Heart monitors, pedometers, and now virtual reality-based equipment (e.g., Cyberbikes, Dance Dance Revolution) have been embraced by physical educators as technologies worth using in the physical education program; however, the use of computers (be it a desktop, notebook, or handheld) in the physical education instructional program, has not been as readily adopted by physical educators. Part of the explanation is that pedometers and heart monitors are easily included in a physical activity setting, whereas desktop and notebook computers are larger and therefore more difficult to include in the physical activity setting. Size may explain why handheld computers seem to be more popular with physical educators when compared to desktop/notebooks computers. Still, many physical educators do not see the necessity for including computers in physical education. I often hear physical educators ask questions such as these:

• How can I use a computer in physical education?
• What software is available?
• Where will I find the time to include the use of computers in physical education?

I think that the wrong questions are being asked when it comes to using computers in physical education programs. I think the questions that we should be asking are these:

• What are my students having a difficult time learning? Can computers help?
• Have each of my students met all of the physical education content standards? If not, then why not? Are there instructional materials/software that will help my students meet the physical education content standards?
• How are my students demonstrating their accomplishment of the content standards? Is there an easier way to monitor student assessment? Can computers help?

The purpose of this article is to provide answers to these last three categories of questions as they pertain to students in the fifth through eighth grade.

Meeting a Need

As I reflect on my own middle school teaching, I can think of several situations when I attempted different instructional strategies, and none of them proved effective until I introduced instructional software. Let me share three of these situations and the software that finally helped my students accomplish the requisite learning.

Situation 1

While teaching students how to keep score during a bowling unit in order to provide students with a better understanding of the importance of getting strikes and spares, many students struggled to grasp the concept. Although there were always students who rapidly caught onto the concept, there were also many who needed a constant reminder to add the pins knocked down on the next roll after a spare and to add the pins knocked down on the next two rolls after a strike. Unless I constantly monitored the students, they quickly forgot and returned to simply adding up the pins without regard for strikes and spares. After experiencing this for a number of years, I decided that this was an appropriate venue for the inclusion of instructional software. I created a software program, Bowling ScoreKeeping, that teaches (or re-teaches) bowling scorekeeping and then provides students with an opportunity to score an imaginary game with feedback for each computation. The constant and immediate feedback finally got the students to understand the concept of scoring.
In situation two, my practice was not unlike that experienced by many physical education teachers. I taught individual skills, sequenced skills, and talked about tactics before sending the students to play small-sided games, but as you will see from this next scenario “talking strategy” was not enough.

**Situation 2**

During a field sport unit (i.e., softball), I often found some of my students paying little attention to the defensive situation they faced. For example, a student threw the ball to home from the infield with a runner on first and no outs. Obviously these students needed additional learning opportunities to interpret defensive situations, decide where to throw the ball, get the necessary feedback on their decisions. Unfortunately, the sport of softball does not provide a high number of practice opportunities for each student in this scenario and staged situational practice is not often transferred to game play. I again wrote a program, Softball Basic Defense, in which I provided students with a wide variety of defensive scenarios and their task was to click on the base where the ball should be thrown. Students are then provided with immediate feedback regarding their choice. Again, the practice scenarios and immediate feedback assisted the students with understanding basic defense.

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**How to Use Computers in Physical Education**

**Method 1: Projection System Method**

Connect the computer to a projection system or to several 25-inch monitors. Use this method for class activities, with students taking turns reading the tutorial part of the software. During the question-and-answer phase of the program, call on individual students to answer questions, or, better yet, use a cooperative learning strategy called *numbered heads*—where students work in groups of four and collaborate within those groups to determine the correct answers to randomly asked questions. It is called numbered heads because each student is given a number from one to four, and the teacher calls out a number instead of a student’s name. Use this technique only when you want to cover a small piece of information with the entire class at the beginning of a lesson. It is not recommended for an entire class period. Some teachers have expressed apprehension about this format; however, once both teachers and students become acquainted with it, it is very effective.

