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**The role of technology in coaching: Enhancing the practice through education, drills
databases, and practice planning**

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Abstract

Every coach faces the daunting task of creating challenging lesson plans for their team every time they enter the venue. Computers have proven effective in the role of computer-assisted instruction, but there is little evidence to substantiate their effectiveness when used as a tool for coaches. Researchers and coaches at the University of Calgary, Sport Technology Research Centre have developed a model for interactive coaching which includes an education component on planning a practice, a drills database using actual videos of the drills, and a practice planner linked to the drills. An interactive CD-ROM on volleyball was developed using this model. The program includes over 400 full video drills, 250 educational practice notes, the ability to modify the drills, a glossary with 130 volleyball related terms, and a customizable practice planning tool. In order to assess the effectiveness of the program, 24 volleyball coaches at various competition levels were selected to attend a two-hour workshop to learn how to use the program. Following the workshop, the coaches were asked to use the program in planning their daily practices. Pre- and post-workshop testing, consisted of questionnaires which evaluated coaches' attitudes towards using computers in their planning, and the suitability of using technology-based tools in their coaching. This paper discusses the potential of technology tools in coaching, the general coaching/technology model, and the Interactive Volleyball CD-ROM as a practical example of the theoretical model. A preliminary analysis of the coaches' attitudes toward the technology is included.

Introduction

The use of technology to enhance coaching and performance has been recognized as an important and effective undertaking (Katz, 2001). However, many of the available tools are not oriented toward the coaches who will be using the technology. Focusing on the users needs and tasks is not a new idea. "Know the user" was the first principle in Hansen's (1971) list of design engineering principles (reported in Shneiderman, 1987). Developments that focused mainly on the technology or the machine itself, rather than on the needs and the tasks of the end-users have been criticized by many researchers (e.g., Norman, 1993). In Norman's (1993) words: "We need to reverse the machine-centered point of view and turn it into a person-centered point of view. Technology should serve us" (Preface; p. XI). Norman (1998) also pointed out that an inappropriate 'machine-centered' approach might result in frustration and inefficiency for the end-users. Fischer (1998) agrees, and points out that the adoption of a machine-centered approach is responsible for the perception that computers are 'unfriendly', 'uncooperative', and time consuming.

Moreover, coaches must prepare themselves in order to be successful in an ever more complex and constantly changing world. In order to keep up with the changes, it is necessary for coaches to review and update their knowledge and skills more frequently than in the past. Technology can play a role in providing coaches with quality information in a timely fashion. This information should be easily accessible and provide the user

with the opportunity to store, retrieve and utilize the data when required. However, in order for most coaches to consider using a particular technology tool it must be relevant, easy to use, time saving, visually appealing, and cost effective. Additionally, the potential user's experience and the perceived characteristics of the innovation will influence the individual's decision on whether or not to adopt a technology (Norman, 1998).

