Horizons in STEM Higher Education Conference Proceedings

Making Connections, Innovating and Sharing Pedagogy

29th – 30th June 2021, Hosted by The Open University, UK

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Dear Delegate,

Welcome to the sixth Horizons in STEM Higher Education Conference. The spirit of the conference has always been one of community, collaboration, and collegiality; and we hope that this year's programme will inspire and inform your scholarship and practice in teaching and learning. This is the first year The Open University has hosted the Horizons in STEM Higher Education Conference, and we are indebted to the National Program Committee for the help and support they have provided throughout the year. This annual conference is primarily a community event, and we thank you for continuing to make it so.

Trevor Collins – Local Organising Committee Chair

Sponsor

We would like to thank our colleagues at Learning Science that have supported this conference.

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Conference Information

Conference Programme

To join the conference please visit the programme on the Horizons in STEM HE Conference website https://ukstemconference.com/programme-2021/ which will provide you with the MS Teams links you require to join each session. Please note that this page is password protected for registered delegates to use, details of which will be emailed separately to delegates. It may be useful to bookmark the page as this is the link you will need throughout the conference. If you become disconnected from a MS Teams meeting return to the programme to re-join the session.

If you do not already have the Teams app installed on your computer, upon clicking the link you will be asked whether you wish to 'Download the Windows app' or 'Join on the web instead', we would recommend that you install and use the app version, which will allow you access to all of the features within Teams.

Helpdesk

Conference staff will be available throughout the conference to help you with any queries that you may have. There will be a member of staff based in the 'Helpdesk' but they can also be reached by emailing esteem@open.ac.uk.

Publicity and Recording

Conference staff and delegates may capture images from the short oral presentation and workshop/demonstration sessions for further dissemination via the Horizons in STEM Conference website or social media channels. Both the opening and closing keynote presentations will be recorded and made available as replays via the Horizons in STEM HE Conference website shortly after the event. Audience members are participants in this process. If you have any concerns, please contact esteem@open.ac.uk.

Posters

Delegates are invited to view the virtual poster display which will be available on the conference website https://ukstemconference.com/ **from Tuesday 29th June**. Conference delegates are invited to vote for the best poster, further details will be available on the website. The winning poster will be announced at the end of the conference on Wednesday 30th June, between 12.15-12.30. The winning author(s) will receive a book voucher.

Session Changes

We will try to keep any session changes to a minimum but inevitably there may be some last-minute changes or cancellations. The programme on the conference website https://ukstemconference.com/programme-2021/ will be updated accordingly with any information about changed or cancelled sessions.

We respectfully ask that in joining the conference, all delegates adhere to the conference Code of Conduct https://ukstemconference.com/code-of-conduct-2/ to ensure this is an enjoyable event for all.

Feedback

We welcome your feedback so if you have any queries, issues or concerns, please contact a member of the Local Organising Committee by emailing esteem@open.ac.uk. We hope you enjoy the conference.

Programme

Day One: Tuesday 29th June

9:00-9:15	**Registration** ***Helpdesk***			
9:15-9:20	**Welcome and Introduction** ***Main Room*** Trevor Collins, Director eSTEeM, The Open University			
9:20-9:30	**Opening Address** ***Main Room*** Professor Nicholas Braithwaite, Executive Dean, Faculty of STEM, The Open University			
9.30-10.00	**Opening Keynote Presentation** ***Main Room*** Paul Taylor, Professor of Chemical Education & Dean: Student Education (Experience), University of Leeds			
10:00-10:15	**Break**			
10:15-11:15	**Short Orals: Assessment 1** ***Room A***	**Short Orals: EDI 1** ***Room B***	**Short Orals: Active Learning 1** ***Room C***	**Short Orals: Laboratory Work 1** ***Room D***
11:15-11:30	**Break**			
11:30-12:30	**Short Orals: Blended and Online Learning 1** ***Room A***	**Short Orals: EDI 2** ***Room B***	**Short Orals: Transitions and Student Support 1** ***Room C***	**Learning Science Workshop - Teaching Innovation Award Winners 2020** ***Room D***
12:30-13:30	**Lunch**			
13:30-14:00	**'Birds of a Feather' Networking Session**			
Room BoF 1	**Learning from the pandemic**			
Room BoF 2	**Can we use Course Level assessment for STEM subjects?**			
Room BoF 3	**Tools and Techniques for Effective Hybrid Teaching**			

Room BoF 4	**How do we best support under-represented students whilst they are at university?**			
Room BoF 5	**Students should co-create STEM curricula: let's ruffle feathers with a student-led debate!**			
14:00-15:00	**Short Orals: Assessment 2** ***Room A***	**Short Orals: Employability, WBL and Apprenticeships 1** ***Room B***	**Short Orals: Active Learning 2** ***Room C***	**Workshop 1** ***Room C***
15:00-15:15	**Break**			
15:15-16:15	**Short Orals: Pedagogical Research 1** ***Room A***	**Short Orals: Sustainability 1** ***Room B***	**Short Orals: Transitions and Student Support 2** ***Room C***	**Workshop 2** ***Room D***
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16:30-17:30	**Short Orals: Assessment 3** ***Room A***	**Short Orals: Employability, WBL and Apprenticeships 2** ***Room B***	**Short Orals: Transitions and Student Support 3** ***Room C***	**Short Orals: Pedagogical Research 2** ***Room D***
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18:00	**Close of Day One**			

Day Two: Wednesday 30th June

9:15-9:30	**Registration** ***Helpdesk***			
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11:45-12:15	**Closing Keynote Presentation** ***Main Room*** Professor Jon Scott FRSB, Higher Education Consultant and Emeritus Professor of Bioscience Education, University of Leicester			
12:15-12:30	**Awards, New Directions Submission Process and Closing Remarks** ***Main Room***			
12:30	**Conference Close**			

Opening Keynote Presentation

Tuesday, 29th June 2021 - 9:30am to 10:00am

Success for All Students in the STEM Curriculum

Paul Taylor

Professor of Chemical Education & Dean: Student Education (Experience), University of Leeds

Abstract

A lot of attention is being given to differential attainment at degree level. Analysis of degree classifications by different protective characteristic or social group shows disturbing differences. University staff and students are rightly concerned and are looking for solutions. However, this is a complex problem and there are no simple fixes. In this short keynote I will discuss some potential ways to start improving outcomes for all students, illustrated with practical examples.

At a high level, decolonization is an important, if controversial, approach to ensuring curriculum feels relevant to all. At a more operational level, we can work to remove barriers to participation in student opportunities, for example work placements, which are known to significantly enhance positive outcomes. Inclusive practice can have a big impact on student success, including digital accessibility, which provides some particular challenges in STEM subjects. Underpinning all this are approaches that ensure all students feel a sense of belonging in their institution and on their programme of study.

The keynote will be brief to ensure there is space for discussion and sharing of ideas.

Biography

Paul Taylor grew up in West Yorkshire. After six years studying Chemistry at the University of Durham and two years postdoctoral research on antimalarials at the University of Geneva, Paul moved to the University of Warwick as a Lecturer, developing pedagogic interests in research-based learning alongside his scientific research. In 2007 Paul became Director of the Reinvention Centre for Undergraduate Research at Warwick and Oxford Brookes. In 2010 he was a founding Director of the Institute for Advanced Teaching & Learning at Warwick.

In 2015, Paul moved to the University of Leeds as Professor of Chemical Education and Director of Student Education for the School of Chemistry. Two years later he moved to the Pro-Dean Education role in the Faculty and in 2021 to his current role of Dean: Student Education (Experience) at Leeds. Paul's current pedagogic interests are in Undergraduate Research, Partnership, Inclusive Practice, Decolonisation and Leadership in HE. Paul continues scientific research in Molecular Evolution.

Assessment 1

Tuesday, 29th June 2021 - 10:15am to 11:15am

Enhancing learning through online open book MCQ examinations – an example from the Biosciences

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Keywords

MCQ; Grade inflation; Discriminator index

Abstract

The introduction of online, open book, multiple-choice question tests a few years ago on a second year Biochemistry module raised a number of questions related to robustness and appropriateness of the approach to support learning. The initial aim of the adaptation was to reduce exam anxiety, with the assessment available on a virtual learning platform for 7 days, though the question paper itself was time limited once opened. The change was successful, although the impact was an exceptionally high average mark above 70%. This raised valid concerns about grade inflation that, as a teaching team, we felt obligated to address and two options were identified, namely a return to an in-class, invigilated exam or writing the questions and answers in a different manner to assess understanding of concepts rather than factual recall. The latter approach was implemented and in the following years the average mark decreased from 76% to 69% and is now consistently around 60%. Initially, we merely rewrote the 'easier' questions, without deeper investigation, which had a small effect on the average mark achieved. In this work, we will discuss the investigation and application of more robust methods to construct discriminative multiple-choice questions, focusing on two approaches: (1) statistical analysis of question performance, e.g. a discriminator index, to robustly identify questions that differentiate students, and (2) formulating our question stem and answers based on in-class discussions, where we can often identify mis-understandings and/or incorrect application of knowledge.

