use by children and adolescents has been cited as a potential contributor to physical inactivity and resulting obesity

(Centers for Disease Control and Prevention, 2012). Interactive “exergames” like Dance Dance Revolution and gaming systems such as Nintendo Wii, X-Box Kinect, and Sony PS3 iMove are increasingly popular and have been offered as a potential avenue for accumulating physical activity (Bidiss & Irwin, 2010). However, including exergaming in physical education curriculum remains controversial. Is there evidence that shows benefits of including exergaming? Would they outweigh the negatives?

Adapting for Special Needs



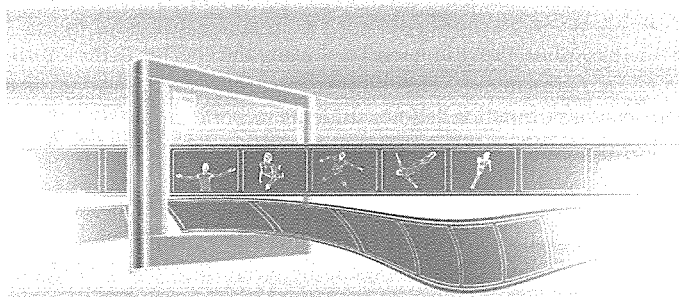
Physical Education and Health Education

Students with disabilities require exercise just as any other student. However, in some cases, special considerations must be made for specific disabling conditions. School personnel should always coordinate physical education activities with the student's family, physician, and the child's physical therapist. Below are some resources that can be used with all students as teachers explore the intersection of fitness, health, wellness, and technology.

- Adapted Physical Education (at the PE Central website)— Provides resources for teachers on how to engage students with disabilities in adapted physical activities.
- Adapted Physical Education National Standards (at the APENS website)— Provides national standards for adapted PE.

- Centers for Disease Control (at the LifeStages topic on the CDC website)— Information on health and wellness for all ages
- Family Center on Technology and Disability (2007). Adapted physical education & AT: To play or not to play (at the FCTD website) – A comprehensive examination of the relationship between assistive technology and participation in physical education.
- Special Olympics (at the Special Olympics website)— Information on sports opportunities for kids with physical and mental disabilities

—Contributed by Dave Edyburn



▲ Digital portfolios can help students keep track of their nutrition and fitness goals. John Foxx Collection/Imagestate



▲ Videos can be helpful for analyzing students' movements in sport or dance and providing helpful feedback on how to improve their performance. Rick Becker-Leckrone/Shutterstock

their learning in psychomotor and cognitive domains, their fitness performance, and their social interactions.

Providing feedback on performance. Once students begin to practice motor skills, providing feedback becomes necessary for improving performance. Research in the field has indicated that providing students' feedback using instructional video can increase the ability to perform motor skills (Banville & Polifko, 2009). The use of video is most effective when it is shown to the student immediately after the performance, along with external verbal feedback and cues. This is where mobile applications such as Ubersense become very valuable as they allow the instructor to view video and annotate and record voice-over feedback of performance, which can be sent to the student via

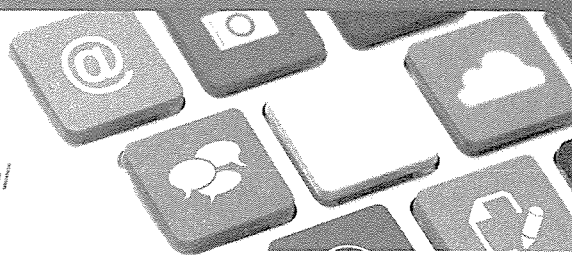
YouTube or other cloud-based Web storage sites. Video replay is best used with students beyond a beginner skill level. Students need some knowledge of correct skill performance in order to use the information these images provide. For students with advanced skills, replay also is useful for strategy and tactics. Video software such as Dartfish Video Analysis can be helpful for analyzing movement and giving students helpful feedback; other programs that provide similar analysis and feedback are available. Lim, Pellett, and Pellett (2009) point out that video editing software can also be used to clip parts of sequences to focus on desired movements (see free editing programs listed in the Open Source Options feature).

Video footage allows a teacher, coach, or the individual to go back and review a performance and break down stages in the skill.

