Innovation and Updates in Teaching and Student Education across Physiology and STEM in the UK

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Abstracts

Experiments on animals and animal tissues

It is a requirement of The Society that all vertebrates (and Octopus vulgaris) used in experiments are humanely treated and, where relevant, humanely killed.

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Authors must tick the appropriate box to confirm that:

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these details). For the preparation of isolated tissues, including primary cultures and brain slices, the method of killing (e.g. terminal anaesthesia) is required only if scientifically relevant. In experiments where genes are expressed in Xenopus oocytes, full details of the oocyte collection are not necessary. All procedures on human subjects or human tissue must accord with the ethical requirements of The Society regarding relevant authorisation, as indicated in Step 2 of submission; authors must tick the appropriate box to indicate compliance.

SA1

Use of data to initiate targeted interventions to address ALL awarding gaps

Nicholas Freestone[1]

[1]*Kingston University*

In this era of the Black Lives Matter and #Me Too movements an increasing focus has been placed on issues around race and gender and equitable access and provision of higher education in the UK. Quantitative, experimentally orientated disciplines such as physiology have not been immune to these societal imperatives and a need has been identified to move away from the rather Eurocentric canons of knowledge traditionally disseminated within our learning institutions. This presentation will discuss means by which the learning needs and awarding gaps evident in different sub-groups within an undergraduate class can be first identified and then secondly will highlight a number of interventions which have been successfully employed to narrow the awarding gaps. The presentation will then go on to explore strategies for diversifying the curriculum and showcase a resource under development which may help academic colleagues take their first tentative steps into this politically contested and nuanced area in a non-threatening and supported manner.

SA2

Aligning a student's perception of feedback with that of the academic's, and those of other interested parties

Damian Parry[1]

[1] *Newcastle University, UK*

Feedback is the “Achilles heel in terms of quality” in Higher Education (HE) (Knight 2002).

That was written in 2002 and yet two decades later students persist in telling the international HE community that feedback is still not satisfactory. This lack of satisfaction is replicated not only across HE institutions in the UK through the influential National Student Survey and in local institutional surveys, but in also in comparable surveys carried out in excess of 30 nations globally.

In response to this over the last 3 decades Universities have made substantial investment to improve feedback in terms of staff time, financial input and infrastructure resulting in imaginative and diverse innovations as evidenced through publications. Yet the response to questions addressing 'Assessment and Feedback' still tell us students are not only 'not satisfied', but, more than this, they are less satisfied. This results in demotivation and well-being implication for many colleagues in the profession.

I will explore the depth of research carried out to determine why this is the case and unpack some of the theories proposed to explain why this is the case. This will be supported by a research project carried out in one of the larger schools in Newcastle University to offer a more local chalk face perspective which gives insight into student persepective.

Evidence suggests that the issues may be more a result of imbalance between perceptions of feedback held by student, tutors and other interested parties compounded by the manner on which the questions are posed.

References:

Knight, P. T. 2002. "The Achilles Heel of Quality: The Assessment of Student Learning." *Quality in Higher Education* 81: 107–15.

SA3

Coping with content: Adapting core concepts to suit the needs of your learners

Derek Scott[1]

[1]*University of Aberdeen, UK*

Core concepts have received increasing attention in recent years as a way of defining central principles or ideas within a discipline area. In terms of physiology, much of the core concept work has been driven by Michael and McFarland, who defined 15 such core concepts. They argue that we can teach physiology more effectively using this approach, and that it helps students prioritize information and master concepts more effectively. This session will discuss the advantages and disadvantages of a core concepts approach to learning. We will also consider whether your specific student cohorts require broader core concepts that do not necessarily align with their subject discipline e.g. relating to their employability. We will also discuss how you might have to tailor use of core concepts to suit your students and their backgrounds.

SA4

A critical examination of global citizenship in the curriculum

Pam Birtill[1], Madeleine Pownall[1]

[1]*University of Leeds, UK*

In Higher Education, it is important that students are supported to develop skills that enable them to contribute to global problems. This is the crux of 'global citizenship', which is an approach to education whereby students are encouraged to apply their subject-specific knowledge and skills to contribute meaningfully and thoughtfully to global problems, such as climate change, sustainability, social justice, and equality. Global citizenship is becoming increasingly integrated in Higher Education policy and practice and is rapidly emerging as a key set of graduate attributes. However, while the benefit of the principles of global citizenship are clear, some scholars have also acknowledged how the term may be problematic or unhelpful and have stressed the need for critical, decolonial approaches to its implementation. In this talk, we will discuss the background of global citizenship, including debates surrounding its conceptualisation, and share our pedagogical research that examines perceptions of global citizenship and its facets (e.g., sustainability, critical thinking, and intercultural learning). This will cover work which investigates student perceptions of the importance and prevalence of global citizenship as a pedagogical construct and an analysis of the existence of global citizenship in national curricular standards. This talk will end with a summary of the pressing debates and discussions surrounding the future of global citizenship in Higher Educator.