The shift in our approach has helped us write multiple-choice exam questions that can be used in an online, open book environment with robust assessment outcomes that encourage higher-level student thinking.

Multiple True-False quizzes with unlimited attempts

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Keywords

Multiple True-False questions; Online learning; Self-assessment

Abstract

For decades computer-marked assignments have been used as both formative and summative assessments. A Multiple True-False (MTF) question is one that presents the student with a scenario and asks several true-false questions about it. In a review on multiple-choice assessments (Haladyna, 2002) this is described as an unusual format with very positive characteristics, including reliable scores.

In this talk I will discuss a major change to the design of the MTF quizzes used in a large second year mathematics module, namely, an increase in the number of allowed attempts from one to unlimited. More specifically, the weekly quizzes consisted of true-false questions grouped into blocks of 4 about the most basic concepts introduced that week, and after each attempt they received: their marks out of 4, some generic feedback, but not the answers. Every attempt consisted of a new random selection from the question bank, which contained 3-5 roughly equivalent versions of each true/false statement. The new format received very positive student feedback, and their comments suggested that the quizzes helped them to become more reflective learners.

The initial cost of creating a large question bank is high, but the marking is automatic, and the bank can be reused for many years. I will present some data of the student behaviour, including how the marks and time spent changed with each attempt, which shows a high level of student engagement. I will try to combine the experience from my module with the published literature to convince colleagues that the initial cost of designing computer-marked assessments which allow unlimited attempts is worthwhile.

You Have 10 Minutes of My Attention – Using Time as the Criterion for Assessment Deliverable

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Keywords

Assessment; Group work; Student choice; Engagement

Abstract

Student choice in summative assessment is commonly cited as an aid to engagement. However, this often is limited only to choices within assignments (of topic, for example) or occasionally between assignments (to do a report or an exam). In written reports, students often over-deliver, packing in too much information and adding content to appendices, despite instruction not to. They can see word limits as targets, leading to an unnecessarily high workload both for them and the marker. In this study, the authors gave students the opportunity to present a project proposal in any format they chose, with the only limit being the time that would be spent on its grading.

Working in small groups, second year engineering undergraduate students were asked to prepare a project proposal on a topic of their choice. The submission format of the proposal was completely undefined – the only limit being that the students had 10 minutes of the marker's attention. 63 groups submitted work, of which 30% chose to use a traditional written report format. The remainder were a mixture of different kinds of live and recorded presentations and videos. 87.5% of the first-class graded proposals were of this latter type, despite a common set of criteria being rigorously applied to grading, of which the students were aware. Student satisfaction with the assessment was high, with 72% of students saying they were able to effectively apply what they had learnt. Importantly, staff reported less fatigue and greater satisfaction when marking a range of submission types than in previous years, when only written reports were permitted.

Equality, Diversity and Inclusion 1

Tuesday, 29th June 2021 - 10:15am to 11:15am

A case study for connective learning: connecting students, tutors and subject

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Keywords

Student transition; Integration of learning; Group working

Abstract

Fostering connections in higher education is vital, both socially and academically, with the development of relationships with peers and members of the university community being a pivotal aspect of successful student transition into and through education (Brooman & Darwent 2014; Maunder 2017). Integration of learning, as a vehicle for enabling connections, can be viewed from a range of perspectives, including curriculum, pedagogy, individual and social learning, and fostering social justice and respect for diverse experiences, opinions and voices through the relational aspects of learning (Leadbetter 2021).

A tutor group-based case study was developed within a first-year pharmacy module. Prior to the introduction of the case study, tutorials focussed on welfare and personal development, but had no academic input. The rationale for introducing the case was: to provide a basis for students to learn with and from each other; to foster early relationships and friendships; to help students apply and integrate their learning; to set ground rules and foster respectful and inclusive discussions early in the course; to provide experience of group work and formative feedback prior to the module assessment; to provide some insight for tutors into students' learning; and to stimulate discussion within tutorials. The case study took place mid-Autumn semester and was designed to require students to apply elements of their learning from the module, to learn how to search for references for new information, to create a presentation and to answer questions from their tutor. They had two days in which to carry out the activity, before presenting to their tutor. An important consideration this year was also the facilitation of online group working, relationships and conversations.

Feedback about the case study process, content and presentation was sought from tutors and students. This proved to be overwhelmingly positive and was enjoyed by both tutors and students. Tutors reported that students were engaged, they could see the value in setting the foundation for future modules, both in terms of pedagogy and content, and it provided opportunity for some good discussions. It was also felt that students were more relaxed and willing to talk in subsequent tutorials, which was particularly valuable in what could otherwise be quite stilted online tutorials. Some tutors noted that it was difficult to correct misunderstandings or answer specific questions, as they do not have the knowledge across all subject areas. Students appreciated the 'breather' and change from their usual routine, enjoyed working with and getting to know others, including the chance to just 'have a chat' to fellow tutees. They found the questions and discussions with tutors useful and it enabled them to

practise creating and giving a presentation within a group. Comments and suggestions for improvement will be considered for next year.

Overall the case study appeared to fulfil its aims of integrating learning and making connections between students, tutors and subject - enhancing relationships and mutual working, and consolidating current learning whilst also starting to prepare the ground for future learning.

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Using food to encourage a sense of belonging at university: the Cultural Food Stories project

Hilda Mulrooney, Mau Lola, Ashley Nabukenya Ndenzi, Chidera Nnadozie, Fatmata Sow and Maya India Jackson

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Keywords

Food; Culture; Belonging

Abstract

An important dimension of 'belonging' at university is the development of relationships within and between staff and students (Ahn & Davis, 2019), which is in part facilitated by physical presence on campus. While much teaching was necessarily delivered online due to the Covid-19 pandemic (UN, 2020; Crawford et al, 2020), physical engagement of students with the university and opportunities to meet peers and staff reduced. After the first lockdown, sense of belonging in KU students fell as a consequence (Mulrooney & Kelly, 2020). Developing a sense of connection and belonging at university is already potentially more difficult for atypical students, such as BAME, mature, commuting students and those with working or caring responsibilities (Reay, 2010; Wainwright & Marandet, 2010; Waite, 2013; O'Shea, 2015, 2016; Southall et al, 2016).

Food is universal and carries cultural, personal and nutritional value for individuals (Lupton, 1994; Rozin, 2005; Williams et al, 2012). This project, carried out with student partners, aimed to facilitate a sense of belonging at the university through the medium of food. Participants were asked to contribute a recipe, together with the story of the recipe and its' significance, to develop a university-specific cookbook. A recipe template was used, which included a short demographics section and short questions about the significance (personal, cultural and/or religious) to the participant, as well as the impact of participation on their sense of belonging. Alternatively, participants could take part in an optional additional short interview online.

Qualitative data were analysed using basic thematic analysis, and quantitative data were collated and descriptive statistics generated. Using food to engage with students, their culture was explicitly valued with the aim of helping them feel part of the university. This talk will identify specific themes from the research (which is ongoing), in order to explore the potential roles of food in facilitating belonging. Preliminary findings suggest that students welcome the opportunity to share significant recipes, and that belonging is increased in some as a result, suggesting that this approach may be a useful way of ensuring that those from different countries and cultures feel welcomed and recognised.

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The value of the Personal Tutor Scheme (PTS) as a mechanism of supporting belonging in an online world

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Keywords

Personal Tutor Scheme; PTS; Belonging; Support

Abstract

Belonging in higher education enhances student wellbeing, and academic engagement and attainment (Freeman et al, 2007; Hausman et al, 2009; Thomas et al, 2017). Establishment of supportive social contacts within student groups and between staff and students is an important element of belonging (Ahn & Davis, 2019). The Personal Tutor Scheme (PTS) is designed as a mechanism to support students within small groups with a named tutor, allowing them to develop relationships with each other and their tutor. KU is a post-92 university with a vibrant and diverse student population, much of which is atypical with diverse support needs. Currently approximately 63% of our students are BAME, 59% are female, 49% are mature, 55% are commuters and 43% are first-in-family to higher education. The move to online teaching and learning in response to the Covid-19 pandemic is, therefore, likely to have a significant impact on student sense of belonging and wellbeing; indeed this was shown to be the case in the first lockdown (Mulrooney & Kelly, 2020). In addition, the PTS is not interpreted or implemented uniformly across faculties. These drivers underpin this project, which seeks to explore among KU students what the PTS means, how it should be designed and, potentially, the impact of the PTS on student sense of belonging.

