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Dawn of a new age

Many conservatoires and music schools are embracing the possibilities of new technology – but is it really more beneficial for students than traditional methods of learning and practice?

By Peter Somerford



A student at the Cleveland Institute of Music examines the results of a muscle test

From tuner and metronome apps to digital sheet music and audio and video recordings, the smartphone- and iPad-based technology available to conservatoire students is already a powerful day-to-day resource. Some music schools are now embracing other technologies, not only to help students with their learning and practice regimens but also to help them cope with the physiological and psychological demands of performance.

One of the leaders in this field is the Centre for Performance Science at the Royal College of Music (RCM) in London. Having developed a performance simulator to give students the opportunity to practise in simulated concert-hall conditions in front of a virtual audience or audition panel, the Centre is now one of several international partners working on a high-tech project called TELMI (Technology Enhanced Learning of Musical Instrument Performance). This will bring together audio and video recordings and motion capture, with the aim of giving students real-time feedback in their practice sessions and lessons. The four-year project began in 2016 and the first prototypes are due to be delivered to students and teachers this summer. George Waddell, a research associate at the RCM and a member of the TELMI team, says: 'It's difficult to say at this point what the final product will look like, because we need to see how

the technical possibilities develop between now and 2019, and how the musicians react to the prototypes. But we're already looking at how much of the technology we can bring to a smartphone or iPad.'

Using the violin as a case study, the TELMI system will give students more than just the ability to see and hear how they are practising, explains Waddell. 'By augmenting recordings with motion capture and with technology that can analyse video, we can explore different ways of providing feedback to the student – about how the bow is moving, for example. The technology could be calibrated to listen to the specific rhythms of a musical exercise, and could give real-time feedback in the practice room, as if the teacher were present and saying, "Did you hear what you were doing there?"'

The motion-tracking technology that TELMI is developing will also feed into the work of the performance simulator team, who video-record every performance in the space so that students can see how they use their body, or how aspects of their posture can change, in a performance environment. Terry Clark, a research fellow at the RCM, explains: 'Running the motion-capture programmes alongside the video recording will enable us to start quantifying musicians' movements – even basic things such as eye contact, and tracking where the student is looking.'

ROBERT WALLER

'We're athletes of the small muscles, and it's important for us to think about form, physiology and how we execute movements properly' – Kathleen Riley, Cleveland Institute of Music

One RCM student who is starting to benefit from the performance simulator is first-year postgraduate violinist Aviva Chertok. 'I've experienced a lot of performance anxiety before,' she says, 'and I often close my eyes and almost shut out the audience, which teachers have picked up on. But I felt comfortable using the simulator, and found myself opening my eyes and looking around the room. I know that the more I use the simulator, the more comfortable I'll be in a real situation.'

Another area where video recording is being enhanced by other technologies is biomechanics. In a lab at the Cleveland Institute of Music (CIM), pianist and biofeedback specialist Kathleen Riley analyses body alignment and muscle activity using a combination of surface electromyography (EMG), which measures the electrical impulses generated when a muscle contracts, and multi-angle video. She works with students to identify and help correct muscle imbalances, using surface EMG to see how much the activity in weak or underused muscles is compensated for by activity in other muscles. 'For example, the powerhouse muscles that we want to open and close the fingers are wrapped around the large knuckle, the main bridge of the hand,' explains Riley. 'But in many students these muscles are underdeveloped. So one of the muscles I like to measure is one of the forearm extensors, because these can end up doing all the work when the left-hand position involves the large knuckle collapsing and thereby inhibiting the intrinsic hand muscles from activating.'

Final-year CIM violin student Jessica Lyons recently worked with Riley on reducing tension in her left shoulder. An ill-fitting chin rest was making her elevate her shoulder but even after having a custom chin rest made to fit her five-inch neck, she noticed there was still too much tension in her shoulder, because the muscle activation of the shoulder lifting had become habitual. 'The light-bulb moment came when I was encouraged to engage my deltoid muscle more, to guide the arm forward and up,' she says. 'Adjusting my shoulder rest helped minimise the activation of the shoulder muscle, and I also discovered that my left bicep muscle, and not the left shoulder, needed to hold the violin up.'

For Riley, the attention to biomechanical detail afforded by the technology in her lab helps musicians learn to think like athletes. 'We're athletes of the small muscles,' she says, 'and it's just as important for us to think about form, physiology and how we execute movements properly.'

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NEWS IN BRIEF

Research uncovers Stradivari's chemical wood treatment bit.ly/2h6g1UR
New research by a team based at the National Taiwan University suggests that a special chemical treatment of the maple used by Antonio Stradivari and other Cremonese makers could account for the unique sound of their instruments. The team detected evidence of the mineral treatment in maple samples removed from four Stradivari violins and cellos, plus one Guarneri 'del Gesù' violin. A combination of five analytical methods was used: NMR, synchrotron X-ray, DSC, TGA, and ICP-MS. The full paper can be downloaded at bit.ly/2iz0yf0

'Violins of Hope' creator receives German honour bit.ly/2gE5DAe



Israeli luthier and collector Amnon Weinstein (left) has been honoured with Germany's Federal Cross of Merit in recognition of his Violins of Hope project, a collection of some 45 violins played by Jewish musicians before and during the Holocaust. The instruments have been collected and restored by the 77-year-old over a period of two decades, and have since been performed in concerts around the world. They have been exhibited in the US and in Germany.

Cellist wins \$25,000 János Starker Foundation Award bit.ly/2hEwX23

South Korean cellist Taeguk Mun has won the János Starker Foundation Award. Worth \$25,000, the prize is granted to cellists under the age of 30 'who have already begun a significant career in music'. A former Juilliard student, Mun is currently studying with Laurence Lesser at the New England Conservatory in Boston, MA, US. He won first prize in the 2014 Pablo Casals International Cello Competition.



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