C01

Addressing the gender gaps in sports degrees: Participation, engagement, and attainment

Paul Ansdell[1], Rebecca Bradburn[1], Erin Quinn[1], Zoe Avner[1], Rick Hayman[1], Paul Cook[1], Daniel Peart[1]

[1] *Department of Sport, Exercise and Rehabilitation, Northumbria University*

Rationale: Women are underrepresented across all levels of science and management, from undergraduate cohorts to the percentage of female professors, particularly in the field of sport. Participation only provides an incomplete assessment of the problem; therefore, this project also investigates how gender affects achievement and engagement.

Methods: Data were retrospectively collected from internal resources at Northumbria University from the previous five academic years and disaggregated by self-identified gender of students.

Results: Physiotherapy recruited 2.15 women per man, whereas Sports Science (SS, 2.05 men per 1 woman) and Sports Development, Management and Coaching (SDMC, 2.95 men per 1 woman) demonstrated the inverse trend. Across all programmes, women achieved higher average marks (63 vs. 59%, $p<0.001$), with the gender difference being greatest on SS (4%, $p=0.010$) and SDMC (4%, $p=0.060$) compared to Physiotherapy (2%, $p=0.050$).

Discussion: Further data about the influence of socioeconomic status, accommodation, and UCAS points will be discussed.

C02

Putting STEAM into nursing teaching

Francesca Arrigoni[1], Carmel Blackie[1]

[1]*Kingston University, UK*

Science, Technology, Engineering Art and Medicine (STEAM) teaching in Higher Education is a mechanism to engage students with science but can engaging nursing students with art be an effective tool to help learn physiology?

Method: We compared online (n=312) or face-to-face(n=36) teaching of cardiac physiology to nursing students from an artistic perspective. Students were initially taught to draw, then they created anatomically accurate drawings of a heart whilst explanations of the structure function relationship were given. Assessments before and after the lesson were taken and questionnaires given at the end of the class.

Results: Whether working online or face to face, test scores improved following the class. Whilst possible to effectively teach online to 300+ students, longer face to face classes produced better results.

Conclusion: We effectively demonstrated a technique which enabled nursing students to engage with complex physiology and learn effectively without feelings of stress typically associated with learning.

Acknowledgements:

Like to thank Health Education England which funded part of the study.

References:

Balemans MC, Kooloos JG, Donders AR, Van der Zee CE. Actual drawing of histological images improves knowledge retention. Anatomical Sciences Education. 2016 Jan;9(1):60-70.

Barbosa, Peter, et al. ""Mindfulness-based stress reduction training is associated with greater empathy and reduced anxiety for graduate healthcare students."" Education for health 26.1 (2013): 9.

Chan, Zenobia CY. ""Drawing in nursing PBL."" Nurse education today 33.8 (2013): 818-822.

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Joewono M, Karmaya IN, Wirata G, Widianti IG, Wardana IN. Drawing method can improve musculoskeletal anatomy comprehension in medical faculty student. Anatomy & Cell Biology. 2018 Mar 1;51(1):14-8.

Lujan, Heidi L., and Stephen E. DiCarlo. ""Too much teaching, not enough learning: what is the solution?."" Advances in physiology education 30.1 (2006): 17-22.

C03

Application of core physiological concepts within a simulated medical environment: How to achieve the best outcomes?

Rachel Ashworth[1], Lauren White[1]

[1]*University of Worcester, UK*

Outcomes for graduates sets out the capabilities required of newly qualified doctors in the UK (1). Part of this requirement is the ability to apply physiological principles, methods and knowledge to medical practice and integrate these into patient care. Designing a curriculum that delivers these all these objectives can be a challenge. There is evidence to show that combining high-technology simulation and physiology teaching enhances student learning (2). This type of activity promotes connections between core concepts, theoretical knowledge, and clinical practice. Development of a new MBChB (Bachelor of Medicine and Bachelor of Surgery) at the University of Worcester offers the opportunity to deliver physiology alongside simulation and clinical skills within an integrated, spiral curriculum. The goal is to have specialists with different expertise (e.g., physiologists and clinicians) working together to facilitate student-centred learning in preparation for practice.

References

1. Outcomes for graduates, GMC. 2018

2. Bintley HL, Bell A, Ashworth R. (2019) Remember to breathe: teaching respiratory physiology in a clinical context using simulation. Adv. Physiol. Educ. 43: 76–81.

C04

I can do this, I'll show you!: Technical and clinical skill literacy and assessment in biomedical and physiological sciences.

Liam Bagley[1], Hadgraft, N.[1], Dempsey-Hibbert, N.[1], Sarginson, J.[1], Evans, G.[1], Coulthwaite, L.[1]

[1]*Department of Life Sciences, Manchester Metropolitan University*

As academics, our aim is to design and deliver training programmes that enable students to gain the knowledge and skills needed for graduate career success (Steele et al., 2020). A survey of academics suggested three top skills for graduates to prosper; Communication, Critical Thinking and Problem Solving (McVitty and Andrews, 2021). However, student misidentification of acquisition and demonstration of these within their study programme, could lead to low confidence and inadequacies in evidencing these to employers upon completion of training (Bist and Mehta, 2020).

We will describe our mechanism for technical skill literacy training and authentic assessment of technical skill competency, using direct observation of practice, clinical simulation and case-based learning. Our aim is to promote technical skills literacy and to provide graduates with a portfolio of evidence for a future employer/ further training provider.