The study consists of two phases; a questionnaire exploring perceptions of the PTS and sense of belonging designed using Qualtrics (Qualtrics XM) and administered online using course lists. The questionnaire also includes a demographics section, to enable exploration of the data by key demographic characteristics such as age, gender and ethnicity. Participants had the option of taking part in an online focus group (Phase 2) to identify key student priorities with relation to the PTS. Phase 2 also involves completion of an online Padlet tool (https://en-gb.padlet.com), to collect data on their personal experience of the PTS, in particular this academic year. Ethics approval was obtained from the Faculty Research Ethics committee of the university.

Quantitative data will be analysed using SPSS (SPSS Analytics) with preliminary data available from Qualtrics. Qualitative data will be collated, and basic thematic analysis carried out. The project is ongoing but to date approximately 200 responses have been recorded. Preliminary

data suggests that students recognise the value of the PTS, while they recognise certain facilitators and barriers related to belonging. This talk will outline the current findings and their implications for future development of the scheme. This is relevant to all institutions which implement a PTS.

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Active Learning 1

Tuesday, 29th June 2021 - 10:15am to 11:15am

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

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Keywords

Laboratory work; On-line teaching; Virtual laboratory simulations; Accessibility; Student learning; Psychomotor skills

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.

Flipping the classroom: results from a pre-pandemic study to inform the post-pandemic future

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Keywords

Blended learning; Flipped classroom; Statistics; Active learning; COVID-19

Abstract

Over the past year, COVID-19 has changed the nature of teaching and interaction with students in higher education (HE). Those who were once cautious, or even sceptical, about online approaches to teaching have been forced to adapt quickly to using novel technologies and techniques. University leaders are sending clear messages that the sector has changed permanently following this step-change in how we deliver education in the HE sector. In this context, this presentation addresses the challenges and potential benefits of using a blended learning approach to teach statistics to large non-specialist audiences. Under the conditions imposed by the pandemic, blended and fully online learning have been deployed in a high pressure situation. Students are not only coping with these educational changes, but have had many other aspects of their lives turned upside down. As such, it is very difficult to separate out the effectiveness of the online teaching approach from this wider background of a very different student experience.

A quantitative study was undertaken to investigate the accessibility of an undergraduate foundation statistics module for business and management students over four consecutive years, prior to the COVID-19 pandemic, before and after the adoption of a flipped classroom teaching approach for a large cohort (~ 500 students per year). Students' module feedback questionnaires, exam scores, basic student demographics and online engagement and attendance data were analysed. Those taught using the flipped classroom approach found the module significantly more interesting and the proportion of students who perceived the module to be difficult was roughly half that under the traditional teaching approach. However, there was no evidence of a difference in exam performance, class attendance or online engagement under the two teaching approaches. Perceptions of the flipped classroom differed according to gender, nationality and reported prior mathematics training, but the flipped classroom appears to enhance the student experience by making a traditionally difficult subject feel more accessible.

This research, having been conducted before the pandemic, provides insight into the effectiveness of a blended learning approach to teaching a STEM subject without the confounding effects of changes in all aspects of students' lives due to the pandemic. As such, for those considering keeping elements of blended learning developed in response to the pandemic, the success of this particular flipped classroom may provide much needed positive context.

Laboratory Work 1

Tuesday, 29th June 2021 - 10:15am to 11:15am

Supporting the affective dimension of laboratory learning in the biosciences with virtual laboratory software

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Keywords

Laboratory; Biosciences; Pedagogy

Abstract

Students undertaking first-year biochemistry modules at The University of Surrey were provided with virtual laboratory software prior to entering the 'wet-lab' teaching environment, looking to support student learning by addressing the affective domain of laboratory learning (Bloom, 1984; Krathwohl, Bloom & Masia, 1990; Simpson, 1972)

To evaluate the impact of this intervention, students were surveyed and interviewed to gain an overview of their confidence in the following; preparation for practical work, laboratory health and safety, using laboratory protocols, using laboratory equipment, asking questions about the theory behind the practice, and completing post-practical tests/worksheets. In addition, student academic achievement and software access logs were analysed alongside their confidence to evaluate whether there was any trend between software use, confidence, and/or academic achievement.

This intervention found that students felt significantly ($p>0.05$) more confident when they had access to the software than when they didn't, with the greatest effect on student confidence seen in the category 'using laboratory equipment' with 'laboratory preparation' and 'using protocol/instructions' completing the top three.

Students felt that the virtual laboratory software was beneficial from the beginning of the year, but this high self-efficacy increased significantly ($p>0.05$) towards the end of the year implying that the software had value beyond the challenging first teaching laboratory experience.

When considering contextual focus group feedback alongside the semi-quantitative measures of the impact of the virtual laboratory software, several themes were apparent. A particular strength of the intervention might be the large self-efficacy increase when students used the software to practice

with new and unfamiliar equipment, which was picked up as a point of concern for students when discussing their first laboratory experiences in the focus group.

The reassurance students felt as a consequence of the formative feedback inherent within the software is also a strength of the intervention, as this level of individualised, immediate feedback would be logistically challenging to provide in another format. This could be significant for the sector as a pragmatic approach to giving high quality, appropriate feedback around laboratory skills.

We expect that facilitators of STEM courses with a practical element such as laboratories and workshops will find this discussion most relevant, however, those immersed in the potential for digital tools to support learning will also find this intervention of interest.

Summative assessment and digital collaboration: scaffolding reflection in laboratory learning

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Keywords

student reflection; group work; laboratory learning; digital collaboration; summative assessment

Abstract

Undergraduate Chemical and Environmental Engineering labs at UoN aim to support students to learn practical lab skills, transfer engineering theory in practice and develop the problem based and independent learning competencies that underpin professional engineering practice. During delivery of year 3 labs we observed students struggled with the transition from short, highly structured fixed problem fixed solution labs in year 1 to the extended open-ended problem, open-ended solution labs.

This was attributed to lack of group preparation and reflection before and in between lab sessions, as observed by academic staff supporting individual groups, and limited development of these reflective skills in previous years. Previous research in similar settings indicated that module structuring and opportunities for useful feedback can increase positive student feedback of similar laboratory programmes. Complementary research on collaborative digital tools in engineering has shown that shared team-based tools have been effective for enhancing collaborative knowledge building and planning further.

This study aimed to validate our understanding of student preparation and we could support the transition to self-directed open-ended learning in year 3 labs, answering two key questions:

- Does a change of assessment strategy from 100% individual final lab report to ongoing summative group assessments between session plus final individual lab reports better support and motivate students to a) work effectively as a team b) guide their own learning c) apply experimental design approaches through analysis and reflection?
- Does the provision of collaborative digital tools (in the form of integrating Microsoft Teams into teaching and assessment structure) further support these targets by providing a space where students a) share research and data with their team b) can work asynchronously but collaboratively c) seek feedback from other students and academic staff?

We collected and analyzed two sets of quantitative and qualitative data and feedback from the cohorts before and after adaptions to the course structure. Both sets involved 5 interviews with academic staff involved, student module evaluations, an online student survey for each cohort, digital engagement and grade outcomes of the year groups.

The key observations were 1) preparation for the laboratory sessions was significantly improved 2) engagement with the digital learning provisions was positive, but slightly differently applied

than expected (e.g. alternative ways of communication chosen by students). 3) students' critical analysis of the laboratories visibly changed from focusing on the total workload and support to imbalances in teamwork and pre-lab assessments when introducing the group assessment component.

The presented developments are still ongoing. Observations of and feedback on the recent shift to fully digital teaching and learning during the pandemic will inform provision, training, and guidance.

#DryLabsRealScience a collaborative network addressing the virtual

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Keywords

Laboratory; Practical; Virtual; Student Experience

Abstract

Background: When the first governmental restrictions due to COVID came into force, Universities closed their laboratories doors, but they did not stop teaching; a rapid transition to remote teaching was seen across the sector. The virtual environment provides a particular challenge for those delivering practical experiences. How do we offer an authentic experience in an online environment? The #DryLabsRealScience network was established as a direct response to this issue as a platform to share best practice, experiences, and ideas when supporting remote learning. This presentation will showcase and highlight the network's outputs and report on their practical application through an evaluated case study of a Masters level cross-program virtual practical delivery.

Showcasing resources: The network began as series of free online seminars in which academics from the life sciences shared their practices in supporting undergraduate practical's, final year dissertation projects, mentoring postgraduate research students and their research, all with limited or no access to physical laboratories. Through collaboration with Lecturemotely the network has created and shared a vast range of resources and support for remote teaching, assessment. These include; complete recordings and materials for every talk that the network has hosted, a series of one-page best practise guides on how to do things such as 'designing qualitative questionnaire-based dissertations' and a series of discipline-specific infographics which highlight freely accessible databases, visual tools and learning materials.

Case study: The resources have allowed the development and delivery of practical experiences. Specifically, at Sheffield Hallam University, the resources have been used to generate an iterative problem-solving experience using simulations to generate unique data sets. The virtual labs were delivered as a live collaborative experience and supported by an innovative framework of command prompts to structure the laboratory script. The assessment was performed through the production of electronic laboratory notebooks. The student perceptions and experience of this delivery has been thoroughly evaluated through a mixed-methods approach. Students

identified the essential skills they have developed during the practical experience and reported that the command structure was an effective learning tool.

