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EMERGING TRENDS OF INFORMATION TECHNOLOGY IN SPORTS

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***Abstract*— This paper overviews the role of the sports coach is hugely varied, but it mainly involves: Teaching rules, techniques and tactics to beginners. Providing an objective view to help teams and individuals enhance performance. Helping those involved in top level sport deal with enormous pressures faced in a highly competitive environment. Through expert tutoring, constructive criticism, motivation and on-hand support, sports coaches can help individuals focus their minds, hone their bodies and learn their disciplines inside-out to ensure they have the best possible chance of succeeding. Diverse information technologies that are used to provide athletes with relevant feedback. Examples taken from various sports are used to illustrate selected applications of technology-based feedback. Several feedback systems are discussed, including vision, audition and proprioception. Each technology described here is based on the assumption that feedback would eventually enhance skill acquisition and sport performance and, as such, its usefulness to athletes and coaches in training is critically evaluated.**

Index Terms— information technology, skill acquisition, sport, training.

I. INTRODUCTION

It is well documented that when feedback is provided in an appropriate manner, motor skill acquisition improves significantly. Consequently, feedback is a major factor in the improvement of sport skill performance. Recently, advances in information technology have made it possible to augment and improve the feedback athletes receive during training and competition. Moreover, modern technology has had such a profound impact on sport that many athletes and coaches now consider information derived from technological advances to be invaluable that originated in mechanical control theory. In accordance with such engineering models, close loop systems were designed to keep homeostasis or equilibrium around a reference value, which, in turn, would allow the work of a main actuator (Shannon and Weaver, 1949). Deviations from the steady state reference were coded as error, which would then drive the system to compensate or correct. That is, in movement science, feedback information about movement was generally expected to allow systematic corrections in the performance. However, feedback will be relevant to the human learner if, and only if, the individual knows the performance goal and perceives the need to carry out corrections relative to some expected outcome. Under such assumptions, a coach should strive to provide an environment that is conducive to optimum learning by augmenting the feedback that athletes receive.

II. VIDEO TRAINING

In normal conditions during training, athletes are active in correcting errors. However, on some occasions, coaches use alternative aids to provide extrinsic (external) visual feedback, for example videotaped replays of the performance. In this context, video technology has significantly influenced training methods. Although video technology originated in the 1950s, its use in coaching is an innovation less than two decades old. Its attractions for use in training are its relatively low cost, accessibility and portability. It is affordable for mottled workers and, perhaps, already the most popular technology used in sport. However, using this medium requires performers to adopt a passive attitude. Individuals watching their performances cannot always control the feedback information received during a video presentation. In a simulated three dimensional virtual environment, the coach may regulate important factors that influence perception, such as speed, orientation and directional changes, simply by operating a joystick or a keyboard. Thus, skill may result as a byproduct of training in controlled simulated This system incorporated an optimization of java for that thrower with the same release speed, and then fed back information on optimal release angle, angle of attack and pitch rate compared with values for the actual throw. As with much technologically driven information on the provision of immediate feedback, no attention was paid to whether the immediate feedback of such information could improve performance. In this case, we expect, from over a decade's experience, that athletes need information on how to change their techniques to aspect changes in release angles and that this information is best provided with non-immediacy. Automatic tracking systems have not yet been widely used in athlete feedback, probably because of their high cost, their use frequently being limited to

indoors and not providing a video image, although this can be done with separate and synchronized video cameras.

However, because of the increasing frame rates of these systems real-time display not only but also of joint kinematics and even of solid body models through packages such as Training in three-dimensional virtual environments

Allows also stereovision and, thus, the environment may be seen in three dimensions. The same technology allows athletes to train and compete online even at remote distances. Web racing is a promising innovation that has been introduced, for example, in diverse sports like bicycle riding, wheelchair racing and rowing The potential for such technologies is great, certainly for as with any other, such as plyometric training. This feedback is delayed until the task is complete and, therefore, cannot always be associated with the internal sensory information at the time of motor execution. Moreover, the information available may often exceed the athlete's processing ability; thus, additional guidance may be required, particularly with inexperienced or young athlet The information conveyed in temporal structures or rhythms may sometimes override the use of spatial information. That is, while people are trained to perform a skill, the duration of the movement is perceived and learned better than some spatial aspects, even if the person pays attention to the latter only For example, they clap their hands tempo encapsulating the rhythm of the action that best suits the spatial configuration of the skill. The performer listens and translates this into motor action.

III. TEMPORAL FEEDBACK IN SKILL TRAINING

The AMISCO system provides a detailed analysis of each player's work rate, an interactive representation of all actions recorded during a match and a graphical reconstruction of all individual actions. More importantly, it can provide a digital replay of all the players and ball and synchronize this with a video replay from any one of the video positions. Therefore, it enables the researcher to describe not only the actions `around the ball', but also the complete context in which the individual action was produced. Such complete analyses will enable sport scientists to investigate valid descriptions of game performance such as that described.

However, further research is still needed to test the reliability and utility. Comprehensive systems generally, four sensors are used to measure forces on the vertical direction only or eight for measuring forces along all three orthogonal axes. Their purpose is to translate deformations caused by loading the upper plate into electrical signals that are amplified and calibrated to known external forces. If the distribution of force is equal across all points of the plate or for all sensors, the centre of pressure will be in the middle of the geometrical system. More importantly, if the centre of pressure is not moving, regardless of the position on the plate, the system rests in a stable balanced state. . Low-frequency sound or silence means that a relatively stable position is being achieved. Increasing higher-frequency sound means deviation from the stable position.

The use of eye movement technology in trainingDuring aiming tasks, such as archery and shooting, three steps must be performed correctly. First, a stable standing posture should be achieved where the athlete learns how to stabilize A second stage follows, during which the shooting device is to be maintained on the target for as long as needed. During this second stage, the training protocol should concentrate on visually stabilizing the gun or bow. Laser beams may serve this purpose. Also, as previously explained, these devices allow the athlete to point towards the centre of a visual target situated over a laser sensitive grid connected to a computer.

Any deviation from the centre of the grid the maximal score is accompanied by auditory tones of diff erent frequencies It is at this third and last stage that training gaze may be important in aiming before actual triggering (shooting or releasing)A popular line of recent research is based on eye movement recording technology that determines where the athlete's gaze is focused. The underlying assumption of such research is that the fovea of the eye a high resolution area that is densely innervated is specialized for the eyes has been Recognition of image contours, edges, junctions, colours and other features this information is further processed in the brain and, consequently, the person sees, interprets and perceives. However, humans cannot see all images and, more importantly, cannot and do not need to look simultaneously at all images. Thus, a cognitive process allows scanning with the eyes of those aspects and features of objects in the environment that are more relevant to achieve a task goal.

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