Self-assessment of student learning. Students can also use technology for self- and peer-assessment to facilitate engagement in their learning. For example, digital video cameras can be placed at stations or students can use mobile technology such as iPad, Flip cameras, or other types of video recording devices to self and peer assess. Tablets provide the ability to record and immediately review performance. Various phases of skill performance can be recorded and students can work in small groups to identify critical features, patterns, and concepts associated with the skill. In preparation, the teacher

develops a skill evaluation checklist or rubric, which evaluates the critical elements of the skill. Then students rotate through stations in small groups. For example, students can work in a group of three

OPEN SOURCE OPTIONS *for Health and Physical Education*



TYPES

Dance software

FREE SOURCES

Labanwriter: dance.osu.edu/3_research_gallery/labban_writer.html

Audio/Video editing software

Open Movie Editor: openmovieeditor.org

VideoPad video editing software: nchsoftware.com/software/video.html

Wax video editing software: debugmode.com/wax

Audacity audio recording and editing software: audacity.sourceforge.net/

Free health software

Sheppard Software health games: sheppardsoftware.com/health.htm

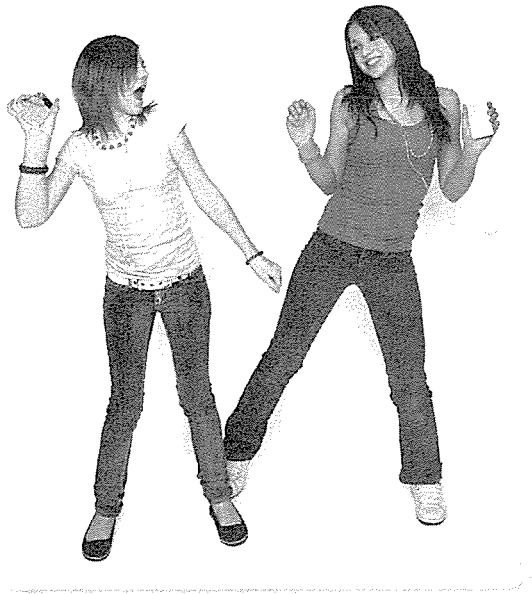
with one student performing the skill, the second providing feedback using the checklist/rubric provided, and the third student recording the performance. The ability to integrate cameras with digital video recorders (which have an auto-playback function) allows students to perform the skill at one station and then self-assess at the following station by watching the video as it replays.

Facilitating skill acquisition. Projects can be designed to assess and assist in the development and understanding of motor skills. Motor skills are classified into movement patterns (e.g., overhand pattern, kicking pattern). Understanding the relationship between skills using the same movement pattern helps with the transfer of knowledge and motor skills from one activity to another (e.g., overhand throw to volleyball serve). Students working in small groups can compare and contrast movement patterns using video to compare the similarities and differences between the patterns. They can also use mobile applications such as Inspiration Maps (from Inspiration Software) or WhiteBoard from GreenGarStudios to diagram and present their findings from the skill comparison.

Software packages, such as Biomechanics Made Easy and SimAthlete (Bonnie's Fitware), provide reference information on the important biomechanical and motor learning concepts (e.g., goal setting, feedback, stability, force production). Biomechanics Made Easy then quizzes students on their understanding and application of the concepts, whereas SimAthlete goes a step further by asking students to create a practice plan for different athletes. The better the practice plan, the better the athlete performs during competition. Measurement in Motion (Learning in Motion) and Dart Trainer (Dartfish) take biomechanical analysis to another level by encouraging open-ended exploration. These software packages use video clips (supplied by the teacher or captured using student subjects) and allow for ease of measurement and analysis of movement performance (e.g., ball rotation, limb speed). Similar applications can be performed using mobile devices with applications such as Ubersense and CoachMyVideo, described earlier. Voice-over feedback can be sent to the student via video server networks such as YouTube or Vimeo for students to view or self-assess. All of these resources can then be placed in one location for delivery using course management systems such as Edmodo or Canvas from Instructure or on a wiki such as PBWorks, all of which provide free course management system options for K–12 teachers.

Assessing Student Learning in the Context of Teaching

Many technology options have been recently developed that allow teachers to assess student learning in the context of teaching quickly and easily. Student response systems such as iClicker or Got It systems by Califone allow the teacher to quickly and effectively quiz every student on cognitive concepts presented during lessons. Sites such as PollEverywhere.com or TopHat.com



▲ Mobile apps allow learners to take dance instruction and practice anywhere. Erics/Shutterstock

allow the teacher to perform similar functions using tablets, smartphones, Wi-Fi-capable MP3 players, or computers to assess learning. Assessment can also be performed using course management systems that have exam capabilities such as Canvas or Edmodo. These systems also allow the teacher to perform learning analytics to identify gaps in student learning or performance that can be readdressed during instructional sessions.

Supporting Students' Work in Dance

Dania, Hatziharistos, Koutsouba and Tyrovola (2011) discussed various ways technologies can assist students as they learn and practice dance movements. Web-based digital video streaming allows the merging of choreography with performance, permitting multiple practitioners to work together. YouTube has become a way for dance students to research and view models of various dances. iPods and smartphones make music private so that several students can play music individually and work on their choreography without disturbing others. Mobile applications such as Dance Choreography (Pohl, 2014), Tap, Salsa, Ballet for Beginners, and the Dance App also allow learners to take dance instruction anywhere through smartphones and tablet devices (Obaiduzzaman, 2010).