Blended and Online Learning 1

Tuesday, 29th June 2021 - 11:30am to 12:30pm

Attitudes and Aptitudes in an Interdisciplinary STEM Programme

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Keywords

Interdisciplinary Science; Learning Gains; Problem-Based Learning; Attitudes to Science

Abstract

We will present longitudinal data on the evolution of skills (aptitudes) and concordance with expert opinion about the nature of the disciplines (attitudes) from a problem-based interdisciplinary STEM programme. The programme as discussed here ran from 2014 to 2020 with a total of 90 graduates. In accordance with the literature on problem-based pedagogies [1], we find that the programme supported the development of professional skills in that students recognised the importance of these attributes and had confidence that the programme provided them. In addition, we will present data from the CLASS survey instruments [2], [3], [4] on students' development of increasingly expert attitudes towards Biology and Chemistry in accordance with their self-reported growth in competence in the subjects, despite the limited time for each discipline in a fully interdisciplinary three-year programme. There was also an increase in expert-like attitudes towards Physics amongst the better performing students.

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Employing a Socratic Dialogue when creating online lecture content

Tuesday, 29th June 2021 - 11:30am to 12:30pm

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Keywords

Blended learning; Online learning; Socratic Dialogue; Socratic Method; Engagement; Video production

Abstract

This work proposes employing Socratic dialogue when creating talking head video lectures where a single teacher plays the role of themselves and Socrates to produce more effective and engaging lecture materials.

The Socratic method provides a counterpoint to the “sage on the stage” / “chalk and talk” approach in which, stereotypically, the teacher does all the talking and the students are passive, mutely taking notes and listening. Conversely, in the Socratic method, all participants are responsible for driving the dialogue forwards, but the teacher acts as something of an antagonist: asking probing questions which challenge the beliefs and values of other actors in the discussion. This methodology is necessarily ad hominem in style and is often applied to teaching philosophy, the humanities and law as these might be more readily associated with considering the human condition and our personal ethics and beliefs. However, we believe that it can also be very effective when exploring the applied sciences and particularly computer science.

Computer science is replete with abstractions of esoteric concepts and ideas expressed in a terse form, appropriate for subsequent computation. These abstractions are built on the perspectives and experiences of their designers. Indeed, outsiders to the sphere of computer science may be surprised to discover that advocates of a particular style of programming or approach to dealing with large amounts of data would be considered ideologues by their peers. Through a Socratic dialogue it is possible to question the design and implementation of these abstractions which helps facilitate a deeper understanding of the implementations themselves and their relative shortcomings.

When recording video lectures, the lecturer plays two primary roles. The first is the lecturer themselves and the second is that of Socrates. Physical distinctions may be made by use of different clothing and assigning each character opposing sides of the screen. Socrates, questions the lecturer’s content as it is delivered, initially framed as an interloper, Socrates highlights weaknesses in the Lecturer’s position, sparking discussion between the two characters and leading to a richer and more engaging viewing experience. The lecturer might extend this to include intentional common mistakes in the lecture that are then unpicked and examined in detail and mirroring the thought processes of some students. The dialogue also provides an opportunity for humorous interchanges between the characters.

Efficacy is to be evaluated through student feedback forms and viewing count for the videos disseminated. Initial indications are hugely positive with video views of around 3-4 times the size of the cohort being the norm. Pre-COVID replay videos were generally watched by around half the cohort. We have also received excellent word of mouth feedback from students reporting that Socrates often asks the questions they would have themselves and even that their parents sit in to watch them.

An investigation of how Jupyter Notebooks enhance students learning of data management and analysis

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Keywords

Jupyter notebooks; Integrating theory and practice; Data analysis techniques; Interviews and surveys; Online interactive learning

Abstract

Students on a data management and analysis module (TM351) are presented with study materials using a combination of the Open University's VLE and Jupyter notebooks. They are also being used in Maths, Physics and Technology modules in the Open University. The notebooks are used within a web browser that allows a mixture of discussion and programming code. This is not unlike a wiki in terms of presentation, but it is much more powerful, as it allows data to be queried and displayed in place. Jupyter notebooks were originally designed to support data scientists by facilitating and documenting the process of data analysis.

At the point the project began it was proposed that the Open University module: Algorithms, data structures and computability would move to embedding all module content within notebooks. We wanted to evaluate if this approach would be supported by students.

Whilst there is some literature around how Jupyter notebooks could be used in education settings we found none reporting the effect, success or otherwise, of the proposed methods. To address this gap in the literature we are evaluated the success of TM351 in its current practice, and in how students think it could be improved.

We issued a survey to students from three cohorts of TM351 to better understand how effective the split is between the VLE and notebooks as a learning resource, and if courses would benefit from a reorganisation of the materials. We also interviewed a cross section of students and analysed their responses to get a better idea of how effective the split of theoretical and practical parts of the course between the virtual learning environment and Jupyter notebooks was in supporting their learning and how this affected the way they studied.

We undertook quantitative analysis of the survey results using Python and Pandas libraries in Jupyter notebooks and the interview transcripts using thematic analysis within NVivo.

We found students who at the start of the course felt they were less prepared and those with accessibility issues were more resistant to using the technology to practice data analysis techniques. However, the majority found they reinforced their learning and students interviewed commented on how they liked that you could intersperse experimental code with notes as to what they had done, and this helped them to understand the work.

We found the notebooks were not without problems. Some were caused by the very large data sets students were using or the fact that some students found the multiple notebooks difficult to search to find the appropriate parts of the course for what they wanted to do.

In summary, the more organised and well-prepared students were, the more they benefitted from using the notebooks for practical work, but they liked the split between having theory presented in book form, albeit online, and practical work in the notebooks.

Equality, Diversity and Inclusion 2

Tuesday, 29th June 2021 - 11:30am to 12:30pm

How students' inspirations and aspirations impact motivation and engagement in the first year of study

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Keywords

Inspirations; Aspirations; Curriculum design; Careers; BAME awarding gap

Abstract

The inspiration and aspirations of students when they arrive in higher education have a profound impact on their engagement and subsequent attainment. Students go to university for a variety of reasons: academic interest, future career, and social life (Balloo, 2017). Although these students all arrive with the attention that it is worth spending the next stage of their life learning, the reason why they think this differs (Wong 2016).

Aspirations can serve to inspire an individual. To better understand our students' inspirations and aspirations and how these affect engagement and attainment we asked students pre-enrolment to write a short reflective piece around their motivations. The reflective piece was thematically analysed and linked to the academic outcomes at the end of the teaching year. The study was conducted across the Biosciences and Chemistry provision at Sheffield Hallam University with 78% of students completing the task and consenting to the study. The uptake rate varied with gender and ethnicity with opt-in rates as follows: White Female 92% (n=108), BAME (Black, Asian and Minority Ethnic) Female 87% (n=47), White Male 73% (n=73%), BAME Male 53% (n=36).

Thematic analysis identified four themes surrounding inspirations and aspirations with 58% of respondents naming a specific career as their aspiration. Career aspirations were different depending on ethnicity, with ambitions for medicine and lab work showing a marked difference between BAME and White students (medicine: BAME 47%, White 17%, laboratory work: 29% BAME, 71% White). Level of engagement with the reflective task was a good predictor of final attainment, with students how completed it fully gaining a higher overall first year mark than those who did not.

Focus groups undertaken at the end of the first year of study highlight increased motivation and engagement when students feel their course content is aligned to their career aims and conversely are disengaged by course material, they feel is irrelevant to their chosen career. Here we will discuss the impact of these findings on course design and career readiness, especially for increasing course accessibility and satisfaction of BAME students as well as level of engagement in early formative tasks as an early indicator of attainment. The resulting observations will feed into employability provisions and curriculum design into the future and allude to inclusive practice with implications for the reduction of the BAME awarding gap.

Balloo, K., Pauli, R., & Worrell, M. (2017). Undergraduates' personal circumstances, expectations and reasons for attending university. Studies in Higher Education, 42(8), 1373-1384.

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Inclusivity in academic support: Can strategies to support remote learning help to narrow the gap?

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Keywords

Attainment Gap; Remote Learning; Inclusive practice; Student support; Assessment

Abstract

The awarding gap observed between white students and students of Black, Asian and minority ethnic groups suggests a lack of equality and inclusivity in the student experience in Higher Education. Strategies to remove attainment differences such as improvements in institutional culture and the knowledge and skills of staff have gone some way to reducing the gap but it still persists and is unacceptable. Engagement with academic support, particularly in the context of assessment, has potential to improve attainment for all students but there is some evidence that students of Black, Asian and minority ethnicities may be less likely to access support. This study aimed to evaluate awareness, use and preferences for academic support in the Science, Engineering and Computing (SEC) Faculty at Kingston University, in order to determine whether there are differences between these student groups.