References:

Bist, S. and Mehta, N. (2020) 'Employers' perception regarding employability skills of management students undergoing internship.' 04/18,

McVitty, D. and Andrews, M. (2021) 'Skills to Thrive – academics' perceptions of student skills development.' WonkHE, 11/01/21,

Steele, K. J., VanRyn, V. S., Stanescu, C. I., Rogers, J. and Wehrwein, E. A. (2020) 'Start with the end in mind: using student career aspirations and employment data to inform curriculum design for physiology undergraduate degree programs.' Advances in Physiology Education, 44(4) pp. 697-701.

C05

Virtual Reality for Biochemistry Education

John Barrow[1], Joakim Edman[1], Will Hurst[2]

[1]*University of Aberdeen, UK*

[2]*Wageningen University & Research, The Netherlands*

Virtual Reality (VR) technology can offer transformative educational experiences and is increasingly being adopted within the biochemistry domain to better understand complex biochemical

processes. This presentation will introduce a pilot study for the efficacy of VR in biochemistry education at undergraduate university level, focusing on the citric acid cycle. Ten participants were immersed within a VR digital environment where they were able to engage with the eight steps of the citric acid cycle. Electrodermal Activity (EDA) readings were recorded throughout the students' interaction with VR to measure physiological engagement and participants were asked about their experience through surveys and focus groups. Multiple linear regression analysis of findings indicates that if the students feel engaged, stimulated, intend to use the technology again and find it useful, they will agree that the VR has increased their understanding. EDA analysis indicated that the majority of participants demonstrate enhanced engagement in the experience.

Acknowledgements:

The authors would like to acknowledge members of the Wander Lab at Wageningen University and Research for developing the VR content:

Orkun Tekeli - Wageningen University and Research, Netherlands

Ioana Mereuta - Wageningen University and Research, Netherlands

References:

Reen FJ, Jump O, McSharry BP, Morgan J, Murphy D, O'Leary N, O'Mahony B, Scallan M, Supple B. The Use of Virtual Reality in the Teaching of Challenging Concepts in Virology, Cell Culture and Molecular Biology. Frontiers in Virtual Reality (2021), 2 (62). https://doi.org/10.3389/frvir.2021.670909

Horvers A, Tombeng N, Bosse T, Lazonder AW, Molenaar I. Detecting Emotions through Electrodermal Activity in Learning Contexts: A Systematic Review. Sensors (2021), 21(23). https://doi.org/10.3390/s21237869

C06

Cultural competence in hands-on ultrasound sessions: student-patient interactions in undergraduate anatomy modules

Keren Bielby-Clarke[1], Pip Garner[1]

[1]*University of Bradford, UK*

The University of Bradford has a distinctive student population in terms of its ethnic diversity, with more than twice the national average of BME students (1). This presents unique challenges when developing clinical undergraduate skills (e.g. cultural barriers to seeing flesh of the opposite gender).

Cultural competence in the healthcare setting is an important part of skills development for students in healthcare-related degrees. We are looking through the lens of the learner, as well as the patient, to identify difficulties and obstacles to student comfort when working directly with patients.

This ongoing project engages students and utilises directed student feedback in the design and development of clinical anatomy sessions (specifically ultrasound use). In this way, we aim to create an inclusive environment for our diverse student population in current and future development of effective clinical skills sessions and direct interactions with patients.

References:

1. AdvanceHE Race Equality Charter: University of Bradford (Bronze Award)

C07

Science travels: A project to improve access to STEM for Gypsy, Traveller, Roma, Showmen and Boater communities

Marie Bowers[1], Iain Rowe[2]

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[2]*University of Aberdeen, UK*

Gypsy, Traveller, Roma, Showman and Boater (GTRSB) communities are very poorly represented in the world of science. Only 3-4% of GTRSB populations aged 18-30 access higher education compared with 43% of 18–30-year-olds in the general population (Mulcahy et al. 2017; Greenfields, 2019). The recently launched "GTRSB into Higher Education Pledge" aims to ensure support, access, and inclusion of GTRSB individuals in HE. This is a matter of social justice, aiming to increase equality, visibility, employability, and social mobility. To achieve these improvements, the scientific community must play its part. The Science Travels project, led by a Romany scientist, recruits physiologists as agents of social change using physiology as a bridge to tackle this challenge. A collaborative approach of co-design and co-development is used to engage primary school age GTRSB children with physiology in a pilot study on GTRSB inclusion in science education, and raising awareness in the scientific community.

Acknowledgements:

The Physiological Society, the University of Glasgow Widening Participation Group, University of Glasgow EDI Unit, MVLS Public Engagement, MVLS Race Equality Subcommittee and Moving For Change.

References:

Ellie Mulcahy, Sam Baars, Kate Bowen-Viner and Loic Menzies (2017) The underrepresentation of Gypsy, Roma and Traveller pupils in higher education. A report on barriers from early years to secondary and beyond. Report commissioned by King's College London.