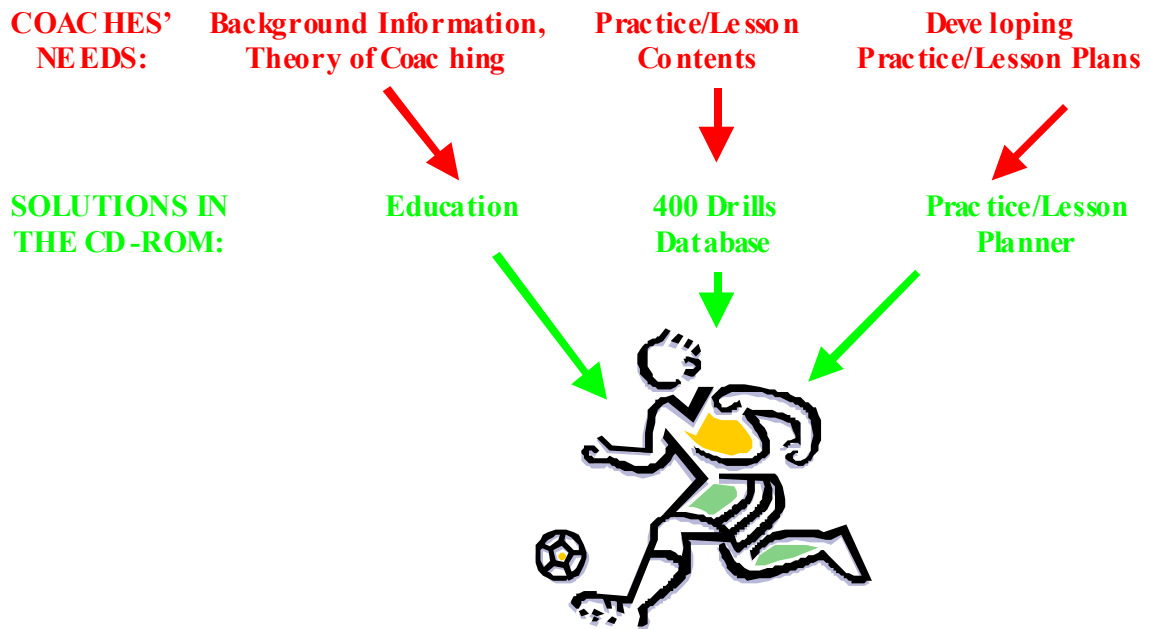
Coaching and Technology

According to the Australian Coaching Council (available on-line) the main goal of the sports coach is to "assist athletes in developing to their full potential". The primary task of the coach is to design and direct relevant practices. The major part of the practice should be devoted to the drills that are used to teach and practice different aspects of the game. Additionally, coaches are in need of background information in coaching-related topics (e.g., components of the practice, principles of drill selection, key-coaching points).

The underlying assumption is that coaches and physical education teachers are in need of electronic tools that are aimed at helping them carry out their job. In this paper, such tools will be referred to as Electronic Performance Support Systems (EPSS) (Raz-Liebermann, 2000). An EPSS can provide integrated, on-demand access to information, advice, learning experience, and tools to enable a high-level performance in a specific job with minimum support from other people (Gery, 1991). According to Des Jardins and Davis (1996), a performance support system includes typically, one or more of the

following components: expert knowledge (advice and coaching), searchable references and data granular training (cue cards and explanations), and /or automated tools (calculation tools, spreadsheets, templates, or job aids such as tax charts). As such, an EPSS may fulfill the needs for quality information and for external storage, in addition to allowing the development of information literacy skills. Bearing this in mind, the following figure (Figure 1) is the result of the discussions that took place in the needs-assessment stage of the Interactive Volleyball CD-ROM. It should be noted that the proposed model is a generic one, which may serve as a prototype for any sport, such as soccer or basketball.

Figure 1: A generic model for the needs and solutions of coaches and teachers of sports.



The purpose of this research project is to explore the impact on coaches of an Electronic Performance Support System tool that follows the coaches needs model identified above.

The Interactive CD-ROM on Volleyball was the first program designed according to that format, so it will be used as part of the assessment.

Method

Subjects

Twenty-four volleyball coaches and physical education teachers volunteered to participate in the study. In the preliminary analysis, coaches and physical education teachers were not differentiated. Therefore, for the purposes of this article, the volunteers will be referred to as coaches.

Procedure

After signing a consent form, coaches were asked to fill in a series of questionnaires related to their attitudes and experience toward using computers. They then participated in a two-hour workshop, which was designed to show them how to use the Interactive Volleyball CD-ROM. At the completion of the workshop, coaches were asked to fill in a second set of questionnaires which addressed their attitude toward the usefulness of the software and whether or not they would consider using the software in the next volleyball season. Coaches who completed the workshop were given a free copy of the CD-ROM.