Data collection consisted of an online questionnaire (MSForms) related to student perceptions of available academic support, both prior to and during the COVID-19 pandemic, which was circulated to students on undergraduate courses with the SEC Faculty at Kingston University in December 2020. The questionnaire was completed by 147 students, across a broad range of courses, with 82 (56%) reporting their ethnicity as Black, Asian or minority ethnic groups and 64 (44%) reporting their ethnicity as white. One student did not report ethnicity but completed the remainder of the questionnaire.

Preliminary results demonstrated moderate awareness of academic support services (44% - 90%) but limited use (16% - 43%). The most commonly known (90%) and used (43%) source of support was the personal tutor (43%), which emphasises the perceived importance of this role, followed by in-module tutorials (33%), with no significant differences between groups. However, while personal tutors were the most used source of academic support for Black, Asian or ethnic minority students (45%), peer support was the most used by white students (41%, compared to 23%). Many of the highest preferences were linked to recently available means of support, put in place to support remote learning (52% pre-recorded video guides, 47% Microsoft Teams meetings, 40% Live online chat) along with in-module support through tutorials (48%). When considering reasons for not using academic support, the most common response was 'I do not feel confident contacting staff for help' (31%), reported by 34% of Black, Asian and ethnic minority students and 28% of white students. With academic support being mostly online this year, 52% of all students, and of both groups, reported that they would be more likely to access

support but a significantly greater number of Black, Asian and minority ethnicity students (26% vs 13%) said they would be less likely to access support.

The findings of this research highlight preferences for more accessible and flexible methods of academic support but also indicate that other factors impact tendencies for seeking support. Lessons can be learnt from the remote learning provision, but care should be taken to ensure available support is both relevant and inclusive.

Perceptions of science research: visibility and accessibility of science research as a career in post-16 Biosciences and Chemistry students

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Keywords

Transitions; Inclusivity; Careers

Abstract

Diversity in scientific researchers produces innovative, creative studies, and ensures that the research undertaken reflects the needs and priorities of the whole population (Stirling, 2007). Historically, STEM has suffered from a lack of diversity. More recently, there are numerous initiatives to increase the diversity within STEM. Although progress has been made in some areas, scientific research maintains its disappointing lack of ethnicity-based diversity (e.g. Bernard & Cooperdock, 2018).

Career aspirations are a key driver for first year students at the start of their degree-level study. Our preliminary research found only 34% of students were considering a career in scientific research which varied with ethnicity (38% of White students considering a career in research compared to 20% of students from Black, Asian and Minority Ethnic (BAME) backgrounds), indicating that the lack of BAME representation within STEM research is already evident in pre-university level study.

This study aims to answer the following research questions; 1) What is the visibility and accessibility of science research as a career in post-16 students? 2) Can higher education student-lead interventions increase visibility and accessibility of science research as a career in post-16 students? 3) Is this impacted by the access route into higher education and different student demographics?

343 students undertaking A level Chemistry or BTEC involving Chemistry were given an in-depth questionnaire to investigate the driver and barriers for undertaking degree level Chemistry and their views on Chemistry-based career pathways. Only 27% of participants were actively considering a Chemistry degree course, which reduced to 21% of BAME participants. The majority of students felt that intelligence was a key attribute of a scientist.

Focus groups were undertaken to explore Chemistry and Biosciences teachers experiences of students' inspirations and aspirations of studying science in higher education and choosing

science-based careers. Emergent themes mirrored those found in the student survey; that students felt intelligence was a key criteria for studying science in higher education and undertaking a scientific career and in addition there was little knowledge of science research as a career. The focus groups were also used as a platform for the co-design of activities and resources aimed to increase visibility and accessibility of scientific research as a career in post-16 students.

Currently, co-designed projects are being undertaken with several post-16 STEM education providers to increase the visibility of science research as a career in post-16 students. A variety of activities and resources are being designed and delivered in collaboration with higher education students to improve the accessibility of science research. Data will be presented to show the impact of these activities and resources on post-16 students utilising pre- and post-intervention questionnaires with both closed and open questions. Chemistry and Biosciences teachers' experiences and evaluation of the activities and resources will also be captured using qualitative methodologies.

Bernard, R. E., & Cooperdock, E. H. (2018). No progress on diversity in 40 years. Nature Geoscience, 11(5), 292-295.

Stirling, A. (2007). A general framework for analysing diversity in science, technology and society. Journal of the Royal Society Interface, 4(15), 707-719.

Transitions and Student Support 1

Tuesday, 29th June 2021 - 11:30am to 12:30pm

Flexible STEM education for a post-pandemic world: a case study in Computer Science

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Keywords

Flexible Pedagogy; Technology Enhanced Learning; Computer Science Education; Engagement

Abstract

This talk will outline an approach to blended learning using a variety of technologies, building on a framework for Flexible Pedagogy [1] and utilizing an agile approach to ensure it responds to student and staff needs. Flexible pedagogy focusses on providing students with some control on the how, when and what of learning. The pandemic experience of 2020 saw institutions rapidly and without planning having to move all their provision to online, for prolonged periods. Flexible approaches provided solutions to some of these challenges [2].

The talk is based on experiences of the author during the 2019-20 and 2020-21 academic sessions, adopting an engagement framework [3] as teaching pivoted to online learning and required adaptions and updates as teaching and assessment moved from a face-to-face biased blended model, to one that was nearly entirely online.

The talk will present an outline of how data on student engagement can provide insights into student support needs, and the challenges for teachers and lecturers that such a move requires. The work is primarily presented as a case study from Computer Science, though with a focus on what aspects are applicable to more general STEM education in the future.

1. Flexible pedagogies: technology-enhanced learning, NA Gordon, Advance HE, 2014, https://www.advance-he.ac.uk/knowledge-hub/flexible-pedagogies-technology-enhanced-learning

2. Handbook on Facilitating Flexible Learning During Educational Disruption: The Chinese Experience in Maintaining Undisrupted Learning in COVID-19 Outbreak, RH Huang, DJ Liu, A Tlili, JF Yang, HH Wang - Beijing: Smart Learning Institute of Beijing University, 2020

3. Redmond, P., Abawi, L.A., Brown, A., Henderson, R. and Heffernan, A., 2018. An online engagement framework for higher education. Online learning, 22(1), pp.183-204.

Statistics Service Teaching: What type of support should we provide?

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Keywords

Service teaching; Student support; Statistics teaching

Abstract

The skills to collect, process, analyse and interpret data are increasing sort after by employers. In response to this universities incorporate data analysis skills into a wide range of qualifications in subjects covering Economics, Psychology, Criminology, Computing, Social Science, Education, Business and Engineering. There are a variety of different models that are used to enable students to develop these skills. One model is to teach statistics as, so called, service modules within each qualification. These modules can pose challenges as students can be less motivated to learn statistical techniques and can require more support than mathematics and statistics focused students. Support can take various forms: academic; social; and pastoral. For service modules it is important to ensure that how each of these forms of support are provided is considered. For example, a psychology student may not have studied any mathematics or statistics for many years and therefore may need a large proportion of pastoral support in terms of confidence building and resilience when learning statistics. One way of gaining this confidence could be through the social support given by peers on the same qualification and the realization that their struggles are shared by others.

At the Open University we have a number of statistics modules which serve a range of different qualifications. These modules must concurrently teach students on multiple different qualifications. This presentation will outline how a second level statistics module at the OU provides a range of different support to students who study a wide range of different qualifications. The module is studied by around 500 students of whom only 40% are on a mathematics and/or statistics qualification, the remaining 60% are studying for a wide range of qualifications. During the last two years we have been piloting different ways of supporting these students, using qualification based social tutorials as well as tutorials targeted towards particularly themes.

Attendance data has been collected and analysed, together with feedback from tutors, who teach on the module, and students. Analysis of the free text responses from a questionnaire completed by 100 students enabled several themes, covering what would make tutorials more helpful and what irritated students, to be identified. The free text analysis also quantified a tendency for students on non- mathematics and statistic qualifications to be more vocal, though not more positive or more critical. The analysis of attendance data, and the number recorded tutorial viewings, identified different ways in which different types of tutorials were used by students.

The presentation will report on the evaluation of this work and provide an outline of how these ideas might be incorporated into service teaching.

Opportunities and challenges of online mathematics support

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Keywords

Mathematics support; Online learning; Covid-19

Abstract

Mathematics underpins all STEM disciplines and it is well-known that for many STEM students it presents a barrier to success (National Audit Office, 2007). One measure that higher education has introduced to support students in overcoming this barrier is Mathematics Support (MS) (Lawson, Grove & Croft, 2020). Such provision is well-embedded in the UK but is still in relative infancy in Germany (Schürmann, Gildehaus, Liebendörfer et al, 2020).

