Use Of ManyCam In Delivering High Quality Laboratory Demonstration

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Problems Presented by Covid-19:

The severe disruption to undergraduate laboratory-based teaching in 2020-21 due to the world-wide pandemic presented new challenges for the delivery of key course content for many accredited degree programmes. With the effective shutdown of physical laboratory spaces to students, universities turned to remote-based experiments to attempt to meet the need for student laboratory participation in line with accreditation. Here we report how the School of Chemistry at the University of Birmingham used virtual camera software to introduce first year undergraduates to new practical techniques.

In addition, the re-opening of laboratory spaces with social distancing requirements meant that safely demonstrating new techniques and procedures was not possible in the pre-pandemic face-to-face style. In response, we report here our use of virtual camera software to provide unimpeded views of in-laboratory demonstrations.

'Labcasting' with ManyCam

Remote:

Live labcasts were delivered over Zoom and Microsoft Teams to Year One undergraduates to deliver demonstrations of common chemistry techniques such as separations, recrystallisations, columns, TLC, work ups, reflux set up and distillation.

The demonstrator were able to use multiple cameras to show the set up and procedure from every angle and were accompanied by a lecturer who described the demonstration and answered any questions in real time, creating a more dynamic atmosphere. Importantly, this approach enabled commonly made mistakes to be highlighted in real time and a demonstration of how to fix/avoid them before undergraduates were able to return to the lab.

In-person:

Once students were able to re-enter physical lab spaces, the typical safety briefing and demo needed to be adjusted for social distancing – allowing students to remain by their fumehoods and have an unimpeded view of the demonstrator. Virtual camera software was found to be an excellent way to allow students to observe the demonstrations from multiple angles and see a camera focused on the demonstrator to promote a better level of understanding and trust.

ManyCam software gives a novel opportunity to switch camera viewpoint to show different aspects during a demonstration. For example, melting point apparatus could use a camera to show the outside controls and another focused on the image of the capillary tubes in the heating mantle

Technicalities:

Virtual camera software used to enhance institutionally available platforms, Zoom and Microsoft Teams, offering us broadcasting capabilities. The aim was to bring remote viewers as close to the bench work as possible and make the event more interactive than the standard talking head video meeting, therefore, it was key that the software was easy to use for academics and students in a lab setting as well as being adaptable to different scenarios. ManyCam was chosen for its open and user-friendly interface.

Our Collaborative Teaching Laboratory (CTL) PCs were equipped with 3-4 USB web cameras attached via USB extension cables and hubs. These cameras could be maneuvered and the extension cables allowed the use of cameras in fume cupboards. The virtual camera software streamlines the multiple camera feeds into a single feed that is then used on the chosen video conferencing platform. The software allows presenters the ability to quickly switch between camera feeds whilst also creating picture in picture and split screen layouts for better coverage.

Take a look at our virtual camera software in action by directing your camera at the QR code or using the link to our Panopto page.

https://bit.ly/3lmZMnV

Feedback:

No formal feedback has been gathered yet for this use of virtual camera software in aiding teaching, but evaluation of the use of ManyCam will be conducted throughout the following academic year.

Demonstrators and academics have found the use of virtual camera software to be of real help in delivering a high-quality teaching experience to undergraduates: "The use of ManyCams enabled us to deliver an in-lab experience remotely when access to the lab was restricted. This enabled strong engagement from our students whilst they were learning remotely. They were able to observe experiments being performed and ask questions in real time which served them well once they were able to return to the lab."

"Having demonstrated both the remote and in-person ManyCam sessions, it was clear the impact the remote sessions had on the students. The student had so much more confidence with the new skills they had learnt about virtually and this meant they could get straight on with the experiment."

Future Work:

ManyCam will continue to be incorporated in live laboratory sessions in the future and pre-lab demonstration videos will be updated using ManyCam software to help students gain an early view about different skills within an undergraduate laboratory.

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