# Increasing engagement in large biomolecular science cohorts: what works?

Monday July 8th 2024, London

## Schedule

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| 10:00 – 10:30 | Registration and arrival coffee and treats |
| 10:30 – 10:55 | Introduction and launch of BioCOPP<br>Dr. Gus Cameron, Dr. Suzanne Ruddy, Dr. Lisa Swanton, Dr. Renée Vancraenenbroeck |
| 10:55 – 11:50 | Session: **Engagement monitoring**<br>Chair: Dr. Suzanne Ruddy<br>Engagement monitoring: a supportive measure or the start of an arms race?<br>Dr. Louise Mackenzie<br>Student engagement: a problem requiring multiple solutions<br>Dr. Catherine Vial and Prof. Gary Willars<br>Understanding and defining bioscience student engagement in the post-COVID19 learning environment: a collaborative study<br>Dr. Lauren Albee, Dr. Rachel Hunt, Dr. Nigel Page, and Prof. Alison Snape |
| 11:50 – 11:55 | Break |
| 11:55 – 12:45 | Session: **Community building**<br>Chair: Dr. Renée Vancraenenbroeck<br>Developing a sense of community through positive teaching assistant – student relationships<br>Dr. Raheela Awais and Dr. Elliott Stollar |
| 12:45 – 12:55 | LearnSci |
| 12:55 – 14:00 | Working lunch |
| 14:00 – 14:55 | Session: **Assessment**<br>Chair: Dr. Gus Cameron<br>Promoting analytical skills in a large TNE module through stepwise active learning<br>Dr. Lilah Glazer<br>Utilising Augmented Reality in Large Bioscience Practicals to Enhance Engagement & Learning<br>Dr. Colin McClure<br>Fostering Inclusive Scientific Experimental Education: Revealing the 'Mechanics Behind the Wheel' with Digital Quizzes Transforming Assessment and Learning<br>Dr. Hannah Campbell |

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| 14:55 – 15:00 | Break |
| 15:00 – 15:55 | Session: **Group work**<br>Chair: Dr. Lisa Swanton<br>Trying to be super when it's a super-sized cohort<br>Dr. Vanessa Armstrong<br>Lab Pods: teaching experimental molecular biology to undergraduates in research-intensive learning labs<br>Dr. Ana P. Costa-Pereira<br>Deconstructing and reutilising Team-Based Learning to diversify and improve assessment in HE<br>*Dr Lisa Donlan, Dr Adam Byron, Dr Paul Shore, and Dr. Michael Smith* |
| 15:55 – 16:05 | Macmillan learning |
| 16:05 – 16:30 | The future of BioCOPP<br>Dr. Gus Cameron, Dr. Suzanne Ruddy, Dr. Lisa Swanton, Dr. Renée Vancraenenbroeck |
| 16:30 – 18:00 | Reception |

## Abstracts (in order of presentation)

*Engagement monitoring: a supportive measure or the start of an arms race?*

*Dr. Louise Mackenzie; University of Brighton*

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We are required to monitor attendance and engagement of students, but has this had any impact on the study that students undertake. What was put in as a supportive measure to help reach those who are not attending has promoted behaviour is some individuals that undermine monitoring. The proposed talk will look through evidence from one lecture, attendance, engagement with the learning material online and the results from the exam question as a case study on the reality of monitoring students.

*Student engagement: a problem requiring multiple solutions*

*Dr. Catherine Vial and Professor Gary Willars; University of Leicester*

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Both anecdotal and empirical evidence would suggest that undergraduate student engagement can be poor with potential detrimental impact on their experience, outcomes and employment readiness.

Poor engagement may be contextual and as part of a broader project, we have assessed engagement in the biomedical sciences, considering not only lecture and tutorial attendance but also access of lecture recordings and slide presentations. Additionally, we explored whether activities designed to encourage student participation were effective and how they were perceived by students. Further, we considered the relationship between engagement and attainment, including the relevance of assessment format. Our pilot studies highlight the

effectiveness of engagement activities and show some positive relationships between engagement and attainment. From a more cautionary perspective, assessment format would also seem to impact engagement, adding to the multifactorial drivers of engagement and highlighting that a single approach is unlikely to be effective in addressing the issue.