Shaping Students' Beliefs and Interactions Related to Physical Activity

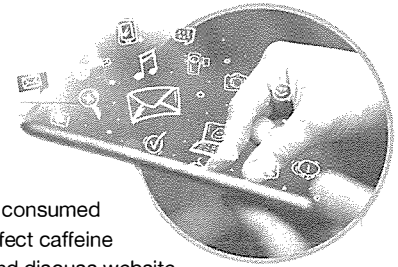
Standards four and five of the National Standards and Grade Level Outcomes for Physical Education (American Alliance for Health Physical Education Recreation and Dance, 2013) primarily address learning outcomes in the affective domain. Assessing these areas as well as providing instruction can be enhanced through the use of technology. Spreadsheets and checklists can be used with tablets to assess attributes in the context of teaching, examining variables such as attendance, punctuality, participation levels, leadership, empathy, listening and applying criticism, as well as others (Mears, 2009). Videos and online materials can also provide opportunities to assist instruction in these areas. Physical educators can use portions of applicable TV programs as prompts for journal writing. For example, prompts might ask students how they would feel if presented with the situation addressed in the recording.

Web-based tools can be an ideal medium for connecting students of various backgrounds and providing them with the opportunities for interactions related to physical education content. In today's digital world ePals or key pals are newly evolved pen pals where students can connect via email, blog, chat, or through social media such as Facebook and Twitter. They can share ideas, concerns, physical education experiences, information, written assignments, and research. Combining these interactions through course management systems such as Canvas or Edmodo creates a safe environment for student to share information versus using open content sources. By using these sites, only designated participants are given permission to access assignments that can be uploaded and exchanged for peer review, editing, and collaboration. Through these connections, they learn to accept individuals from other communities and cultures. Sites such as the ePals Global Community help teachers get started with collaborative activities. They can visit one of the sites to find other physical educators interested in teaming for class projects.

Another option to connect students with others for collaboration on personal fitness goals is MyFitnessPal, an app shown in the **Top Ten Must-Have Apps for Health and Physical Education** feature, or through various types of physical activity monitoring devices such as FitBit. FitBit has software and mobile applications allowing students to form collaborative connections for sharing physical activity and nutritional data with each other and establishing support groups to compare activity levels, nutritional intake, and weight loss if desired.

Helping Students Assess and Enhance Personal Health. When attempting to motivate individuals to change their lifestyles and adopt a wellness approach toward improving their health, information alone is not enough. Fortunately, online sites are available to guide students through the process of making changes. One of these is the Ripple Effects website,

TECHNOLOGY INTEGRATION



Example 14.2

TITLE: What's the Buzz? Exploring Concepts About Caffeine

CONTENT AREA/TOPIC: Health, biology

GRADE LEVELS: 8–12

ISTE STANDARDS•S: Standard 1—Creativity and Innovation; Standard 2—Communication and Collaboration; Standard 4—Critical Thinking, Problem Solving, and Decision Making; Standard 6—Technology Operations and Concepts

CCSS: Reading: Informational Text—Key Ideas and Details (RI.9–10.1)—Reading: Informational Text—Integration of Knowledge and Ideas (RI.9–10.8)

DESCRIPTION: Before the lesson begins, have students collect and bring in containers from drinks that have caffeine. Discuss how

much caffeine each student has consumed in the past three days and the effect caffeine has on the human body. Read and discuss website information on the effects of caffeine (e.g., the *New York Times* online article, “A Century Later, Jury’s Still Out on Caffeine Limits”). Tell the class that they will work in groups to explore how caffeine affects the body, how common it is in various consumer products, and whether its use in consumer products is regulated in any way. Then each group will be assigned a focus question and will put together a dramatic skit intended to teach their peers about their specific question. Have students use video cameras to record the skits to post on SchoolTube.

SOURCE: Based on concepts from “The Buzz About the Buzz: Learning How Caffeine Affects the Body,” a lesson plan at the Learning Network: Teaching and Learning with the New York Times, <http://learning.blogs.nytimes.com>.

which offers video-based scenarios and advice on behavior issues such as bullying. The activities it provides allow students to apply their knowledge to problem-solving situations. The U.S. Department of Health and Human Services has developed several websites that provide information for kids and teens related to healthy lifestyles and refraining from unhealthy behaviors.

