TECHNOLOGY TIPS

Editor: Bonnie Mohnsen

Using Multimedia Programming to Teach Sport Skills

Robert N. McKethan
Edward T. Turner

When considering the term "multimedia," one may think only of commercial products from major software producers. This conception is only partially correct. In schools across America, a myriad of multimedia software applications are being produced by teachers and students in all grades. The purpose of this article is to illustrate the development and use of a multimedia instructional tool. Information presented in this article is also intended to encourage other professionals to augment their instructional processes with self-developed multimedia software presentations.

Multimedia software applications contain elements of technology already found in physical education textbooks, classrooms, and gymnasiums. These elements include the printed word, film strips, film loops, video and audio cassettes, as well as drawings, photographs, and transparencies.

Presentation programs and authoring programs are multimedia software programs that run on a computer. Both are collections of the aforementioned elements in a digital format. Unlike presentation programs, authoring programs allow for a higher level of user interactivity. Some elements that contribute to greater user interactivity include: (1) test-taking capabilities, (2) scoring capabilities, (3) submission of scores via e-mail, and (4) logging of data on program usage. Presentation programs are created using software such as Corel Presentations or Microsoft PowerPoint (known as a development environment), whereas authoring programs are created using programs such as Hyperstudio, Hypercard, SuperLink, and Director. Once the program is assembled, it may be run from within the development environment or packaged so that it runs independently of the development environment.

Using the MultiMedia Analysis of Sport Skills Program

At Appalachian State University, all elementary education majors take a course entitled, "How Children Move." This course is designed to help prepare classroom teachers to support the regular physical education program. Part of the course requires students to study and analyze fundamental and manipulative skills. Many of the students participating in this course have little or no athletic or sport background. Examination of these skills through class demonstrations, study of sequence pictures, observation, and text explanation can be exasperating and can result in sensory overload.
Consequently, the MultiMedia Analysis of Sport Skills (MASS) program was developed by McKethan and Everhart (1997) for the purpose of augmenting classroom instruction. This program was developed using the Asymetrix Toolbook II Assistant (Asymetrix Learning Systems, 1996) program in a PC environment. Toolbook II Assistant is a drag-and-drop authoring program. It allows developers to create multimedia programs that have greater user interactivity than those programs developed with more common multimedia presentation programs such as Corel Presentations and Microsoft PowerPoint.

MASS is used in the classroom to support instruction and outside of the classroom as a study tool for students. With a click of a button, students can see a skill in video and examine still pictures showing phases of the skill execution. The use of MASS in the classroom demonstrates its features so that students may effectively use the program independently of the instructor. The program was placed on a server for non-internet access by students in computer labs across the campus.

MASS uses text, videos, pictures, and graphics to illustrate manipulative skills addressed in physical education programs. This project was started with the intent to gradually add locomotor and non-locomotor skills, striking skills, and specific sport skills.

The program allows the user to view videos of mature and immature executions of manipulative skills. As the user examines a mature execution of a skill, he or she may also read a text description of that particular skill. Additionally, the user may view skill components in a traditional format (i.e., still picture frames), examine cues for providing feedback on the skill, view an immature execution of the skill, as well as take a quiz on the skill.

MASS was developed in a non-linear format; in other words, the user may move to any place in the program at any time. Buttons on the lower part of program windows allow the user to access any feature, as well as to navigate within the program or exit the program. During startup, the user encounters a title window, an introductory window (showing the program purpose, copyright, and program credits), and a table of contents window before accessing a skill window.

Skill Window

The skill window (figure 1) is the information center of MASS. This portion of the program contains videos, graphics, and text information. The text information provides an introductory description of the skill. When the window first appears, there is a blank video stage and a
Figure 4. Component Window

Components - Overhand Throw Delivery

The weight shifts from the back foot to the forward foot. As the arm movement begins, the elbow leads the movement followed by forearm extension, and a final snapping of the wrists.

Figure 5. Teaching Cues Window

Teaching Cues Overhand Throw

1. Stand with non-throwing side of the body facing the target
2. Step toward the target with the foot opposite the throwing hand
3. Rotate the foot as the throwing arm moves forward
4. Bend the arm at the elbow. The elbow should lead the forward movement of the arm.