*Understanding and defining bioscience student engagement in the post-COVID19 learning environment: a collaborative study*

*Dr. Lauren Albee and Dr. Rachel Hunt; King's College London - Dr. Nigel Page; Kingston University - Prof. Alison Snape; University of Leicester*

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The COVID-19 pandemic has significantly challenged the way students identify and interact with their learning environment on campus, which can be reflected in the student experience, overall levels of engagement and attainment. The COVID-19 aftermath has also merged with a cost-of-living crisis and an increased prevalence of mental health issues bringing new challenges to students and staff. This collaborative study, conducted across three South London higher education institutions (Kingston University, King's College London, St George's), involved the collection of survey data from 900 life science students and incorporated focus groups. This presentation will explore the multifaceted impact of travel and cost implications for on-campus attendance, the influence of timetabling, and reasons for non-attendance, encompassing factors such as the teaching environment, health concerns, and other commitments. Furthermore, an exploration of the interplay between various demographics will be presented, offering an evaluation of common challenges and unique features across institutions.

*Developing a sense of community through positive teaching assistant – student relationships*

*Dr. Raheela Awais and Dr. Elliott Stollar; University of Liverpool*

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Ph.D demonstrators (teaching assistants) spend significant time with undergraduate students on a weekly basis in large teaching labs and are well poised to offer students meaningful learning and a sense of community. We discuss their training tailored to students needs as these change in 1st- and 2nd-year labs across three overlapping learning domains (psychomotor, cognitive and affective). We propose a multimodal training framework that includes inclusivity/approachability as an integral part of the training to foster a positive demonstrator-student relationship that leads to a strong sense of community. We also look at the complimentary role technology may play in labs and computer workshops. Several impacts of this work will be discussed and the session will conclude advocating that Ph.D students should become partners with academic staff to enhance teaching large student cohorts and maintain a sense of community.

*LearnSci: Working Smarter, Not Harder*

*Prof. Leanne Williams*

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We are in the midst of a digital revolution impacting everything from what students experience prior to University, informing their expectations on arrival, to how we deliver robust and engaging content. Teaching and learning strategy is also often constrained by physical limitations such as

student numbers in labs, workshops, tutorials. Prof. Leanne Williams will be discussing her vision of how technology enhanced learning through the lens of equity for both staff and students can help to promote increased delivery of content whilst reducing workload and improving autoregulation in students.

*Promoting analytical skills in a large TNE module through stepwise active learning*

*Dr. Lilah Glazer; Queen Mary University of London*

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Students in undergraduate Transnational Education (TNE) programmes face complex challenges in their studies, adding language and cultural hurdles on top of subject specific learning requirements. When it comes to the development of higher-order thinking-based skills such as critical analysis there is a clear need for additional support to allow TNE students to complete their summative assessments at a comparatively equal position as home students. Enabling students to individually develop critical analysis skills in large modules poses a significant challenge for educators, especially in providing students with a variety of learning opportunities fitting with their diverse learning needs.

In this ongoing scholarship project, I aim to develop a stepwise series of formative exercises that will support the development of critical analysis skills leading up to a summative assessment. The project is developed within a module on Precision Medicine in the Queen Mary University – Nanchang University Joint Programme in Biomedical Sciences.

*Utilising Augmented Reality in Large Bioscience Practicals to Enhance Engagement & Learning*

*Dr. Colin McClure; Queen's University Belfast*

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The use of technologies can improve learning, by enhancing engagement and individualising material to allow for self-pacing. Here we discuss the development of an in-house smartphone application utilising Augmented Reality (AR) that was designed to increase engagement, understanding and assessment in a compulsory year 1 practical. The application (BioLab Assist) offers students the opportunity to visualise, at a molecular-level, the action of biochemical principles in what would otherwise be the transfer of transparent liquids, enabling students to better identify the experimental processes involved in the practical session. The effectiveness of the application was determined by assessing the performance and experiences of students who had access to BioLab Assist during the practical session, relative to those who could access it after. Students who had access to BioLab Assist during the practical performed better (although not significantly) than those who did not, while the application was very positively reviewed.