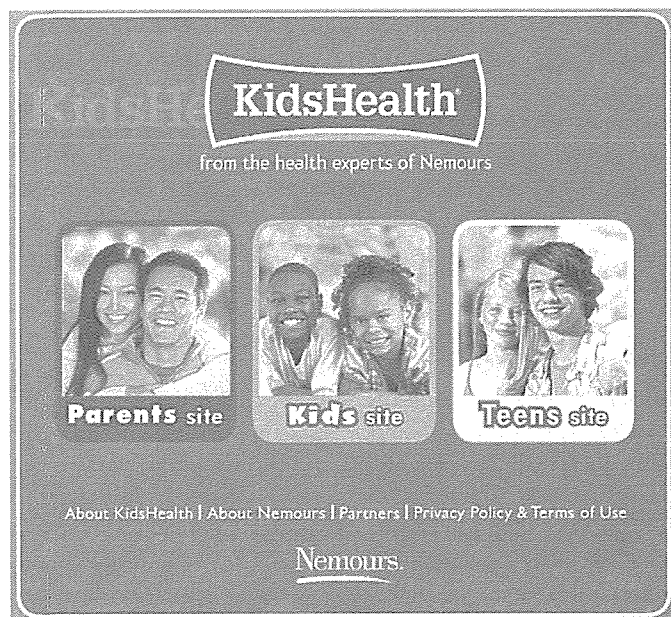
Many nutritional analysis programs and mobile applications are currently available. These programs (e.g., DINE Systems’ DINE Healthy; ChooseMyPlate.gov; MyFitnessPal) ask the user for data on age, weight, height, gender, and amount of physical activity, and then calculate the individual’s nutritional needs. The U.S. Department of Agriculture’s Choose My Plate.gov resource provides various calculators as part of their SuperTracker application, which allows children and adolescents to create a profile and monitor and track dietary intake with analysis tools (United States Department Agriculture, 2013). These sites allow the user to record the types and amounts of foods eaten daily, and the programs create reports that lists the calories ingested, the nutrient values for all foods, and the total of all nutrients ingested. These reports then are used to determine if the student has met the recommended dietary allowances and whether the number of calories ingested was excessive. These programs expose poor nutritional and fitness behaviors through their analysis of daily food intake and physical activity. Appropriate menus and exercises are recommended for a healthier lifestyle. The software packages can also serve as personal trainers for fitness and nutrition. Many of these sites also have calculators that determine body mass index, basal metabolic rate, and other information to assist in determine appropriate caloric intake and nutrient content. The CDC also has launched an interactive site for children that provides education on various health topics such as disease, food and nutrition, physical activity, and safety as well as other topics. Content is presented via interactive games and video. Also see Technology Integration Example 14.2 for a useful lesson on the effects of caffeine.

Health risk assessments are another type of useful tool. These electronic questionnaires ask the user to input data regarding his or her lifestyle. Questions include height, weight, gender, age, cholesterol level, blood pressure, smoking habits, alcohol usage, physical activity habits, family medical history, nutritional information, and use of seat belts. Based on the data received, the program determines the individual’s life expectancy, cardiovascular disease risk, and/or cancer risk. Some examples of these include the weight and health risk, heart attack risk assessment, and diabetes risk assessment.

Helping Students Obtain Valid Health Information

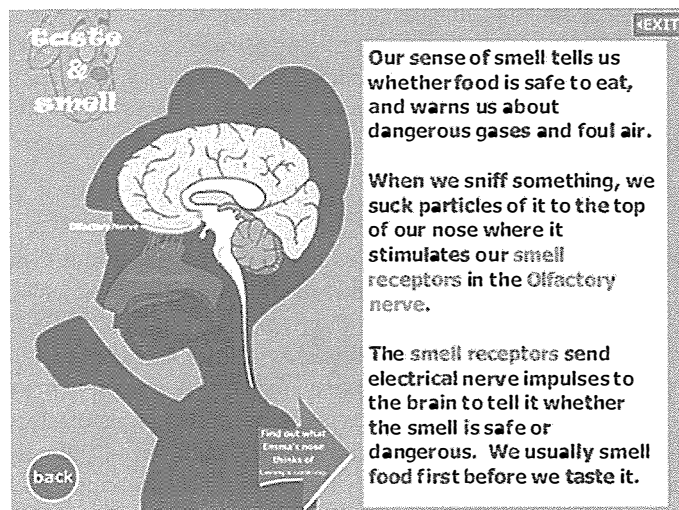
Historically, the health education textbook has been the primary source of information and reading material in health education classes. Today, the Internet and various software packages