Prior to the Covid-19 pandemic, there had been some talk but little action in the MS community about the provision of online MS (Grove, Croft & Lawson, 2020 and Johns & Mills, 2020). With the introduction of measures to combat the spread of Covid-19, MS, in-line with all of higher education learning and teaching, was forced to move online in a very short space of time.

All online learning and teaching has challenges, however the challenges for mathematics are perhaps greater than for many other disciplines because, inter alia, of the difficulties writing and sharing formatted mathematical text. There are further challenges for MS due to its opt-in nature and the fact that many students who would benefit from MS are mathematically-averse and tend to adopt procrastination and avoidance strategies towards mathematics.

This presentation will report preliminary findings from questionnaires and interviews with MS practitioners throughout the UK and Germany. The focus will be not only on the challenges of providing online MS and how they have been addressed, but also on the opportunities that online MS provides and how these have been exploited to provide enhanced elements of service. Preliminary findings indicate the identification in an MS context of three of the five benefits of general Online Learning, as presented by Barber (2021), namely increased flexibility, personalised learning and pedagogical opportunities.

We will conclude with thoughts about what MS provision may look like in the future when online provision is not required by external circumstances and when there are no restrictions on face-to-face teaching.

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Grove, M., Croft, T., & Lawson, D. (2020). The extent and uptake of mathematics support in higher education: results from the 2018 survey, Teaching Mathematics and its Applications. 39(2), 86-104.

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Learning Science Workshop – Teaching Innovation Awards Winners 2020

Tuesday, 29th June 2021 - 11:30am to 12:30pm

Learning Science combines leading-edge educational technology with academic teaching and learning expertise to transform the student learning experience. Drawing on 20 years of e-learning experience, our resources help students to develop skills and deeper understanding in core experimental methods, underlying theory and data analysis - significantly enhancing the learning potential of practical sessions.

The Learning Science Teaching Innovation Awards celebrate and share our partners' outstanding practices and support innovation to positively impact teaching quality and student learning. The 2020 applicants demonstrated how they led innovation in their institution using Learning Science resources and winners were chosen by an expert panel of science educators. We look forward to the Teaching Innovation Awards 2021 and invite all our partners to apply later in the year.

In this dedicated session, four of the 2020 winners will present their work and the impact it has had on their students.

Smart Worksheets to Identify Student Numeracy Skills in the Division of Natural Sciences

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Abstract

Skills in mathematics forms a key aspect of Natural Science degree programmes at the University of Kent. New stage one students were predicted to struggle with key mathematics skills, as a result of the cancelation of A-level/ BTEC examinations, lack of in-school teaching and lockdown fatigue, due to the Covid-19 global pandemic. To action this, in collaboration with Learning Science, the Division of Natural Sciences set out to produce an interactive online Smart Worksheet to identify such students. The Smart Worksheet encompassed fundamental mathematical principles in a range of presentation styles to ascertain not only the theoretical areas but additionally how the problems appear (i.e. graphically, tabular, written format) that students might find problematic. The aim was to assess both individual student and entire cohort understanding across the Division of Natural Sciences.

Here we focus specifically upon the analysis of stage one Biosciences students. The results from the numeracy Smart Worksheet indicated that 60% of incoming students had adequate skills in mathematics. The remaining students that did not engage might have lacked confidence in mathematical skills, preventing them from attempting the test. To identify whether certain groups struggled more than others we compared the engagement and average marks against equality, diversity and inclusivity (EDI) characteristics. A low engagement with the numeracy Smart Worksheet was identified in the male and BME student cohorts, where 45% and 48% engaged, respectively. The results facilitated the implementation of additional support strategies to reinforce mathematical skills for all stage one Bioscience students to enhance future success.

A Virtual Practical Produces Surprising Results

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Abstract

The lab practicals for 2nd year students studying the compulsory 'drug target identification' module on the Pharmacology and Innovative Therapeutics BSc are based on functional analysis of G-Protein-Coupled Receptors (GPCRs) which are a major drug target. One of the Learning Objectives for this module was to provide students with practical experience of methods used to study GPCRs. The topic is covered extensively in lectures before students are offered practicals which are usually delivered in a teaching lab. Students are allocated into groups of 2 or 3 and the practicals are divided into three stages across 3 separate lab sessions; set up, results 1 and results 2.

At the start of each session the practical lead provides an overview and context to the lab session lasting up to 15 minutes and the total length of each lab session is 3 hours. After the final lab session students analyse their data and submit a full lab report for summative marking.

In the wake of the Covid-19 pandemic it was clear that an alternative to traditional lab classes was necessary. Learning Science (LS) has a range of scientific equipment simulations (LabSims) across the fields of biology and chemistry and they also have 'Smart Worksheets' which are in a question answer format. Based on student responses results are automatically generated. We realised that LS had LabSims and Smart Worksheets that aligned well with our practical class. With some customisation we were able knit together text, LabSims, video clips and Smart Worksheets into a practical experience in which students also obtained personalised experimental data sets. Students used their virtual experience and data to prepare a practical write-up in the same format as previous years.

In order to keep a similar format to a lab-based version, the practical was divided into 3 parts which were released online to students over the course of 3 weeks. The release of each part was accompanied by an online Teams session to introduce the new information. After all parts were released an additional Teams session and a one-to-one Teams session were run where students could ask additional questions about the write-up.

Whilst the overall teaching time for the practical decreased from 9 hours to 4+ hours with the virtual experience the majority of the time was now spent on theory and answering questions, whilst in the lab most of the time students were performing tasks and although they had time to ask questions the time was more limited. The smart worksheets were formative, so we didn't use these to assess students directly but the scores gave us a very good indication of student engagement which was 100%. Overall marks for the write-ups increased from an average of 72% (19/20) to 81% (20/21).

The impact of effective online design and the use of Learning Science resources

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Abstract

UWC Science Faculty (Professor Michael Davies-Coleman) and Dr Juliet Stoltenkamp, Director of the Centre for Innovative Education & Communication Technologies (CIECT) discussed the possibility of integrating the Learning Science resources on the University's Learning Management System, iKamva. The partnership with the Learning Science CEO Bill Heslop was officially launched with a visit in January 2020. The CIECT team presented to over 50 staff members, focusing on teaching and learning methodology, whereby a Faculty champion would be assisted to create a structured, interactive online laboratory environment, including a Pre-Lab section. The simulations were integrated into iKamva via LTI (Learning Tools Interoperability) standards. The lecturers were advised and trained on how to align the simulations to specific topics, discussion forums and assessments.

The CIECT team has assisted Science lecturers across disciplines, to create structured interactive online environments. The lecturers are able to structure units of work for students to actively engage in related content and activities. ***Pre-lecture online engagements*** include the embedding of pre-lab simulations to familiarise and prepare students for the lecture. ***During the lecture*** the embedded simulations arranged within the structured environments enabled students to interactively engage and practice experiments to weigh out sample solutions and collect material. Through this process, students are able to accurately engage with lab equipment, explore different options and understand the consequences of their choices. Immediate feedback is provided at any stage about specific elements that may be unclear to them. ***Post-lecture engagements*** enable the students to review and revisit the experiments at any stage to reinforce their learning processes. Recently, Smart worksheets (aligned to the pre-lab simulations) have also been integrated into the online classrooms, enabling students from a broad range of disciplines across Bioscience, Chemistry, and Mathematics to analyse and complete calculation activities.

The CIECT team aims to measure the impact of the design of the online environment and the effective use of the resources for teaching and learning purposes.

The data retrieved from the online learning platform, iKamva will include: number of online Science modules; structured lessons and related outcomes, content and activities; number of embedded Learning Science resources; student engagement within discussion topics; student activity and feedback; number of attempts by students in relation to the smart worksheet; test & quizzes aligned to weekly lessons; and student scores.

Preliminary findings reflect a number of 13 137 learning activities taken within structured online environments, for the period 1 July 2020 to 31st January 2021.

The Use of an Inclusive Curriculum Framework to close a BAME module award gap

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Keywords

Active learning; Inclusive curriculum; Decolonisation; BAME awarding gap

Abstract

The BAME degree awarding gap in all UK Universities is well known. Nationally in 2018/9 the awarding gap between Black students and white students was 22.6 % with 81.4% of white students being award a good degree compared to only 58.8% for Black students (OFS). At Kingston University the development of an Inclusive Curriculum Framework has been an important aspect of addressing differential degree outcomes. The Kingston Inclusive Curriculum Framework can be applied at module, programme or institutional level and focuses on challenging staff to reflect on the extent to which their practices and content:

- are accessible,
- enable students to see themselves in the curriculum and
- prepare students to contribute positively to a diverse world.

These practices embrace some aspects of the decolonisation of the curriculum agenda. An introduction to Kingston Inclusive Curriculum Framework will be provided.