*Fostering Inclusive Scientific Experimental Education: Revealing the 'Mechanics Behind the Wheel' with Digital Quizzes Transforming Assessment and Learning*

*Dr. Hannah Campbell; University of Leeds*

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Scientific experimental report writing is crucial to the scientific method, requiring specific nuances and nomenclature for high-quality output. However, students often struggle with these

concepts, and academics, afflicted by the "curse of knowledge," assume their feedback is easily understood. General feedback also fails to address specific mistakes.

To address these faults for a large cohort across five undergraduate programmes in the school of Biomedical science at the University of Leeds, we developed a formative experimental report quiz, which offers immediate feedback and access to supplementary resources like Skills@Library. Additionally, a formative experimental report plan helps students through the planning phase, clarifying their decision-making processes and providing targeted guidance.

The goals of these formative assessments are to scaffold student learning, foster critical thinking in report writing, placing the student in the 'markers shoes' to unveil hidden academic expectations and conventions, whilst reducing staff marking and feedback workload for large student cohorts.

*Trying to be super when it's a super-sized cohort*

*Dr. Vanessa Armstrong; Newcastle University*

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I lead a 20 credit module that all 350 of our students take. This is a module that has a lot of contact hours delivering lab practicals, lectures, seminars and workshops. It has 4 strands; practicals, ethics, informatics and statistics- key skills for bioscientists but there are challenges when faced with how do you teach and assess effectively ensuring a good student experience. This module is work in progress but has learnt me many lessons- 24 hours of labs in week 1 in the super lab meaning the module starts with a bang!

*Lab Pods: teaching experimental molecular biology to undergraduates in research-intensive learning labs*

*Dr. Ana P. Costa-Pereira; Imperial College London*

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Learning in BSc Medical Biosciences at Imperial College London is interactive, collaborative, and deeply practical, with transferable skills such as teamwork, leadership, independent learning, problem solving, critical thinking, digital literacy, analytical and communication skills embedded in the academic curriculum.

Thanks to the Lab Pods, standalone practical modules in Years 1 and 2, scientific research is the core syllabus. Here, students are immersed in a supportive, authentic research environment from the start of their undergraduate journey and can thus develop their identity as genuine biomedical scientists during their undergraduate studies. Students learn both key experimental techniques and skills essential in any professional setting, including fast paced, changeable environments. It is in the Lab Pods that students start their journey from novices towards professionals, and where the real magic happens.

*Deconstructing and reutilising Team-Based Learning to diversify and improve assessment in HE*

*Dr Lisa Donlan, Dr Adam Byron, Dr Paul Shore, and Dr. Michael Smith; University of Manchester*

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Diversifying summative assessments is crucial to enhancing student experience and closing attainment gaps. We deconstructed a Team-Based Learning (TBL) assessment method to assess its effectiveness.

A 12-week unit was divided into 3 topics, each concluding with a TBL session which included three activities: individual knowledge assessment (MCQs/iRAT), group evaluation of understanding (team-based MCQs/tRAT), and team application of complex subject knowledge.

We analysed individual and group performance over time, noting improved attainment when comparing individual and team performance. This method was inclusive, with students registered with Disability Services outperforming in the tRAT (82.2% vs 78.2% p=0.001) and performing equally in the iRAT (p=0.381). Other groups defined by EDI criteria showed no significant differences, indicating inclusivity. Feedback (n=118/196) showed 83.9% of students preferred this method, with 76.1% experiencing less anxiety compared to traditional assessments.

This combination of active learning and individual and team-based testing is an accessible, dynamic, and desirable assessment method.

*Macmillan learning: Strategies for Monitoring Student Engagement, Building Community, and Improving Group Work and Assessment in Bioscience Education*

*Teresa Keane and Kim Doyle*

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Struggling to engage your students in such large class sizes? What if we could offer you a solution… Our discussion will be centred around how to encourage active learning in the rapidly evolving landscape of bioscience education. We will explore innovative strategies and best practices you can adopt to enhance the learning outcomes of your students. Covering the central themes of engagement monitoring, community building, group work and assessment, we will give you a taster of how digital courseware can help to resolve these issues. Creating a general definition of how students learn is an impossible task in our diverse classrooms, so we will be discussing how to create an inclusive and supportive learning environment, ensuring that we inspire what is possible for every learner. These are complex issues, and employing the correct solution can be time consuming for teaching staff, but we hope to illuminate how you can create an engaging, supportive, and effective learning environment in an efficient manner.

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