Using Technology In Coaching Gymnastics - An Introduction

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The world has seen an explosion of technology in recent years that has invaded nearly every aspect of our lives. In 1984 approximately 6% of American households owned a personal computer; by 1999 the number was 60.3% (Communications Industry report). An estimated 60% of all jobs currently require skills with technology (The current generation of children is clearly more computer literate than any previous generation. In fact, nearly 2/3 of American children are growing up in households with computers (Census report 2001).

The world of sport has not been isolated from this technology explosion. It is now possible, even commonplace, to perform basic analyses of sport motion on a laptop on the field or in the gym. Remote coaching via the Internet is even emerging. The world of technology has created possibilities for technical training that have not been available to coaches until recently. The purpose of this series of articles is to introduce computer coaching technologies and provide step-by-step instructions on utilizing these technologies. The focus of the current article is an introduction to these technologies and how they can assist coaches.

How can I use computerized video technology in coaching my athletes?

For most of the history of modern gymnastics, motion picture analysis of performance has not been commonplace. While a few coaches utilized Super-8 mm movies in the 60-70's, the development of the home camcorder significantly increased the availability and use of movement analysis in gymnastics in the 80's. Today, it is uncommon to find a gymnastics coach who has not used a camcorder to record a gymnast's performance. Modern gymnastics coaches regularly play back and analyze performances as an aid to correcting errors. Now it is a new millennium. The availability and ease of recording performances have made advanced analyses of movement more accessible than ever before. Several specific applications of computerized video technology will now be discussed.

1. Comparison of lower level performance with higher level performance

Very often a gymnast does not understand the error he/she is making. Having a video clip of a desired performance for comparison and analysis can greatly enhance his/her understanding of the error. Moreover, once viewed on video, the gymnast often simply "knows" how to make a correction. In some software programs, the computer screen can be divided into two or more views, so that different performances can be viewed simultaneously and even synchronized. Then, simple drawing tools allow the coach to edit the videos to show angles or positions more clearly to the athlete. For example, perhaps your gymnast is not completing the extension on the bottom of a giant swing. You could record your gymnast's performance and place it on a screen alongside an excellent version of this skill that you have previously recorded from another athlete's performance. These two skills can be played frame-by-frame simultaneously so that the gymnast receives a clear idea of precisely where the error is occurring, and how the skill should be performed. You could use a drawing tool such as an angle or line to emphasize the technical correction you would like him/her to make (see figure below).

2. Effect of technical correction on performance
How many times do you find yourself making the same correction to the same athlete on the same skill, over and over again? Does he/she not understand what you mean by “turn later?” Sometimes you might give a visual or kinesthetic cue for the athlete to focus on for timing a correction during skill performance. Now, with the use of computerized video analysis, when a gymnast makes a significant change in performance, either positive or negative, the performance can be reviewed with the gymnast and the outcome of the correction readily observed and understood by the athlete. Not only did he/she feel the change in the skill, but now he/she has a visual image of what effect the correction made on the actual performance. For example, perhaps your gymnast repeatedly throws his/her head backward during the tumbling take-off. If you collect an image of the poor performance and an image of a better performance (i.e., with the correction), you can then simultaneously display these two versions of the performance and demonstrate the significance of the correction on the outcome of the skill.

3. Visual demonstration of desired techniques or positions

Often a gymnast does not have a mental picture of the completed skill you are asking him/her to perform. Perhaps your program has not had an athlete perform this skill before, or it is simply a skill the gymnast has never seen. Video clips of skills can be easily archived (stored in a computerized library of sorts) and displayed when a video representation of a new skill is needed. In the past, this was very clumsy and time consuming with video tape because the correct video tape had to be selected (among probably hundreds stacked in your office or gym), and then the correct section of the video found either by manually searching or using a number from the video recorder display window.

4. Recording of information onto CD or video for gymnast's repeat viewing

It is possible with these new technologies to create “perfect” performances of routines, parts, or skills that can be recorded onto CD or standard videotape and sent home for the gymnast to use in visualizing his/her performance. For example, small sections of routines can be performed and then merged together to create an ideal performance for each particular gymnast. The gymnast will be able to watch his/her own performance frequently and will be better able to create a mental picture of his/her own performance to be used in practice and competition preparation.
5. Upload video clips onto the Internet for expert analysis

Perhaps the most exciting use of computerized video technology is in the coach’s ability to upload (send) a video file of a performance of one of his/her gymnasts to the Internet so that it can be viewed by others for feedback or analysis. Perhaps you are having difficulty in getting your gymnast to regrasp the bar on a Geinger. No matter what correction you provide the athlete, he/she has not been successful. You can now videotape this performance and send it instantly to a specific location on the Internet to be viewed by a specific expert coach located somewhere else in the country, or the world for that matter. This expert coach can then make notations or drawings on the video and send a text message to you as to how to correct the error. This can all be performed in a matter of a few minutes. No waiting in lines at the post office to send a video tape, then waiting for the other coach to receive, view, and write a letter or call you back regarding the performance. This “remote coaching” model is an exciting development that will potentially greatly enhance our abilities to communicate expertise across vast distances without the expense and time of travel.

6. Documentation of improvements

Often through the drudgery of training, athletes lose interest or focus in refining basic skills because the improvements are so minuscule and progressive that they are not obvious. By cataloging performances over time, the gymnast can periodically be shown that indeed his/her performances are improving even if the changes are not dramatic and immediately apparent.

7. College recruiting tool

Videotaped performances can now be sent via email to college coaches for recruiting.

While many of these uses may seem time consuming, with just a little practice and a simple set-up they become very efficient. A common use of computerized video in other sports involves taping and recording private lessons. As part of the private lesson, why not include a CD with the gymnast's improvements clearly visible? A fee could be charged to the parents desiring a personal CD of the session, making income for your program.

Hopefully, this simple introduction has opened your imagination to the possibilities of computerized video technology as an important aspect of coaching modern gymnastics. The next article will cover the "nuts and bolts" of hardware and software requirements for utilizing these technologies. In addition to listing various hardware and software options, step-by-step instructions for creating a typical setup will be provided.