At Kingston, the University provides data on BAME Module average gaps to help identify differential outcomes at module level. In this paper, how the University's Inclusive Curriculum Framework guided work on closing a large module average gap for a first-year chemistry module will be explained. This module had the largest BAME module gap in the whole department.

Research has shown that Active Learning in STEM Higher education benefits all students, but disproportionately benefits students from under-represented backgrounds (Freeman et al., 2020). In this module an eighteen-hour lecture/workshop unit was replaced by a Project Based Learning (PjBL) approach. This allowed students the opportunity to co-create the curriculum. For the assessment of the project work traditional unseen examination questions was replaced with a longer seen examination question based on the PjBL final report. In addition, the delivery, assessment and feedback of the practical programme was made more accessible by providing pre-lab demonstration videos and animations, and developing smart worksheets to provide support in and out of the class.

How these changes can be mapped against the Inclusive Curriculum Framework and how they align with the decolonising the curriculum agenda will be illustrated. These changes had a very positive impact on the BAME module award gap, changing it from -14.3% in 2018 to +10% by 2020.

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Freeman, S. et al., (2020), Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math. Proceedings of the National Academy of Sciences, 117(12), 6476-6483.

Assessment 2

Tuesday, 29th June 2021 - 2:00pm to 3:00pm

Searching for Best Practice in the Successful use of Mark Schemes: Top Ten Tips for Successful Post-hoc Marking

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Keywords

Post-hoc Marking; Mark Scheme Adaptation; Adaptive Marking

Abstract

Covid-19 has placed unprecedented pressure on higher education institutions, not least of which is the uncertainty introduced into planning, delivery and assessment of programmes of study. The flexibility and adaptability, which normally passes unnoticed in the day-to-day business of educators, has been brought into sharp focus. In this paper, we exploit this situation as an invaluable opportunity to explore common practices in marking assessments. In particular, we focus on the development and application of mark schemes in the marking of automated online assessments.

The performance of a student cohort undertaking a given assessment (either examination or coursework) is impacted by a range of factors including: the quality of prepared teaching materials; effectiveness of teaching processes; support provided by educational staff; relevance and understandability of the assessment descriptions; student engagement with learning processes; annual variation in the difficulty and complexity of assignments, etc.

It is extremely difficult to develop a fair and effective mark scheme prior to an assessment activity taking place (when the full impact of the previously listed factors is unknown). Established educational practice however requires an indicative marking guide to be developed before an assessment activity is undertaken. To reconcile these dual demands, pre-defined mark schemes are frequently adapted and actively interpreted during the marking process. The aim being to reach a fair and equitable final set of marks that reflect the lived experience of the assessment.

The authors represent three different disciplines from within the range of STEM subjects. They draw upon their diverse knowledge and experience in order to bring together a collection of insights and examples from their disparate educational practice. Both primary and secondary research methodologies are used to help identify effective and efficient best practice in this area. Essential to this is the consideration the problem from the perspective of numerous impacted stakeholders, including teaching staff, students, QA staff, external examiners and accrediting bodies.

The primary contribution of this paper is to compile a list of ""10 Top Tips"" - advice and guidance for educators in successfully adapting and refining mark schemes post-hoc, after the completion of assessment activities by students.

Implementation of exam proctoring for an end of module exam: Case study from the department of Pharmacy at Kingston University

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Keywords

Exam proctoring; Online exams; Respondus; Canvas; Covid-19

Abstract

The Covid-19 pandemic has changed the way that UK universities, including Kingston University, conduct student assessments. Remote examinations are becoming the new norm and ensuring exam security and validity is challenging; can we ensure that a students' performance in an assessment is due to merit not academic misconduct? Consequently, HE providers have started to use different methods to ensure exam integrity with one being proctoring.

Virtual proctoring involves online invigilation of students during exams, either by remote human proctoring, online artificial intelligence software, or a combination of both. This presentation will report on a pilot of the online proctoring tool Respondus Monitor in the Department of Pharmacy at Kingston University. We will share the lessons we learned and provide recommendations for future usage.

Respondus Monitoring uses the Lockdown browser alongside AI monitoring of the students' webcams and microphones to deter academic misconduct. The browser prevents internet searches, chat use and screenshots of questions, whilst the monitor deters the use of other devices. This system was used successfully for an end of module examination in January. Out of a cohort of 112 students, 103 completed the exam online while 8 opted for on campus sitting due to a mixture of reasons including inappropriate environment or digital inequality. During the exam, 6 students experienced brief technical problems which were promptly addressed by the module team and allowed the students to complete the assessment.

The overall exam average was 56% (range 24%-82%), there was no statistically significant difference ($p > 0.05$) in average marks between the students who sat the exam online at home and those who sat it on campus. For the first part of the exam, the software had flagged 30% of the students who sat the test as "high review priority" for the invigilator to investigate. While part B, had only 8% of the students flagged with "high review priority". Following the review of the high priority, none of the students showed any sign of academic misconduct and it was a matter of poor lighting or having a toilet break. The overall average and pass rate was similar to the previous year where students sat a paper-based exam on campus with human invigilation. Students` performance between this year and last was comparable leading us to conclude that both the system worked as intended and that students were not disadvantaged by its implementation.

Peer Assessment through Comparative Judgement: setting and assessing less structured mathematics questions

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Keywords

Peer assessment; Comparative judgement; Extended response

Abstract

Mathematics traditionally relies largely upon exams for assessment where, in the quest for simple unambiguous marking schemes, the scope for broad open-ended questions that require significant interpretation or scope for different methods of solution is often limited. Comparative judgement is a method of assessing work which is much more amenable to open-ended questions and additionally can engage students as a key part of the marking/assessment process. In this framework we abandon the detailed mark scheme, let students assess their peers' work, retain validity and enhance students' understanding of their work by exposing them to their peers' varied responses to the same question.

Comparative judgement relies on the principle that in many situations assessing the absolute merit of one item can be hard, but assessing the relative merits of two items is relatively easy. Many such comparative judgements of items, whether weights of objects or qualities of responses can be pulled together with a statistical model to produce scores indicating the relative weights of the objects or quality of the responses. Furthermore, the judgements can be made with very little training or guidance on marking/assessing the work, yet still produce (in the assessment context) grades of much the same reliability as traditional mark-scheme based methods. Having students (not teachers or academics or postgraduate assistants) make the judgements has little effect on the reliability of the process while introducing a whole host of benefits associated with peer assessment.

In this talk we outline the motivation for and experience of incorporating this kind of assessment into a second-year mathematics module; and offer some reflections and suggestions for how it might be used and/or improved in the future.

Employability, Work-Based Learning and Apprenticeships 1

Tuesday, 29th June 2021 - 2:00pm to 3:00pm

Supporting activities to embed creativity and innovation as an implicit part of the bioscience student experience

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Keywords

Enterprise; Hackathon; Creativity; Engagement; Biosciences

Abstract

The Wakenham review (2016) identified mismatches in expectations between STEM HE providers and employers, particularly in areas such as creativity, innovation and enterprise; where a compounding factor for this deficit is likely the fact that much bioscience enterprise education was traditionally delivered as extracurricular. To address such disparities in the biosciences at Kingston University, we have initiated a strategy that involves much closer integration of our careers, employability and enterprise support services with the core curriculum activities. This has led to the embedding and contextualisation of several broader university initiatives such as the university's enterprise competition and hack centre directly across all levels of our bioscience curricula. It has also generated new opportunities for students to work directly with employers and professional bodies in exploring and solving real-world scenarios and to work in interdisciplinary teams. These student initiatives have been also complimented with in school dedicated training sessions to empower and equip staff with the necessary tools in delivering enterprise education. These have prepared staff for developing and running a range of collaborative online enterprise events such as hackathons in the wake of COVID-19. These enterprise activities have provided opportunities for students to engage their creativity, capacity for innovation, teamworking, develop new online employability skills whilst tapping into their subject knowledge. Perhaps, moreover, during the time of COVID-19 they provide exciting, enjoyable and social activities alongside more traditional teaching and learning approaches. This presentation will share some of our experiences in developing, delivering and reviewing a range of bioscience enterprise activities including those online as well as demonstrating a successful collaboration of staff and effective use of resources across the university.

Structured Biomedical Sciences Honours Projects: A Protocol for Resilience and Preparedness for the World of Work During the Pandemic?

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Keywords

Biomedical; curriculum; employability; practical; project; teaching

Abstract

For the past four years, undergraduate students studying on the Royal Society of Biology accredited Biomedical Sciences honours degree at Edinburgh Napier University have been undertaking structured, timetabled honours projects co-supervised by a group of academic staff across a number of 'themes'. There is a long-standing emphasis on employability in the curriculum design of this degree (e.g. Skills Passport work of Campbell and MacCallum), and so the projects were designed to allow students to gain hands-on training in a number of techniques that would usually not be available to undergraduates due to cost or access to equipment and training (e.g. RT-PCR, cell culture). Student achievement on the module remained in line with previous years as measured by mean mark and range of marks, and feedback has been positive. In the past year, this structured approach has enabled these projects to go ahead in the context of the COVID-19 pandemic.