**Method 2: Heterogeneous Learning Station Method**

Method 2 requires that you set up learning stations, including one computer station. A few management tips for student use of the computer will facilitate the process. Students, in cooperative learning groups of four students each, rotate from one station to the next. Each student is assigned a role—for example, navigator (controls the movement through the software), encourager (reinforces the contributions of the other individuals in the group), expander (elaborates on answers given by other members), and summarizer (brings closure to group learning). Method 2 is used most commonly in physical education because it allows for a high percentage of time on task and keeps students physically active during most of the lesson; however, the actual amount of time spent with the computer is rather limited, so students should be directed to either follow task cards, respond to a series of questions, or conduct specific research. This method also can be structured to provide additional computer opportunities for those students who have medical excuses.

**Method 3: Homogeneous Learning Station Method**

Method 3 is similar to Method 2 in that it uses one computer station. However, in this method, the groups that are not using the computer are preparing to do so. For example, students prepare their tumbling routines on paper, then use the computer to input their routines and view a visual representation. Students then can evaluate and refine their routines. Another example of this method is for a sport like orienteering in which students learn, in expert groups, various elements needed for orienteering. The computer program simulates an actual experience. Method 3 should be used only when students have time to prepare for what they will be doing on the computer.

**Method 4: Lab or Unlimited Access Method**

In Method 4, each student or pair of students have access to a computer (notebook, desktop, or handheld) with the appropriate software. There are three situations in which Method 4 is recommended. The first is when the objective of the lesson requires the use of the software for an expended period of time. The second is when students have computer lab time during the school day, separate from their other classes, and the lab teacher is open to using a variety of software (including physical education software) to teach students computer skills. Finally, the lab setting can be used when students create multimedia projects.
At the conclusion of a dance or gymnastics unit, like many teachers, I often asked students to create routines. The students were provided with numerous examples and demonstrations of appropriate combinations. However, I still had students who could not visualize the sequencing of skills. They often combined inappropriate skills into combinations until I introduced the use of computers as a visualizing tool.

### Situation 3

This final situation took place during a tumbling unit. Toward the end of the unit, I asked students to create a routine to demonstrate the skills they had mastered and to show their creativity at putting skills together. Although there were students who did an excellent job, there also were students who saw no problem with the

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### Software Aligned to Standards

#### Standard 1

Demonstrates competency in motor skills and movement patterns needed to perform a variety of physical activities.

**Volleyball Complete:** provides information on volleyball for the eight physical education subdisciplines. Includes a portfolio section where students can record their learning related to volleyball.

#### Standard 2

Demonstrates an understanding of movement concepts, principles, strategies, and tactics as they apply to the learning and performance of physical activities.

**SimAthlete:** instructs students on how to develop their own practice plan. **SimAthlete** provides a reference section to help students apply motor learning principles. It also has a simulation section where students can assume the role of a coach and develop a practice plan for an athlete. If they create an effective practice plan, their athlete performs well. If their plan is ineffective, their athlete performs poorly. Scores for the simulation are recorded so teachers can monitor student progress.

**BioMechanics Made Easy:** instructs students on analysis of movement. It provides a reference section to help students apply biomechanical principles (e.g., stability, projection, levers). In addition, there is a simulation section where students apply their knowledge in real-life situations and their performance is monitored and recorded.

**Elementary Physical Education Dictionary:** this A to Z dictionary addresses physical education terminology appropriate for grades two through six. It includes pronunciation, picture or animation, and description. It also contains quizzes to test students’ understanding of physical education vocabulary.

#### Standards 3 and 4

Participates regularly in physical activity. Achieves and maintains a health-enhancing level of physical fitness.

**Health-Related Fitness:** knowledge base covering frequency, intensity, time, and type (FITT) concepts. The program also allows students to create a personal fitness portfolio.

**Middle Muscle Flash:** a flash card program designed to teach students the names of muscles. It displays a graphic of a single muscle and asks students to identify it. They receive feedback on the accuracy of their responses. The application also asks the muscle’s location, function, and exercises for strengthening. In addition to self-testing, there are four quizzes that can be assigned, with the results recorded for the teacher.