FIGURE 14.4 KidsHealth Website



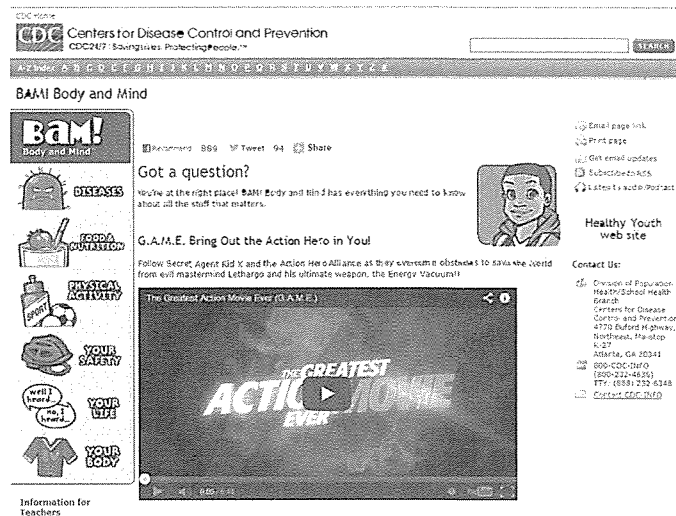
Source: © The Nemours Foundation/KidsHealth. Reprinted by permission.

FIGURE 14.6 From Explore Your Body Software



Software can help promote health awareness in young children.
 Source: Interactive health lesson from Core Health I Course, published by Core Learning; www.core-learning.com. Reprinted by permission.

FIGURE 14.5 CDC Body and Mind Website



Copyright © Centers for Disease Control and Prevention, <http://www.cdc.gov/bam/>

provide students with access to a rich variety of additional materials. KidsHealth (see Figure 14.4) is an example of a health-related site targeted at K–12 students. Another good source is the CDC (see Figure 14.5), which has information and materials designed for people of all ages and for special populations (see a link to the site in the Adapting for Special Needs feature). High-quality software includes the BARNs Multimedia Series I and II (Learning Multi-Systems) for middle and high school students, and the Core Learning series on health that has an appealing format and engaging activities on a variety of topics (menu items on the site include The Body, Illnesses and Injuries, Staying Healthy, Becoming an Adult, and Emotional Health; see Figure 14.6 for an example from The Body). Children and teenagers can use these and other resources to research health topics, including the side effects of commonly used medicines or symptoms of major medical illnesses.

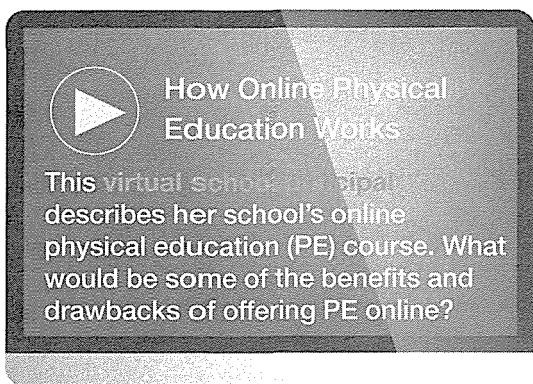
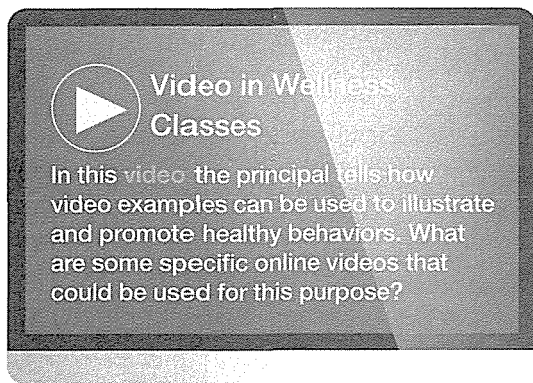
Computer-mediated and online formats are also a good way for young people to obtain reliable information on topics that, due to their controversial nature, teachers may not be able to discuss through direct classroom instruction. For example, Goldsworthy and Schwartz (2008) describe an effective multimedia curriculum for sex education. Noar, Pierce, and Black (2010) reported a meta-analysis of studies on computer-based

interventions in sex education that indicated these kinds of materials have the desired impact on attitudes and behaviors.

Buhi, Daley, Fuhrmann, and Smith (2009) say that “The Internet has become the leading source for sexual health information” (p. 101). However, as noted earlier, students need instruction on how to distinguish between accurate and inaccurate information, so these sources must be carefully vetted before teachers recommend that young people use them.

Influencing Health Behaviors

When evaluating all of the complex issues related to health education, students frequently look for models of appropriate behavior. One way to provide these models is through working with



other students like themselves who face the same kinds of problems and decisions. Classes in various parts of the world can collaborate on projects such as studying local safety or behavior issues. When they complete their research, they work together on developing a Web page or other product that documents healthy behaviors. Students also are able to discuss the differences between various cultures with regard to subjects such as drug use or government-sponsored health care.