C08

A colour-coded graphical guide to the Hodgkin and Huxley papers

Angus Brown[1,], Amy Hopper[1]

[1]*University of Nottingham, UK*

The Hodgkin and Huxley papers present a considerable challenge to the novice student, but this has been partly allayed by recent publications that have updated the reporting of current and voltage to reflect the modern convention, and two books that describe the contents of the papers in detail. A disadvantage is that these guides comprise hundreds of pages, requiring considerable time and energy on behalf of the reader. We present a concise guide to the Hodgkin and Huxley papers that includes only essential content, with the data presented in a linear and logical manner. We have colour-coded figures for ease of understanding and included boxes that summarise key information for easy reference. It is our expectation that this Illuminations article will act an accessible introduction for students to the work of Hodgkin and Huxley, and hopefully foster an appreciation for a fascinating story that repays in depth study.

Acknowledgements:

Funding from the University of Nottingham

C09

Reviewing the Context of Sports and Exercise Science in the United Kingdom and Abroad: Student expectations, experience and outcomes

Hannah Campbell[1]

[1]*University of Leeds, UK*

The field of Sports and Exercise Science has undergone significant change over the past century. Importantly, compared to other vocational degrees, sports and exercise science is not necessarily linked to a specific career outcome. It is necessary to delineate the purpose for entering a sports and exercise science degree with academic notions of what students require and the potential career outcomes they may achieve.

Sports and Exercise Science is well placed to address a number of challenges faced locally, nationally and globally. My planned research is to explore student expectations, experiences and outcomes in

the discipline of sports and exercise science to strengthen the curricula and methods of delivery for these students and to manifest the potential of sports and exercise science is addressing systemic global challenges.

C10

Learning pharmacological science in context using art

Francesca Arrigoni[1], Clare Conway[1]

[1]*Kingston University, UK*

One of the challenges faced by undergraduate biology students is the overwhelming body of knowledge that they have to learn. Such information rich syllabus's promote rote learning of a breadth of information but sometimes with a lack of depth. In order to promote a greater depth of knowledge surrounding fundamental biological principles of pharmacology, a small cohort of pharmacy and pharmaceutical sciences undergraduates were taught fundamental pharmacological principles through a creative lens of pharmacognosy. Whilst learning about the pharmacological properties of selected poisonous plants, students were taught botany and botanical art, creating an additional creative perspective. In this way the students were enabled to retain new knowledge by engaging with drawing as a 'fundamental tool' of science (Merkle, 2018).

The students were then taken to the Economic Botany Collection at the Royal Botanic Gardens, Kew, where they accessed a collection of artefacts associated with these plants.

Acknowledgements:

We would like to thank the team at Royal Botanic Gardens Kew for allowing us to access their collections

References:

Merkle, M.G. (2018) 'Drawn to science' in Nature 562. S8-S9 (2018)

C11

Using H5P to facilitate interactive problem based learning in respiratory physiology

Benjamin Chant[1]

[1]*University of Bristol, UK*

Student-centered, active learning is one of the cornerstones of engaging students. Typically, first year biomedical science students find the core concepts of respiratory physiology challenging. To

address this an in-person workshop was timetabled to follow the lectures in which students engaged with a student-centered active learning task. An interactive H5P problem-solving session was developed, in which students integrated their knowledge from the lectures to solve a question 'What is the purpose of the physiological sigh?'. Students were encouraged to work either independently or in small teams to complete tasks including drag & drop questions, multiple choice questions, calculations, interpreting data and application of theory from all the lectures. The immediate feedback given within the H5P activity encouraged self-reflection from the students and helped facilitate conversation about gaps in knowledge and further revision. The development and initial feedback from the session will be discussed.

C12

Is the online learning platform Lt an effective learning tool for all students?

Laura Corns[1], Rebecca Barnes[1]

[1]*University of Sheffield, UK*

Lab practicals are a cornerstone of Biosciences teaching, and the practical instructions given to students are key to an effective learning experience. In our Biomedical Science course, we are in our third year using the online learning platform Lt to deliver our practicals. Lt enables the embedding of videos, automatic feedback on questions and release of materials following completion of pre-lab tasks. Before fully rolling out this platform across the School of Biosciences, we wanted to better understand how students use this platform, whether it is more effective than modes currently used, such as paper handouts, and how effective this platform is for students for whom English is a second language and for students with disabilities. We are currently analysing survey data and running focus groups which will give the opportunity to gather more specific student recommendations on how to improve the lab instructions and make them more inclusive.

Acknowledgements:

Thank you to Dr Janet Cronshaw, Dr Will Hentley, and Dr Mohammed Nassar for assisting in the student recruitment for this research.

C13

Using AI to develop transferrable skills

Dawn Davies[1], Frances MacMillan[1]

[1]*University of Bristol, UK*

The potential for AI-generated answers to assessments has created a lot of chat within the academic community, mostly focused on 'the death of the essay'. However, as the initial panic subsides, it is clear that the AI has substantial limitations but, at the same time, offers opportunities to rethink assessments. But what are these opportunities and how do we turn them into sustainable activities for our students? One potential route is to use AI output to focus on reliability of sources and critical evaluation. This would reinforce teaching on identifying reliable sources, whilst striking a note of caution about AI limitations. We would be really interested to hear about any other ways that people are using or are thinking about using AI with the aim of creating/contributing to a repository of ideas for educators.

