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**Addressing the challenges of delivering a laboratory class when students are miles away**

**Smith, C.L. and Coleman, S.K.**

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**Theme: Laboratory work / Blended and online learning  
Oral presentation**

**Title: Addressing the challenges of delivering a laboratory class when students are miles away.**

S. K. Coleman and C. L. Smith

[C.Smith24@westminster.ac.uk](mailto:C.Smith24@westminster.ac.uk) [s.coleman@westminster.ac.uk](mailto:s.coleman@westminster.ac.uk)

School of Life Sciences, College of Liberal Arts and Sciences, University of Westminster, 115 New Cavendish Street, London, W1W 6UW

### **Abstract**

Background: The global Covid-19 pandemic instigated many challenges for Higher Education teaching, especially for Life Science students who need learn a range of laboratory techniques and gain psychomotor skills as part of their degree course. These laboratory-based skills are required by professional bodies and bioscience employers. Even before the pandemic it had been observed that the student laboratory experience could be impeded by several factors, including but not limited to; cost of specialized equipment; time available; scheduled access hours; student numbers and requirement for group work.

Outline: During the pandemic on-site laboratory sessions were dramatically changed to allow social distancing; risk assessments reduced both the capacity and time available for laboratory use to enable rigorous cleaning between classes. These new conditions refocused the laboratory scenarios to allow cross-module and degree course relevance. Emphasis for on-site attendance was always placed upon feeling safe, so that no student felt pressured to attend the University, also it was recognized that many students might have returned to families during the pandemic either in the UK or overseas. Therefore, laboratory teaching was filmed with SMOTs™ cameras, which allow close-up filming from multiple angles, and live streamed to students watching from home who could participate remotely through chat threads. To prepare students for on-site or live-streamed laboratory sessions, completion of relevant virtual laboratory simulations was required. During the laboratory classes supplementary virtual laboratory simulations, quizzes, videos, and relevant background information, provided via the VLE, was deployed. The laboratory sessions were directly followed with tutorials either on-site or online.

Methodology: Students experiences of these sessions were collected via Likert type surveys which included free text responses and VLE login attendance data. Academic staff viewpoints were obtained via reflective in-progress feedback on the sessions and follow-up questions.

Preliminary findings: Students who did not wish to travel to the University, valued the opportunity to attend live-streamed practical sessions appreciating the chance to engage with questions, comments, and requests. The quality of infrastructure is critical for a good experience (multiple camera set-up and internet) for both students and teaching staff, together with trained camera operators. Critical reflections from staff revealed the importance of having an academic staff member focused on the online attendees whilst another colleague attended to students physically present; this was pertinent to both the laboratory and subsequent tutorial. Reflections on the live-stream recordings revealed dead-time and sessions were adapted to include online activities (short virtual laboratory technique simulations, videos, quizzes) to reduce drop-out of on-line students.

Summary: Covid-19 has impacted on-site laboratory teaching sessions, paradoxically it has forced a greater focus on what is taught, allowing more explicit linkage of subjects across modules and degree courses. Collaborating with NHS biomedical scientists has enabled employers to be introduced during the breakout tutorials enhancing student awareness of real-world scenarios, broader employment and graduate requirements. Moreover, adapting laboratory teaching for students simultaneously online and on-site has allowed greater accessibility for student learning and engagement.