



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).

VR is becoming an increasingly accessible option 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. 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: How Virtual Reality technology can help us understand perception/action coupling

Cathy Craig (Ulster University, UK)

This talk will look at how Virtual Reality technology can be used to understand perception/action coupling. The first part will look at how perceptual information picked up through our senses as we interact with our surrounding environment provides context for the action-based decisions we make. The second part will explore how our ability to tune into this perceptual information differs between individuals and subsequently influences our decisions about which course of action to take. Examples highlighting these differences will be drawn from sport (deceptive movement in rugby) and health (gait in people with Parkinson's).

Presentation 6: Implementing Virtual Reality Technology into Sport – Challenges and Opportunities

James Stafford (Queens University Belfast, UK)

While the theoretical implications of virtual reality have been extensively debated in academic literature, the actual adoption of immersive technology in sporting environments (both at the top and grass roots level) has been scarce. As a result, greater emphasis should be placed on how to present VR to sports organisations with the aim of improving understanding of the technology's benefits and limitations. In this presentation, I will present how INCISIV is currently marketing their various VR products (CleanSheet, VR-HIT, & MOVIR) in sport to allow athletes to move better and perform better.

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

Matt Dicks (University of Portsmouth, UK)

This presentation will describe and consider the findings from an experiment that examined expertise differences in how athlete's scale the timing of their actions during visual anticipation. Implications will be considered for the design of visual anticipation training interventions and VR applications.

Presentation 8: Decision-making in professional football players: perspectives from interviews with professional coaches

Harry Ramsey (University of Portsmouth, UK)

Despite wide interest and research into the development of decision-making, coach perspectives on this topic are largely absent from the literature. The present study interviewed professional coaches to understand their perspectives, with considerations regarding: (i) the importance of decision-making skill; (ii) the key factors that influence decision-making; and (iii) methods for improving player decision-making. Key findings will be discussed alongside considerations for theory and training, including VR applications.