C14

Introducing undergraduate students to investigation, data analysis, and report writing in exercise physiology

Brendan Egan[1]

[1]*Dublin City University, Ireland*

Active investigative student-directed experiences in laboratory settings are effective learning tools and are increasingly encouraged. This report describes the implementation and assessment of a module (10 ECTS) in Integrated Sport and Exercise Physiology for ~70 second year students from BSc Athletic Therapy and Training, and BSc Sport Science and Health at an Irish university. The module builds on two introductory modules (general physiology and exercise physiology), but is the students' first experience of data collection, analysis, and report writing. In five fortnightly blocks, students perform experimentally-driven data collection on human subjects (classmates) for handgrip strength, maximum rate of oxygen consumption, anaerobic power, isokinetic strength testing, and glycaemic response. Students are introduced to statistical analyses including correlations and t-tests, and data illustration including scatterplots, column charts, and line graphs, through asynchronous tutorial recordings. Laboratory reports (three in total) take the form of a short scientific paper (<2000 words) with formative feedback.

C15

Virtual laboratories as pedagogical tools to enhance STEM practical teaching & learning: Preliminary findings from a multi-institutional study in Ireland

Caoimhin S. Griffin[1], Bernard T. Drumm[1], Ronan Bree[1], Bridget Kelly[1], Sinead Loughran[1], Arjan van Rossum[1], Aoife Morrin[2], Brian Murphy[3], Eric Moore[4], Marwa Aly[5], Carmel Breslin[5], Frances Heaney[5], Denise Rooney[5]

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[2]*School of Chemical Science, Dublin City University, Ireland*

[3]*Department of Pharmaceutical Sciences & Biotechnology, Technological University of The Shannon, Ireland*

[4]*School of Chemistry, University College Cork, Ireland*

[5]*Department of Chemistry, Maynooth University, Ireland*

As part of a multi-institutional project, we investigated how virtual laboratory resources (VLRs) impacted student transferable skills and employability via practical-based pedagogy across Ireland. At our institution, in 2021 & 2022, we surveyed 150 students (year 1-4) across a range of programmes and performed focus groups on their experiences/opinions of VLRs. 74% of students reported VLRs worked best to enhance versus replace F-2-F labs. These findings were reinforced from student discussions in focus groups. Students consistently commented that VLRs work best as a pre-practical activity, to link with lecture material and complement practical theory. Focus groups also revealed limitations and disadvantages to VLRs such as accessibility, disparities in assessment strategies and potentially overburdening students with excessive VLR workloads. This data suggests that from a student perspective, while VLRs might be advantageous in enhancing practical learning in students, they should primarily be used to supplement in person teaching.

C16

Assessing Academic Writing in Physiological Disciplines.

Matt Hardy[1], Sian Howells[1], Stacy-Paul Wilshaw[1]

[1]*University of Bradford, UK*

In Higher Education, discrepancies in marking written assignments is problematic. For example, differing expectations of staff considering undergraduate theses leads to inconsistent assessment (Koris and Pello 2022).

Benchmark statements by QAA for Biomedical/Bioscience disciplines provide focus on appraising literature and discussion. Biomedical graduates should be able to ‘read and evaluate appropriate

literature' and 'critically discuss and debate … using appropriate scientific language' (QAA 2022a; QAA 2022b). However, guidance in style and structure of language is limited. Furthermore, clinically-relevant, reflective writing skills are absent from Health Studies benchmarks (QAA 2019).

This study aims to develop a framework for assessing writing ability within physiology disciplines in Higher Education. This will enhance assessment literacy for staff and students.

The framework will be based upon survey responses from:

1. Academic staff- to quantify expectations of writing abilities at FHEQ levels 4-7 (FQHEIS 7-11).

2. Physiology professionals- to identify writing skills required by employers.

References:

Koris, R. and R. Pello (2022). ""We cannot agree to disagree: ensuring consistency, transparency and fairness across bachelor thesis writing, supervision and evaluation."" Assessment & Evaluation in Higher Education: 1-12.

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C17

The Nernst equation: using physico-chemical laws to steer novel experimental design

Amy Hopper[1], Angus Brown[1]

[1]*University of Nottingham, UK*

The application of physico-chemical principles has been routinely used to explain various physiological concepts. The Nernst equation is one example of this, used to predict the potential difference created by the trans-membrane ion gradient resulting from uneven ion distribution within

cellular compartments and the interstitial space. This relationship remains of fundamental importance to the understanding of electrical signalling in the brain, which relies on current flow across cell membranes. We describe five distinct occasions where the Nernst equation was ingeniously applied in experimental design to illuminate diverse cellular functions, from the dependence of the action potential on Na+ influx, to K+ buffering in astrocytes and axon conduction failure during high frequency. These examples are discussed with the aim of inspiring students to appreciate how the application of seemingly textbook bound concepts can dictate novel experimental design across physiological disciplines.

Acknowledgements:

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C18

Proforma-based report writing including feedback reflection to develop scientific writing skills in Year 1 bioscience students

Alison Howard[1], Harley Stevenson-Cocks[1]

[1]*Newcastle University, UK*

Report writing is a crucial component of undergraduate study, with students' final year research projects culminating as a capstone written dissertation. However, students typically struggle with the concise and strict nature of report writing in the biosciences, and struggle to integrate prior feedback into future written assessments.

In this talk we will detail our efforts to integrate report writing skills into Year 1 of our bioscience degree programmes, including assessed reflective components in which students must address how they have responded to prior feedback, in an attempt to improve both scientific writing skills and feedback literacy amongst students. Furthermore, we will describe the use of a new rubric to ensure consistency in marking amongst staff so as to maximise students' engagement with feedback.