Video resources are an efficient way to remove logistical hurdles when teaching health-related issues. They allow students to hear information and advice from a voice other than the teacher's. They also allow students to see health issues in real-life settings and view models of healthy behaviors.

Supporting Interdisciplinary Instruction

The popular opinion regarding interdisciplinary instruction for health and physical education is that these subject areas support learning in other subjects. However, the perspective of health and physical educators is that interdisciplinary instruction requires a symbiotic relationship: subject areas support each other. The adoption of the Common Core State Standards (2012) by the majority of states nationwide has as its key objective the integration of multiple content areas in preparing students to become college and career ready. The website PE Central provides a section of peer-reviewed lesson ideas for integrating physical education content into other subject areas. SPARKPE has developed a series of lessons and activities aligned to Common Core State Standards, which merge physical education content with literacy and language arts instruction (SPARKPE, 2014a, 2014b). See Technology Integration Example 14.1, provided earlier in this chapter, for an example of an interdisciplinary lesson that integrates physical education, science, and math, along with the use of computers. Technology teachers can help with these interdisciplinary units by providing Internet research support and multimedia project development tools that let students demonstrate their health and physical education learning.

Offering Online Health and Physical Education

A recent trend is for physical education and health education courses to be taught online. One might wonder what an online physical education course looks like. As with any course, the design and pedagogy differ greatly from class to class. However, they often state a goal, such as walking four miles a day, that students must accomplish for each week. Students keep a log of their physical activity, sharing their data with other students while they keep a journal of their experiences. However, more complex interventions are needed to ensure that students demonstrate mastery of cognitive, affective, and psychomotor domains of all applicable content areas versus merely physical activity to meet the National Standards and Grade Level Outcomes (American Alliance for Health Physical Education Recreation and Dance, 2013). Mears (2009) reviews how podcasts and wikis can help with learning at a distance, and Shumack and Reilly (2011) feel that video podcasting (**vodcasting**) can help get needed physical education information out to students in a highly visual format. Vodcasts are simply videos posted on a course site or other website, such as YouTube, a practice that is also referred to as video sharing. The Society of Health and Physical Educators (SHAPE America, formerly the American Alliance for Health, Physical Education, Recreation and Dance or AAHPERD) has developed appropriate practice guidelines for offering physical education online to ensure it meets national standards and appropriate practice guidelines. These guidelines are available at the SHAPE America website.



TECHNOLOGY LEARNING CHECK

Complete **TLC 14.2** to review what you have learned from this section about strategies for integrating technology into health and physical education.

TEACHING HEALTH AND PHYSICAL EDUCATION TEACHERS TO INTEGRATE TECHNOLOGY

This section gives recommendations for how teachers can prepare to integrate technology effectively into instruction for health and physical education. Teachers in this area are challenged to use young people’s natural fascination with technology to enhance and increase active and healthy behaviors. But these are also content areas where students’ ready access to technologies has made it necessary to place additional skills in the curriculum. Health and physical education teachers are tasked with making students more savvy consumers of health-related information and encouraging them to take responsibility for their own health and wellness. This is also a content area that often includes instruction to reduce bullying behaviors. Fortunately, many new lesson plans and resources are available online to support instruction on these topics.

Rubric to Measure Teacher Growth in Health and Physical Education Technology Integration

Begin by reviewing the rubric in Figure 14.7 to measure teachers’ progress in effectively integrating technology in health and physical education. Part I of the rubric addresses knowledge of issues and challenges, and Part II addresses health and physical education integration strategies.

FIGURE 14.7 Rubric to Measure Teacher Growth in Technology Integration for Health and Physical Education

Part I: Teacher Knowledge of Health and Physical Education Issues and Challenges			
	Basic knowledge (1–2 points)	Intermediate knowledge (3–4 points)	Advanced knowledge (4–5 points)
Instructional time and quality physical education programs	I can articulate the nature of the issue.	I can both articulate the nature of the issue and some of the possible ways to address it.	I can articulate my own plan for addressing the issue in my own teaching.
The link between physical inactivity and obesity	I can articulate the nature of the issue.	I can both articulate the nature of the issue and some of the possible ways to address it.	I can articulate my own plan for addressing the issue in my own teaching.
Accuracy of Internet information on health and physical education	I can articulate the nature of the issue.	I can both articulate the nature of the issue and some of the possible ways to address it.	I can articulate my own plan for addressing the issue in my own teaching.
Addressing physical education and health standards	I can articulate the nature of the issue.	I can both articulate the nature of the issue and some of the possible ways to address it.	I can articulate my own plan for addressing the issue in my own teaching.
Handling controversial health issues	I can articulate the nature of the issue.	I can both articulate the nature of the issue and some of the possible ways to address it.	I can articulate my own plan for addressing the issue in my own teaching.
Part II: Teachers’ Technology Integration Strategies for Health and Physical Education			
	Basic knowledge (1–2 points)	Intermediate knowledge (3–4 points)	Advanced knowledge (4–5 points)
Supporting improved physical fitness	I can describe the strategies and identify technologies to carry them out.	I have designed at least 1–2 activities based on these strategies to enhance my teaching and my students’ learning.	I have designed plans for how I will integrate these strategies throughout my curriculum to enhance my teaching and my students’ learning.