Test Window

Figure 2 shows the test window for the overhand throw. In each test window, there are five true-or-false items related to the skill. The selection of the true-or-false test format was based on program design considerations (i.e., to keep all test items on one test screen and maintain readability). Test items are directly related to information found in the teaching cues window, components window, and the general description in the skill window. A unique feature of the tests in this program is immediate feedback to the students on their answer selection. Feedback for correct and incorrect responses is given in pop-up windows. The content of the feedback is determined by the program author at the time of development.

In many multimedia authoring programs, such as Asymetrix Toolbook II Assistant (Asymetrix Learning Systems, 1996), there are several testing formats from which to choose, such as multiple choice, matching, or essay layouts. If the program is on a computer that has internet access, the scores can be sent to a designated e-mail address. An instructor is also able to access a digital video requires massive amounts of storage space, only very short clips (2-3 seconds) were used.

The video stage provides a playback of a mature execution of the skill, or a repeated playback if so desired. The slider bar located on the bottom of the video stage allows the student to advance or reverse a skill sequence. Repeated playback allows the student to examine the entire sequence as many times as needed. It is also possible to terminate the playback at any time, as well as to pause the playback. The pause feature is particularly important in order to closely examine characteristics of phases in the skill execution.

The text box contains a description of the skill. In the development stage, information can be typed into the box or the information may be imported from a word processing file. In the development of the program, the author has the choice of not protecting the text or protecting it so that it cannot be changed by the program user. Unalterable text information protects the integrity of the program. The text box found in the skill window is a scroll box, which allows the user to view text information too large for the size of the box.

At the bottom of the skill window are buttons for teaching cues, a test, a video of an immature skill execution, skill components, and contents (table of contents). When these buttons are activated, the user is taken to another area of the program.

text box. Students demonstrating the skills illustrated in MASS were video taped (with secured parental permission) at a local elementary school. The video was "captured" into a digital format so that it could be imported into the program. To capture video, one must have a computer with a video capture board, video capture software, and a standard VCR. The VCR is interfaced with the video capture board, permitting the taped playback to be viewed on the computer screen as well as on a television. The video capture process was enabled by the use of the soft-
log of the student activities on the program to view (1) test scores, (2) how much time students spent on the program, or (3) when the student was using the program.

Immature Skill Video Pop-up
Another feature in this program is the ability of the student to examine a video of an immature execution of the skill. This video is in a pop-up format. It is accessed by clicking on the video button found at the bottom of the skill window (figure 3). This particular video was set to run in a looping fashion. In the program, it is possible to view the mature skill and immature skill executions at same time. This allows the student to make discriminations between the two skill executions. When the stop button is clicked, the pop-up video disappears from the window.

Component Window
The component window is accessed by clicking on the component button found at the bottom of the skill window. The student is taken to a window that lists the components of the skill, in this case, the overhand throw. Clicking on one of the skill component buttons takes the student to a window (figure 4) showing a picture of the delivery skill component of an overhand throw and a text box describing the component.

The component window provides the student with specific visual information about the skill component, as well as a written description of the skill. Armed with this information, the student can switch back to the video to identify this skill component within the context of the entire skill. With information about the specific skill components, the student may also view the video of the immature skill execution to identify poorly executed skill components. The text box found in this window has no scrolling capabilities. Like information in the boxes with scroll bars, it may not be altered.

Teaching Cues Window
The final window accessed from the skill window buttons are teaching cues (figure 5) related to the skill. This window presents specific feedback and/or cue information that can be given to a student. Teaching cues are based on the skill component descriptions and the overall description of the skill.

Using Multimedia in Physical Education
In classrooms, there are many different learning styles represented among students. Some students are more visually oriented, others prefer auditory-based instruction, while others are more "hands-on" oriented. Teachers who are sensitive to the needs of students, whether in the public schools or in higher education, should attempt to diversify their modes of instruction. Multimedia programming is a good instructional choice, since it is another tool for the teacher and is a relatively new instructional strategy. In a sense, it is a repackaging of the traditional elements of instruction found in physical education.

Consider the fact that public school students of all grade levels are developing sophisticated and meaningful multimedia programs as extensions of their learning experiences. Therefore, multimedia development is within the grasp of every educator who has access to a computer and desires to expand his or her repertoire of instructional strategies.

References
—Robert N. McKethan is an assistant professor and Edward T. Turner is a professor at Appalachian State University, Boone, NC 28607.