ESAN

Expertise and Skill Acquisition Network

Preconference Workshop: Abstracts

Developing perceptual cognitive expertise: considerations for the role for Virtual Immersive technology

Tuesday 11th May, 2021

Introduction: **Sam Vine (Exeter University, UK)**

Matt Dicks (University of Portsmouth, UK)

Elite athletes who compete in dynamic sports are required to adapt their movements relative to information from the surrounding environment, including the positions of teammates and opponents. An established body of literature exists, which indicates that expertise in such dynamic sports is underpinned by domain specific perceptual-motor skills. Specifically, anticipation and decision making skills have been shown to differentiate elite and sub-elite athletes. Moreover, the increased accuracy in anticipation and decision making in elite players has been shown to be underpinned by differences in the timing and locations of gaze patterns compared to sub-elite players. Contemporary approaches to anticipation and decision making have begun to adopt new methods in the study of expertise, including, for instance, the use of virtual reality technologies (VR) as well as qualitative methods.

Virtual reality (VR) technologies are becoming increasingly accessible options for both coaches and researchers due to the availability of higher fidelity and lower cost commercial devices. As a result, VR is becoming increasingly common in both research labs and applied training settings. Head-mounted VR offers a number of practical advantages for training, as well as the potential to augment training with automated feedback and measurement methods. For research, VR enables extensive environmental control and the opportunity to manipulate sensory information in ways that would not otherwise be possible, opening up new research routes. However, the uptake of VR within coaching likely outstrips the evidence base for its effectiveness, and there are legitimate concerns about whether VR is a sufficiently representative way to train many sporting skills. Similarly, the unusual perceptual effects in VR (e.g., impoverished haptics) also pose challenges for research purposes.

This preconference workshop will present recent work which has used VR for research, training and coaching, exploring both the possibilities and pitfalls of VR. Subsequently, this symposium will present work on three novel approaches to the study and training of anticipation and decision making in football. A key message that will be emphasised across all presentations is the theoretical implication of these perspectives, alongside potential implications for applied practice.

Presentation 1: **Stroboscopic training in VR**

Dave Mann (Vrije University, The Netherlands)

Stroboscopic training in VR - claims have been made about the effectiveness of stroboscopic training to improve predictive behaviour in tasks such as when hitting a tennis ball or stopping a football penalty. The analysis of gaze provides one way to understand the nature of predictive gaze behaviour, however it is typically not possible to track gaze while wearing stroboscopic glasses. In this presentation I will talk about how we used VR to simulate stroboscopic vision in a tennis hitting task while tracking eye movements. The results show that participants at first are less predictive rather than more when experiencing stroboscopic vision.

Presentation 2: **Training perceptual-cognitive skills in VR**

David Harris (Exeter University, UK)

Training perceptual-cognitive skills in VR – The immersive nature of VR and the potential to present more realistic visual information means that it may facilitate better training of perceptual-cognitive skills. I will present a recent study that tested the feasibility of training visual search skills in VR for applications to Police room searches.

Presentation 3: **Implementing a Constraints Led Approach (CLA) to Coaching in VR**

Rob Gray (University of Arizona, USA)

Implementing a Constraints Led Approach (CLA) to Coaching in VR - Virtual reality (VR) presents a unique opportunity to implement a CLA approach to skill training by manipulating constraints that are impractical (or even impossible) to change in real-world practice. In this presentation, I will consider some examples of this VR-CLA approach in baseball training.

Presentation 4: **Exploring the Quiet eye using VR**

Sam Vine (Exeter University, UK)

Exploring the Quiet eye using VR – I will describe and discuss a recent experiment in which the characteristics of the Quiet Eye (QE), location and duration, were experimentally tested using a VR golf putting task. Implications for QE research, and implications for the use of VR in the lab will be discussed.

Presentation 5: **Applications of VR to study anticipation and decision making in sport: Part 1**

Cathy Craig (Ulster University, UK)

Applications of VR to study anticipation and decision making in sport, including examples of how VR can be used to measure expertise and train developing players

Presentation 6: **Applications of VR to study anticipation and decision making in sport: Part 2**

James Stafford (Queens University Belfast, UK)

Presentation 7: **Athlete abilities impact upon the accuracy timing of actions during visual anticipation**

Matt, Dicks (University of Portsmouth, UK)

Consideration of how athlete abilities directly impact upon the accuracy timing of actions during visual anticipation

Presentation 8: **Using qualitative methods to understand decision making in professional football players**

Harry Ramsey (University of Portsmouth, UK)

Using a qualitative method, develop an insight and generate key themes relating to professional football players' decision making in order to understand the ways in which they gain an advantage over their opponents as a facet of skilled performance