(Continued)

FIGURE 14.7 Rubric to Measure Teacher Growth in Technology Integration for Health and Physical Education (continued)

Developing and improving motor skill performance	I can describe the strategies and identify technologies to carry them out.	I have designed at least 1–2 activities based on these strategies to enhance my teaching and my students' learning.	I have designed plans for how I will integrate these strategies throughout my curriculum to enhance my teaching and my students' learning.
Assessing student learning in the context of teaching	I can describe the strategies and identify technologies to carry them out.	I have designed at least 1–2 activities based on these strategies to enhance my teaching and my students' learning.	I have designed plans for how I will integrate these strategies throughout my curriculum to enhance my teaching and my students' learning.
Supporting student work in dance	I can describe the strategies and identify technologies to carry them out.	I have designed at least 1–2 activities based on these strategies to enhance my teaching and my students' learning.	I have designed plans for how I will integrate these strategies throughout my curriculum to enhance my teaching and my students' learning.
Shaping students' beliefs and interactions related to physical activity	I can describe the strategies and identify technologies to carry them out.	I have designed at least 1–2 activities based on these strategies to enhance my teaching and my students' learning.	I have designed plans for how I will integrate these strategies throughout my curriculum to enhance my teaching and my students' learning.
Helping students assess and enhance personal health	I can describe the strategies and identify technologies to carry them out.	I have designed at least 1–2 activities based on these strategies to enhance my teaching and my students' learning.	I have designed plans for how I will integrate these strategies throughout my curriculum to enhance my teaching and my students' learning.
Part II: Teachers' Technology Integration Strategies for Health and Physical Education			
	Basic knowledge (1–2 points)	Intermediate knowledge (3–4 points)	Advanced knowledge (4–5 points)
Helping students obtain valid health information	I can describe the strategies and identify technologies to carry them out.	I have designed at least 1–2 activities based on these strategies to enhance my teaching and my students' learning.	I have designed plans for how I will integrate these strategies throughout my curriculum to enhance my teaching and my students' learning.
Influencing health behaviors	I can describe the strategies and identify technologies to carry them out.	I have designed at least 1–2 activities based on these strategies to enhance my teaching and my students' learning.	I have designed plans for how I will integrate these strategies throughout my curriculum to enhance my teaching and my students' learning.
Supporting interdisciplinary instruction	I can describe the strategies and identify technologies to carry them out.	I have designed at least 1–2 activities based on these strategies to enhance my teaching and my students' learning.	I have designed plans for how I will integrate these strategies throughout my curriculum to enhance my teaching and my students' learning.
Offering physical education and health education online	I can describe the strategies and identify technologies to carry them out.	I have designed at least 1–2 activities based on these strategies to enhance my teaching and my students' learning.	I have designed plans for how I will integrate these strategies throughout my curriculum to enhance my teaching and my students' learning.
Total points	_____ of 75 possible points		

Learning the Issues and Applications

The first step in technology integration is to become acquainted with the issues and challenges discussed in this chapter and how they shape teachers' uses and applications of technologies. Then teachers can begin developing capabilities to address instructional standards and curriculum goals. The following is a suggested sequence of learning activities.

- **Issues and challenges in health and physical education.** After reviewing the information in this chapter, go to the SHAPE America website and the National Health Education Standards section of the CDC website. Review the standards at both sites. See professional development resources the sites offer, and decide on which can help you gain insight into the issues and challenges outlined in this chapter. Discuss and reflect on the two questions under the Collaborate, Discuss, Reflect feature at the end of the chapter. Complete Part I of the rubric in Figure 14.7 before you begin this sequence and again at various points in your progress.
- **Health and physical education technology integration strategies.** After reviewing the information in this chapter, review examples of the technologies suggested in the Open Source Options feature and the websites and projects described under each section, and do the lesson evaluation and lesson development activities outlined in the Technology Integration Workshop at the end of this chapter. Reflect on how you will plan for implementing these strategies in your own classroom using the TIP model. Complete Part I of the rubric in Figure 14.7 before you begin this sequence and again at various points in your progress.



TECHNOLOGY LEARNING CHECK

Complete **TLC 14.3** to review what you have learned from this section about how health and physical education teachers can develop their knowledge and skills in technology integration.