C20

Development of a Virtual Learning Platform Integrated Module Textbook

Matthew Jacques[1]

[1]*University of Nottingham, UK*

Objective:

Textbooks have long-been a staple tool for staff and a learning resource for students in higher education, providing a fundamental source of information (Waller, 2013). For students, staff and Institutions alike, hard copy textbooks are expensive and environmentally unfriendly (Kingkade, 2013). Debate remains however around the efficacy and effectiveness of textbooks in a digital age (Lynch and Ratto, 2012), with Grensing-Pophal (2010) stating "higher education must position itself to be ready to incorporate e-books effectively". Online E-books have become increasingly utilised by many UK academic libraries (Casselden and Pears, 2020; JISC, 2017), however it can be difficult to find a single textbook of reference that encompasses content for an entire module, as such this may result in students needing to access multiple textbooks/e-books. The authors prospective study is utilising Xerte as an open source software for creating interactive learning content, to deliver an online virtual learning platform integrated, module textbook.

References:

GRENSING-POPHAL, L. 2010. Are textbooks obsolete? An education in the impact of electronic textbooks. EContent (Wilton, Conn.), 33.

KINGKADE, T. 2013. College textbook prices increasing faster than tuition and inflation. The Huffington Post.

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C21

Student engagement and curriculum design within Clinical Exercise Physiology

Melanie Leggate[1], Amanda Pitkethly[1]

[1]*Edinburgh Napier University, UK*

This project aims to determine the perceptions of both graduate and current students studying on a MSc programme in Clinical Exercise Science. This project aims to redevelop our current provision to align with the new Clinical Exercise Physiology Framework. As part of this redevelopment, we plan to run two graduate led focus groups – one with recent graduates and another with our current student cohort. The sessions have been cocreated with graduate from the programme who will lead the sessions.

We hope that by engaging students in the redevelopment of our curriculum we can develop a programme that meets the needs of employers as well as our student body. It is anticipated that the information gathered from the focus groups will inform our curriculum design for our new provision, including approaches to learning and teaching; assessment and feedback; mode of delivery and placement design.

C22

Are undergraduate & PGT dissertations past their sell-by date?

Dave Lewis[1]

[1]*University of Leeds, UK*

The broadening of project opportunities, mushrooming of essay mills and launch of ChatGPT has made the traditional undergraduate and PGT dissertation increasingly inappropriate. To address this, we have created a portfolio of authentic assessment tools as an alternative, no longer assessing learning instead using assessment for learning. We have given learners agency to choose the most appropriate assessment tool for them, and demonstrated that it is inclusive, enabling every learner to realise and showcase their full potential. Assessment of projects is no longer an end-point assessment. Instead, in keeping with the capstone ethos, it is part of an integrated transformational and translational approach to better prepare all learners for the diversity of careers they go into.

Acknowledgements:

This intervention is a collaborative learning partneship between students and colleagues within the School of Biomedical Sciences, University of Leeds. Their support and contributions are gratefully acknowledged.

C23

Team-based learning strategy for physiology teaching

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Team-based learning (TBL) is a student-centred, instructor-directed teaching strategy for active small-group learning. The TBL approach has many proven advantages for the students in terms of knowledge, skills, and attitude domains. [1-6] TBL is implemented in three phases: preclass preparation, in-class readiness assurance, and application of course concepts. In the pre-class phase, students receive a list of suitable learning materials accompanied by a set of learning outcomes on a specific topic. Students study materials individually in preparation for the TBL in-class session. The readiness assurance phase includes an individual readiness assurance test (iRAT), a team test (tRAT), feedback and clarification, and team appeals. The iRAT contains MCQs that promote discussion and teamwork. The tRAT is the same iRAT but discussed by the teams. Finally, real-life case scenarios are discussed by the teams in the application phase. The TBL instructor guides the TBL session, clarifies unclear issues, and gives immediate feedback.

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C24

Supporting digital skills and student transition into higher education

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Entry to higher education is a major transition for students. Getting it 'right' is key to student retention and future success.

We developed bespoke online induction courses for incoming undergraduate medical and life sciences students, based on a freely available 'digital skills awareness course' template(1). Hosted on our virtual learning environment (Moodle), students gained access prior to the start of semester one. Students' perceptions of the utility of the course in supporting their integration into higher education were collected via a voluntary online survey.

Students said that the course helped them to familiarise themselves with institutional expectations and navigating Moodle. Student testimonies and short videos were particularly popular.

Integrating a bespoke online induction course supports students' transition into higher education, however course content must be tailored to meet specific student needs. Future work will explore the experiences of staff who have implemented the digital skills awareness course in their institutions.

Acknowledgements:

I gratefully acknowledge the Bloomsbury Learning Exchange who created the Digital Skills Awareness Course which formed the framework for the online induction courses., and my collaborator Dr Jennifer O'Neill for her contributions to this work.