**DINE Healthy:** exposes poor nutritional and fitness behaviors through an analysis of daily food intake and physical activity. Appropriate menus and exercises are recommended for a healthier lifestyle. The application serves as a student’s personal trainer for fitness and nutrition. It is especially effective for students who desire to reduce body fat, cholesterol level, and blood pressure.

#### Standard 5

Exhibits responsible personal and social behavior that respects self and others in physical activity settings.

**Inspire! Team Building and Group Development:** includes 20 activities for teaching effective group communication and team-building skills. The activities on this CD-ROM address critical thinking, leadership, collaboration, individual self esteem, competition, group dynamics, and team confidence. It includes 20 activities to help students learn team-building and group development. Using interactive multimedia, **Inspire!** shows the teacher how to set up, lead and process each activity. In addition to watching and hearing video, instructions for any activity can be read or printed.
following sequence: Forward roll—V-sit—Round-off. So, the question I asked myself was how do I get the students to visualize their sequences and to evaluate the aesthetic dimensions of their routines, not to mention the practicality and feasibility of executing the combinations (i.e., v-sit into a round-off). I had many ideas for software to address this issue, but before I could implement any of them, I found an interesting piece of software called Barbie Team Gymnastics. Students used this program to create floor exercise routines while receiving feedback from the software on their choices of combinations, along with the need for transitional moves. Finally, students were able to see their routines before attempting to perform them. This results in much higher quality routines.

Meeting Content Standards

These three situations are not just personal experiences; each actually aligns to a national content standard (NASPE, 2004). Scoring in bowling and defensive softball strategy align with Standard 2 (Demonstrates an understanding of movement concepts, principles, strategies, and tactics as they apply to the learning and performance of physical activities), while creating routines aligns with Standard 6 (Values physical activity for health, enjoyment, challenge, self-expression, and/or social interaction). Nor are these the only software programs that help students accomplish skills, understanding, and behaviors that they find challenging. Which skills/understandings/behaviors related to the standards do your students find challenging? Since I cannot know the challenges that your students face when it comes to addressing the standards, lets review a number of software programs that align with each of the standards.

Assessing Standards

So far in this article I have focused on the use of instructional software; however, I would be remiss if I failed to mention software programs designed for assessment. In fact, many of the software programs mentioned in the instructional section actually have assessment components in the form of quizzes (Biomechanics Made Easy, Elementary Physical Education Dictionary, and Muscle Flash), simulations (SimAthlete), or specialized portfolios (Volleyball Complete, Health Related Fitness). All of these have Save or Print features so that you can review scores and data for grading purposes. In addition, there is a generic portfolio (e.g., Physical Education Portfolio) designed specifically for physical education where students can store all of their assessments.

There also are handheld programs designed to replace a teacher’s record book. Ideally these work together providing physical education with additional time-saving assistance. Noting that there weren’t any of these systems on the market for physical education, Bonnie’s Fitware has taken its already popular Record Book for PPC/POS and Physical Education Electronic Portfolio and created a conduit between the two programs in their latest release. Record Book 7 for POS/PPC can import assessments from any one of the now three versions of the physical education electronic portfolio (elementary, middle school, high school), thus facilitating the grading of products in the portfolio and eliminating the duplication of work often associated with portfolios. Each of the portfolios is designed around the national standards, and pieces not used by a particular state, district, or school may be eliminated.

Summary

This article has shown how software can assist with physical education instruction and assessment. The integration of technology helps students attain a greater understanding of movement principles and concepts; however, to date the evidence is mostly anecdotal. It should be noted that by following the suggestions in this article, you will not only be addressing the NASPE physical education content standards, but also the NETS-S standards (see highlighted box above). This article only scratches the surface when it comes to reviewing software programs specific for physical education. For example, there are software programs, such as HyperStudio (for multimedia projects), Inspiration (for cognitive mapping), and web browsers for research and instruction that help with all curricular areas and promote interdisciplinary learning.

Additional Reading


References