COLLABORATE, DISCUSS, REFLECT



Monkey Business/Fotolia

The following questions may be used either for in-class, small-group discussions or may be used to initiate discussions in blogs or online discussion boards:

1. In this chapter, you've read some of the ways technologies can help address what has often been referred to as the "childhood obesity crisis." Can you cite authority or evidence that these technology-based strategies will be sufficient to counter the contributions to obesity caused by the other technologies mentioned? What conditions will have to be in place for these positive strategies to make a difference?
2. Although physical education courses can be (and are being) taught online, what are the issues and problems you see associated with these kinds of courses? How would you recommend teachers address each of these issues and problems?

The following is a summary of the main points covered in this chapter.

- 1. Issues and Challenges in Physical Education and Health Education.** Each of these current issues has implications for how teachers can and should integrate technologies. These include instructional time and quality physical education programs, the link between physical inactivity and obesity, accuracy of Internet information on health and physical education, addressing physical education and health standards, and handling controversial health issues.
- 2. Technology Integration Strategies for Physical Education and Health Education.** Technology-enabled strategies in these areas include:
 - Supporting improved physical fitness (with physical activity monitoring devices, exercising with equipment and monitoring software, fitness plans and portfolios, exergaming, and exercise and sport opportunities for students with special needs).
 - Developing and improving motor skill performance (with monitoring performance, providing feedback on performance, self-assessment of student learning, and facilitating skill acquisition).
 - Assessing student learning in the context of teaching.
 - Supporting students' work in dance.
 - Shaping students' beliefs and interactions related to physical activity.
 - Helping students assess and enhance personal health.
 - Helping students obtain valid health information.
 - Influencing health behaviors.
 - Supporting interdisciplinary instruction.
 - Offering online health and physical education.
- 3. Teaching Health and Physical Education Teachers to Integrate Technology.** Teachers can begin by consulting the rubric provided in this chapter to measure their own growth in health and physical education technology integration. After that, they may review issues and challenges in health and physical education and use chapter resources to learn technology integration strategies they can use to address the issues and challenges.

TECHNOLOGY INTEGRATION WORKSHOP

1. APPLY WHAT YOU LEARNED

To apply the concepts and skills you've read about throughout this chapter, go to the [Chapter 14 Technology Application Activity](#).

2. TECHNOLOGY INTEGRATION LESSON PLANNING: PART 1—EVALUATING AND CREATING LESSON PLANS

Complete the following exercise using the sample lesson plans found on any lesson planning site that you find on the Internet.

- a. **Locate lesson ideas**—Identify three lesson plans that focus on any of the tools or strategies you learned about in this chapter. For example:

- Use of physical activity monitoring devices
 - Use of software and/or websites for fitness planning
 - Exergaming
 - Joint student projects using sites such as ePals
 - Videos to influence health behaviors
 - Videos as models for sports and dance skills and to demonstrate needs for improvement
 - Use of polling for immediate feedback on performances
- b. Evaluate the lessons—Use the **Technology Lesson Plan Evaluation Checklist** to evaluate each of the lessons you found.
- c. Create your own lesson—After you have reviewed and evaluated some sample lessons, create one of your own using a lesson plan format of your choice (or one your instructor gives you). Be sure the lesson focuses on one of the technologies or strategies discussed in this chapter.

3. TECHNOLOGY INTEGRATION LESSON PLANNING: PART 2—IMPLEMENTING THE TIP MODEL

Review how to implement the TIP model in your classroom by doing the following activities with the lesson you created in the Technology Integration Lesson Planning exercise above.

- a. Describe the Phase 1—Planning activities you would do to use this lesson in your classroom:
- What is the relative advantage of using the technology(ies) in this lesson?
 - Do you have resources and skills you need to carry it out?
- b. Describe the Phase 2—Implementation activities you would do to use this lesson in your classroom:
- What are the objectives of the lesson plan?
 - How will you assess your students' accomplishment of the objectives?
 - What integration strategies are used in this lesson plan?
 - How would you prepare the learning environment?
- c. Describe the Phase 3—Evaluation/Revision activities you would do to use this lesson in your classroom: What strategies and/or instruments would you use to evaluate the success of this lesson in your classroom in order to determine revision needs?
- d. Add lesson descriptors—Create descriptors for your new lesson (e.g., grade level, content and topic areas, technologies used, ISTE standards, 21st Century Learning standards).
- e. Save your new lesson—Save your lesson plan with all its descriptors and TIP model notes.

4. FOR YOUR TEACHING PORTFOLIO

Add the following to your Teaching Portfolio:

- Reflections on Hot Topic Debates.
- Summary notes from the Collaborate, Discuss, Reflect activity.
- Lesson plan evaluations, lesson plans, and products you created above.
- Your *Apply What You Learned* Product from Activity 1.