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C25

Do Bears Poop in the Woods? Developing an Inclusive Workshop Supporting Understanding of Critical Analysis

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Third year biochemistry and biomedical science students requested a workshop on critical analysis, a term some struggle to fully understand and successfully put into practice. A series of workshops is proposed using non-science questions and prompts to initiate ease of group discussion and exploration of evidence in support of / against each question. The aim is that students learn to think beyond what they are being told or first think. The initial question 'Do bears shit in the woods' was chosen to provoke debate, proving a popular and light-hearted entrance to the topic. Evidence put forward was gathered via Padlet and discussed before a critical analysis was written and shared. It is hoped sessions will translate into confidence within this key skill and enable greater understanding of the term. Formal feedback has yet to be collated but will be assessed across year groups.

Acknowledgements:

Special thanks to Marta Woloszynowska-Fraser for support and wisdom.

C26

Feedback café on essay writing

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We have a diverse student population who often enter university with little or no essay writing experience and struggle to meet the marking descriptors. In a first-year physiology unit we have a structured plan for essay writing training, but students often do not make effective use of written feedback. To encourage engagement with feedback, especially for first year undergraduate students, we trialled lunch time feedback café sessions in the Biomedical Science Building social space. These were voluntary drop-in sessions where students could have one-to-one sessions with a member of staff to discuss their written feedback and how it related to the marking descriptors for the assessment. Cafés were timed to coincide with the release of essay marks and feedback. Anonymous feedback from the students who attended a café that showed the sessions were valued but take up was low. We would value input as to how to improve take up.

C27

Supporting transferable skills development in first year students.

Elena Paci[1], Joanna Howarth[1]

[1]*University of Bristol, UK*

First year undergraduate students often struggle to identify skills required to enable them to thrive in their degree and beyond, and critically they are unsure how to establish when they have become proficient in a given skill.

To facilitate this, we have embedded weekly online resources into two mandatory Neuroscience units. In the first term, skills focused on learning how to study efficiently, effective notetaking and developing independent learning. During the second term we focused on transferable and global citizenship skills; supporting working well in teams, communication, critical thinking, problem solving and digital literacy. Each skill is paired with a key activity or assessment students encounter that week, providing them immediate opportunities to put tips and suggestions into practice.

Through partnering with students we aim to establish what they found useful and what skills they identify needing to develop further, so that we can further tailor these resources.

C28

Pandemic positives - replicating the online chatbox in the physical classroom

Louise Robson[1]

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During COVID-19 universities had to deliver classes online, using a range of platforms. One thing these had in common was a chatbox, where students could post questions. In my online classes it became clear that students were asking many more questions than they would have done in the physical classroom. As I transitioned back to in class teaching I decided to replicate the online chatbox in the classroom, by enabling a question tool that provides an opportunity for students to ask questions anonymously. Student feedback on the question tool was extremely positive, with 83% of students strongly agreeing / agreeing it was helpful to be able to post questions. Use of this anonymous question tool provides an inclusive and supportive learning environment, where students (who may not have put their hand up in class) can ask questions and importantly get answers and feedback to support their learning.

C29

A workshop about death and dying

Laura Ginesi[1], Derek Scott[2]

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[2]*School of Medicine, Medical Sciences and Nutrition, University of Aberdeen, UK*

Objective:

Death is an uncomfortable truth that some might rather not think about, but we may be disadvantaging students if they lack understanding of what typically occurs when a person is dying (Brown, 2022).

This workshop was designed to provide a safe environment for examination of physiological basis for signs of sudden death and terminal illness (Minett & Ginesi, 2020). Since the content is sensitive, trigger warnings were given in advance.

Fictional characters (Scott, 2022) and core concepts (Michael and McFarland, 2020; Hsu and Halpin, 2022) can help students think about complex ideas in physiology. Following a short mini-lecture, the students' groups focus on selected examples from James Bond movies. They reflect on experience from placement and unpack true causes of why patients die in their practice settings.

We suggest that aspiring healthcare students could benefit from clear, honest explanations of the basis for physiological observations at the end of life.

Acknowledgements:

We gratefully acknowledge the contribution of Katie Brown, a student at University of Aberdeen, whose BSc project provided data on which this workshop is based.

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C30

Student led lecture initiative

Lijun Shang[1]

[1]*London Metropolitan University, UK*

Interactive learning is part of active learning which is an essential component of high-quality lectures for increasing student understanding, how to get students involved still need to be explored. I started an initiative of student led lecture which allow interested student gives a lecture to peers. This has been practised in several modules by a top student in the cohort under my supervision. I would like to share what have been done, the preliminary analysis on these endeavours and also discuss with colleagues in the conference on its feasibility, applicability, and effectivities with a hope to have some broad experiences on Physiology module teaching.

C31

"What is Physiology?": Interview insights straight from the physiologists' mouths

Harley Stevenson-Cocks[1], Michael Taggart[1], Charlie Biggin[1], Aine Browne[1], Joseph Cleghorn[1], Calum Earl[1], Beth Henshaw[1], Areej Mahmood[1], Elysia Marrs1, Luisa Roa-Gil[1], Kavishi Sheth[1], Nakshatra Sivaraj[1], Rebecca Watson[1]

[1]*Newcastle University, UK*

Physiology is often described as the ‘science of life’. It’s a good headline but, without further definition, is perhaps too simplistic an explanation of the complexity, fascination and importance of physiology. Since 2021’s iteration of Physiology Friday, we have tasked our students with gathering perspectives on what physiology is, and what physiologists do, through recorded interviews with peers and academic staff (from several UK universities). These are hosted on an e-repository for public dissemination (https://doi.org/10.25405/data.ncl.19235835). In doing so, students have enhanced their communication, organisational and teamworking skills, broadened their physiological network and academic horizons as well as increased their own understanding of physiology as a scientific discipline.