Tools

Interactive Volleyball CD-ROM

The Interactive Volleyball CD-ROM (Katz, Kilb, & Raz-Liebermann 2001), and its accompanying manual (Kilb & Morey-Sorrentino, 2001) were developed over a 10-year

period as part of a research project undertaken by the Sport Technology Research Centre (STRC), Faculty of Kinesiology, at the University of Calgary. The initial content for the Interactive Volleyball CD-ROM came from the book, "400 Volleyball Drills and Ideas" (Bratton & Kilb, 1990). The researchers initially developed an interactive laserdisc program that displayed full motion versions of, and instantaneous database access to, all 400 volleyball drills (Katz, 1992; Soucie & Katz, 1992). Subsequent to the development of the initial laserdisc project, Raz-Liebermann began working with Katz and Kilb on developing a theoretical model for the effective use of educational technology with coaches. As part of the project, a multimedia version of the Interactive Volleyball was created based on the theoretical model described above (Figure 1). The program includes an education section, a multiple access database of 400 drills, and a coaching/teaching practice/lesson planner. A brief description of the program follows.

The **education section** is designed to provide 250 comments on designing proficient practice/lesson plans. These comments are divided into fourteen major educational topics that will enable coaches to learn how to plan, run, and evaluate practices and lessons more efficiently. Each section is introduced with a short descriptive video presentation and is accompanied by textual information that includes highlighted words that are linked to the glossary with their definitions. Information on the screen can be printed if desired.

The education section answers the following types of questions:

- What are the steps in planning a volleyball practice or lesson?
- What are the components of a well-planned practice or lesson?
- What are the various categories of drills?

- What are the principles related to selecting appropriate drills?
- How do blocked and random practices differ?
- Why is it important to evaluate both the practice plan and the practice management?

The textual information in the Education Section is highlighted with hyperlinks which are linked to 135 defined terms. Additionally, the terms can be accessed by selecting the glossary icon.

The **drills database** contains over 400 volleyball drills. Coaches can search the database by ability level, skill, degree of complexity, stage of development, or drill type. In some categories, there are sub-categories such as the underhand serve within the serve category. After selecting the categories, the list of drills can be sorted numerically or alphabetically. Thereafter, each drill can be selected to view its specific information which includes, in addition to the text, a diagram and a full-motion video clip. If appropriate, selected drills can be added to the lesson/practice plan.

Although the CD-ROM contains over 400 drills, it is possible for coaches to design their own drills. Coaches can design a totally new drill, or use an existing drill as a starting point to design a different version of the drill.

The practice/lesson planners have been created so that coaches and teachers can quickly plan their practices and lessons incorporating the drills contained in the database. The planner is connected to the drills database, so each drill that was selected previously can

be stored in the specific plan. Coaches can print any number of the following elements of the drill: duration, objective, description, equipment, space for key points, space for evaluation, diagram. The planner includes the option of entering additional information to the planner such as the goals of the lesson/practice, drills to use in the warm-up session, or administrative remarks. The practice plan and drills can also be viewed on a monitor or projected onto the wall of the gymnasium to help demonstrate the drill.

Questionnaires

The pre-workshop questionnaire included sections on demographic information, computer experience, attitude toward computers, and the role of technology in coaching. The post-workshop questionnaire included sections on the perceived characteristics of the Interactive Volleyball CD-ROM, computer attitude, and intention to use the Interactive CD-ROM for coaching or teaching.

Results

The data is currently being analyzed but preliminary results are as follows. There were 24 coaches, 11 females and 13 males. Coaches ranged in age from 23 to 51 with an average age of 36.1 and a standard deviation of xxx. All the coaches had a minimum of a bachelors degree, and 23 out of 24 were school teachers. All of the coaches either agreed or strongly agreed with the statement that "there is a role for technology in coaching" (mean= 4.3, S.D.=xxx).

Conclusion

An attempt was made in this paper to present a model for developing an Electronic Performance Support System in the field of coaching and teaching physical education. According to the model, the process should start by recognizing the different needs of the potential users. The following stage should include developing a model, which includes the needs and possible technological solutions for those needs. The authors attempted to apply this model throughout the development of an Interactive Volleyball CD-ROM (Katz, Kilb, & Raz-Liebermann, 2001). To test the model, a study was designed which included a 2-hour workshop for potential users, (i.e., volleyball coaches and physical education teachers). Preliminary analysis indicated that all the coaches expressed enthusiasm toward the program and expressed a desire to try and use the program for their practices. The next phase of the research is to followup with the coaches to determine if they actually used the program with their players/students, and to evaluate the effectiveness of this new tool in relation to the model.

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