

How the use of video technology is helping British athletes strike gold

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Diving

KEEPING A CLOSE EYE ON TECHNIQUE: Sensors trip a video camera to capture the moment a diver's hands break the surface of the water, providing a coach with instant feedback.

The technological revolution is shaping the face of modern-day sports coaching. Here are some examples of how video footage is providing coaches with valuable information that is helping them enhance their athletes' performance.

- **Sheffield Hallam University's Centre for Sports Engineering Research creates bespoke innovations in the area of video content to help governing bodies drive performance gain.**
- **Video footage should be immediate and capable of being stored, analysed and distributed.**
- **The information and data provided allows a coach to modify an athlete's behaviour or technique, which in turn leads to improved performance.**
- **Example: Slow-motion video clips in tennis that capture spin rate to inform opinion over optimum string tensions for players.**

Performance development through technology is a rapidly expanding market.

It is a favourite topic for sport bloggers, and articles are becoming as impossible to evade as Kim Kardashian pictures on the Daily Mail website.

The future has arrived, and you'd better embrace the changing times as tapping into tech and keeping up with the trends is not something you will be able to abstain from.

Marrying technological advances with your coaching practice can take myriad forms but in this article we shine the spotlight specifically on video technology and explore the imaginative methods being used by Sheffield Hallam University to enhance performance levels.

It is a drop in the ocean of what is possible but illustrates how the use of video content can have a direct bearing on medal chances at an elite level.

Set in motion

Dr David James is the Principal Research Fellow at Sheffield Hallam and Acting Director of the Centre for Sports Engineering Research.

His team at Sheffield Hallam creates bespoke innovations for a variety of sports by using a three-pronged approach: define (what is it you want to know?); develop (a way to measure it); and deliver.

The innovations provide qualitative information (easily observable results) and quantitative information (numerical data) that can be dissected by the coach. In some techniques, they fuse the two.

The programme is medals-driven, and they will only take on a project if they think it can improve the chances of success in the competitive arena.

‘Sports want straightforward, simple solutions that work well for their needs,’ says David.

‘Good video is really important. We can store it, retrieve it, analyse it and feed it back to coaches and athletes, and hopefully, that will allow an intervention that will change behaviour that will lead to improved performance. It has got to be immediate, visual and capable of being distributed.’

Simple but effective

Let’s kick off with gymnastics and aquatics.

‘We devised a simple video record and capture system. The video is triggered automatically by using image processing when an athlete comes into the field of view, tripping the sensors,’ says David.

He uses the example of the vault, with the gymnast’s take-off, aerial somersaults and landing filmed. The clip can be played back instantly to enable the coach to see the replay on a screen. The video is then filed in a database, where you can tag it so it can be easily found in browses or searches.

This equipment can also be used to provide immediate feedback for diving coaches, with the video being tripped the moment a diver springs on the board or via an underwater camera that records from the split second the diver’s hands break the surface of the water.

David explains: ‘In swimming, cameras can look at the efficiency of starts or turns, or count the strokes or stroke rates of swimmers. The training measurements form a database. This analysis system is then used to pick out key performance indicators (KPIs).’

Having unearthed their swimmers’ KPIs – gold dust to the elite sports coach – they can then use the information to inform strategy and help their swimmers make better decisions.

Boxing clever

David – who says his team is committed to taking measurements in the field simply because ‘athletes don’t behave same way in the lab’ – highlights an example of quantitative information, which can be used to help coaches assess the strengths and weaknesses of their boxers – as well as their ring rivals.

Five motion-sensor cameras are placed around the training facility at an event so coaches can record action inside the boxing ring. This enables them to see how a boxer moves, their nuances, flaws in their technique and hit rates.

‘This information is of enormous value to a coach,’ says David.

Performance analysts, or the coach in session with their athlete, can pull up clips to study from the large database of boxers’ performances. Again, analysis of these data sets will help tease out those all-important KPIs.

Slow-motion video clips have been used to great effect in tennis too to capture spin rate.

One benefit was that coaches discovered some rackets were putting too much spin on the ball, prompting a rethink over equipment and string tension.

Hammer out an advantage

In another bespoke solution to helping coaches study the particular traits and idiosyncrasies of their athletes, David details the technology that is being used to boost the performance levels of Britain’s hammer throwers.

In a more complex innovation, two cameras are connected to a laptop. They film the thrower in stereo using image-processing techniques and track the hammer throw to get an array of 3D information.

‘All sorts of useful metrics and data can be acquired,’ says David. ‘You can see the launch velocity and angle of the hammer and you can use it indoors in winter training. The computer will even tell you how far the hammer travels.’

The beauty of these examples is that, while the technology may involve the appliance of science, coaches are not blinded by science when it comes to using the innovations in their training sessions.

There is also scope for amateur coaches to adapt these techniques as they look to evolve their own coaching methods.

How do you use technology in your sessions to drive performance? Leave a comment below.

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