In this talk, we will describe the outcomes of our efforts to date, including thematic analysis of the interviews for key messages, with a view to encouraging audience debate and suggestions for continued, wider, engagement with the oral recordings of “what is physiology?”."

C32

Interactive tutorial on scientific writing

Alex Swainson[1], Frances MacMillan[1]

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Biomedical science students arriving at university have often not written essays. We have a series of sessions in year 1 to introduce students to essay writing that includes evaluation of example essays using a structured mark scheme used to mark their first essays. This format can be problematic, as feedback is often to the whole class, making it difficult for students to check their individual understanding.

We will report our initial efforts to create an interactive activity using Html-5-Package (H5P) suitable for in-person or online delivery. Using example excerpts from essays, students can work individually or in small groups, to complete activities such as drag-and-drop, answering questions and rearranging sentences to identifying aspects of writing including persuasive argument; identify the most appropriate scientific language; teleology and correct examples of referencing. The tutorial will provide instant feedback that students can revisit when completing coursework or revising for exams.

C33

Wearable technology making stats more fun?

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[1]School of Physiology, Pharmacology and Neuroscience, Faculty of Life Sciences, University of Bristol, United Kingdom

We found that students returning from learning remotely were often struggling with carrying out data manipulation and statistics in excel. In addition to this, students often don't seem to enjoy or engage with analysis as readily as other parts of practical sessions. We tried to counteract this by designing a new analysis based session, were data was collected by the cohort using fitbits in the weeks leading up to the session. During the session, students had to clean the data and then analyse the effects of activity, alcohol consumption and blue light exposure on the sleep of participants. Student feedback indicated that using a large, longitudinal data set collected during their day to day lives made the practical more engaging and helped them develop their analytical skills. However there still appears to be room for improvement in terms of how enjoyable the session was, ideas welcome!

C34

The importance of developing a sense of student belonging for success and progression at university: The role of early transition in students from a range of backgrounds

Teresa Thomas[1], Clare Ray[1]

[1]*University of Birmingham, UK*

Developing a sense of belonging in students results in more satisfied students and enhances success and retention. The presentation will be based on the results of a transition survey conducted at the University of Birmingham which provided insight into student engagement with extracurricular activities, staff and their peers during their transition to university. Our results suggest that a sense of belonging is closely associated with student engagement with extracurricular activities and is influenced by their interactions with other students and staff. Gaps between the experiences of groups from different backgrounds should be considered when designing activities and support during transition and throughout the course of a student's journey.

C35

Problem-based learning for authentic assessment in a large class setting

Clare Tweedy[1]

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Problem-based learning (PBL) traditionally occurs in small groups with the presence of an expert facilitator to direct learning. The benefits of PBL include student engagement and the development of problem-solving skills. By taking elements of PBL and adapting it to a large class setting, the benefits of PBL can still be achieved with reduced facilitator workload. 220 undergraduate students in a Level 2 module formed 47 groups (4-5 students in each). The focus of the first 4 weeks of the module is on neuroanatomy. A patient case study was produced, and students completed workbooks during weekly timetabled workshops. Training was provided on that week's questions by the facilitator and learning was supplemented with pre-recorded learning material and a neuroanatomy laboratory practical. Students were highly engaged with the task and enjoyed the challenge. In conclusion, PBL can be adapted for authentic assessment in a large class setting.

C36

Respiratory Physiology Experimental Problem Solving to Deduce What You Cannot See

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Functional physiological data is routinely used in respiratory medicine, and its interpretation is often presented professionally as complicated flow charts - a compressed summary. Early years medical students are overwhelmed by information presented as these linear logic diagrams. An example is the "simplified algorithm to assess lung function in clinical practice" by ATS/ERS. In this work in progress, I show a teaching approach where first year undergraduate students "learn" that they can understand the flow chart during an optional hour-long problem solving session. The students painstakingly go down every pathway in the ATS/ERS flow chart using simplified individual clinical examples, which are presented in an order that stresses how the changes in one result lead down a different pathway for clinical logic. Only at the end are the students shown the flow chart. The result is an experience in which the students gain a structural understanding of lung function tests.

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C38

Outreach video and animation assessment for neuroanatomy students

Marta Woloszynowska-Fraser[1]

[1]*Keele University, UK*

Second year neuroscience students were randomly allocated into groups of 6-10 people. They were tasked with creating an outreach video/animation. The topic of the video was pathology related to neuroanatomy. Students were advised they can use any form, but not a narrated PowerPoint. Their target audience was patients and their families. The assessment was marked based on student engagement (25%), verbal skills and accessibility of video/animation (10%), visual aids (10%) and content (55%). A comprehensive marking rubric was created based on Peeters et al. (2010). This significantly decreased marking time and provided broad feedback to students. The assessment was stimulating and helped students develop their ability to work as a team member. An assessment as such brings out the creativity in students and is easily adjustable to other subjects.

Acknowledgements:

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