The pandemic has created opportunities for Life Sciences graduates in the Central Belt of Scotland, however this cohort of final year students have had a disrupted learning experience over the past year and there is anecdotal evidence of decreased confidence amongst this group of students. 2/3 students chose to attend the 'Immunology' and 'Physiology' RT-PCR in-person lab sessions and online alternatives were provided to students who chose not to. The impact of the in-person laboratories on student experience and preparedness for the world of work was evaluated via a survey and informal verbal feedback. Data were analysed through the lens of transitions based on the 'Five Senses for Student Success' model proposed by Lizzio of 'capability', 'connectedness', 'purpose', 'resourcefulness' and 'cultural competence', and recommendations are made on how student success in the transition to the world of work might be improved through continued changes to the approach to honours projects and the wider curriculum in the biomedical sciences.

Outreach in the curriculum: Skills development in undergraduate and postgraduate Biosciences and Chemistry students

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Keywords

Outreach; Employability; Science communication skills

Abstract

Communicating science to the public through outreach activities is a key responsibility of scientists across all disciplines. Learning the skills and having the confidence to do so however is often perceived as a barrier to undertaking and involvement in outreach (1) and opportunities for training in science communication to a non-scientists audience is not routinely offered (2). By involving students early in their academic studies in outreach activities an alternative route to enhance employability can be provided in addition to improve their communication skills (3). It is

also suggested that by incorporating science communication into degree level study a culture of communication with the public in scientific disciplines may be fostered (2).

At Sheffield Hallam University undergraduate and postgraduate students have been actively involved in outreach activities. This has been achieved by integrating formal training opportunities, project work and seminars into the Biosciences and Chemistry programme as well as students having the opportunity to participate in our public engagement events and schools and colleges activities outside of the set curriculum.

To analyse the impact of participation in outreach on students' skills set and perceived ownership of science, questionnaire responses collected before undergraduate and postgraduate students' engagement in outreach have been collected. Preliminary data analysis of 92 student questionnaires indicated that respondents viewed undergraduate students as the least important group to participate in science outreach and that they viewed outreach activities as more important to children than an adult audience. They also report that the skill areas they are least confident in are talking to large groups, talking to adults about science and the design and delivery of activities. Confidence levels amongst students also did not rate highly in 'explaining difficult concepts simply' although this skill was reported as very important to them personally.

Subsequently, students were then invited to participate in the design, planning and delivery of various outreach activities. The broad impact on engagement with outreach activities will be determined by post engagement questionnaires, with in depth impact being determined by individual interviews. These data will be collected and both qualitative and quantitative analytical techniques will be used to analyse and compare pre and post engagement responses.

Findings from this study will be used to inform future integration of outreach opportunities for students at both undergraduate and postgraduate level into the curriculum and give a better understanding of how we can support skills development and confidence building in the ownership of science amongst early career scientists. The interventions described here will be transferable to other educational institutes and STEM discipline areas.

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[2] Brownell SE, Price JV and Steinman L (2013) Science Communication to the General Public: Why We Need to Teach Undergraduate and Graduate Students this Skill as Part of Their Formal Scientific Training. The journal of Undergraduate Neuroscience Education 12(1): E6-E10

[3] Clark G et al (2016) Science Education Outreach Programs That Benefit Students and Scientists. PLOS Biology 14(2) 1-8

Active Learning 2

Tuesday, 29th June 2021 - 2:00pm to 3:00pm

Interdisciplinary Co-creation for active learning of immunology concepts

Eva Malone[1], Richard Firth[1] and Iain Macdonald[2]

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Keywords

Immunology; visual communication; co-design; interdisciplinary learning; storytelling; mobile active learning

Abstract

The Royal Society of Biology values the development of student creativity and innovation in accredited programmes. This follows many modern scientific RandD organisations that are adapting insights and methodologies from design thinking (Simons et al 2011). The rewards for developing understanding and sharing methodologies can extend beyond solving research questions to enhance the researcher and student learning experience. When academic researchers and students are given the opportunity to work together outside the confines of the curriculum and inhabit a space of 'otherness' in playful learning, liberated thinking and uninhibited ideation can transform patterns of learning and problem solving. Differences in culture, in this case of learning and discipline, are the essential tools in creating the other (Abu-Lughod 1991; Bhaba 1994).

Taking an active learning approach, this study brought students from Biological Sciences and Product Design together to explore new methods of communicating and learning the principles of immunology, at a time when the concept of a pandemic was distant and seemingly remote. Recent student feedback from undergraduate Biological Sciences students indicated a demand for more visual aids and videos to assist in Learning and Teaching of complex immunological concepts. Combining art with science has been shown to be a way of enhancing understanding and communication (Verran 2019).

Active learning is situated at the core of interdisciplinary co-design workshops (Steen 2013). This study exposed scientists and designers to the challenges of reconciling their different cultures of learning through empathy and reflective practice (Schön 1992) in order to develop accessible immunology communication materials.

The study covered five fortnightly extra-curricula Design Thinking workshops (Cross 2011; Brown 2009) located in a Design Studio. Three teams completed the study, comprising of a mix of six Product Design and six Biological Sciences students. Demonstrating active learning the students used their initiative and craft skills applied to easily accessible applications and mobile devices to create their own distinctive digital videos using live action, model making and stop-motion animation as well as digital 2D computer rendering.

During the workshops data from student conversations, presentations and peer feedback was recorded through contemporaneous notes and drawing. Drawing facilitated the communication between the different disciplines by concept mapping and visualising abstract ideas (Averinou

and Pettersson 2020). Semi-structured interviews of the student groups explored their preconceptions, experience and future learnings of working in interdisciplinary groups. Both positive and negative sides to the experience were questioned and discussed, ensuring each participant had an opportunity to give their personal testimony. These interviews were then analysed using thematic analysis (Braun and Clarke 2006). In follow up, a Likert questionnaire was distributed for anonymous data gathering to gauge some of the questions more empirically.

From the qualitative triangulation of participant and researcher interviews and reflective accounts several key findings were identified and four themes that influenced active learning emerged: environment, playfulness as a creative approach, storytelling as a means of expression, and recognition of the value of Interdisciplinary working.

Inclusive inter-disciplinary outreach: Learning in action, learning from action

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Keywords

Inclusion; outreach; professional learning; co-creation

Abstract

As part of a transdisciplinary STEM project, the principal investigator, established a consortium involving professionals spanning Education, Physical Science, Biomedical Science and Engineering at Strathclyde, in collaboration with academics from The Innovation School at Glasgow School of Art.

EPSRC funding was awarded to design, develop and deliver five days' of 'hands on' STEM outreach on the theme of sustainability. aimed at young people, aged between 11 and 13, with disabilities who also live in an area of high social and economic disadvantage. The project actively addresses the need to engage all citizens in the technologies and lifestyle choices for environmental sustainability (Bhamra, Lilley and Tang, 2011; Lockton, Harrison and Stanton, 2008; Rolfe, 2016). This STEM consortium seeks to develop their own pedagogic skills for diverse audiences, simultaneously enhancing their own social capital whilst enhancing the science capital of participants (Archer et al, 2015). The evaluation will thus be theory-based, drawing on Bourdiesian notions of 'capital' as the sum of knowledge, behaviours and skills that individuals accrue, which enables them to be socially mobile and to exercise wider choices about their life.

To facilitate mutual professional development, 'crossover' workshops will be staged to promote exchanges between educators, scientists and technologists. These notoriously difficult-to-capture inter-disciplinary exchanges will be facilitated by the Glasgow School of Art's School of Innovation and the findings used to inform the design of activities, evaluation tools and dissemination of the project outputs.

The other distinctive component of the project, for which some evidence will be available by the time of the conference, is that the development of pedagogic skills for working with diverse audiences is based on the concept of 'knowing in action'. This will be delivered through an epistemic/ creative community of practice. Rather than extensive theoretical preparation for

inclusive teaching, the participants will develop their understanding by co-creating activities for the target audience. Such a short-lived but intense interaction is characterized as high energy and innovative, capable of rapidly extending participants' knowledge base (Amin and Roberts, 2008).

This focused collaboration contrasts markedly with much routine professional development, which sets out general theory and principles, leaving participants to apply these independently in their own context afterwards. Records of the planning and implementation will provide material for future analysis, whilst part of the evaluation will probe how staff's understanding of inclusive teaching and address if their self-efficacy have been changed by their experiences. If this approach is shown to be an effective form of professional development, it raises the prospect of achieving a paradigm shift in the way that professional development could be undertaken through knowledge exchange with a mutually agreed output.

Design, Development and Evaluation of a Green Chemistry Concept Inventory

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Keywords

Concept Inventory; Green Chemistry; Sustainable Chemistry; Active learning

Abstract

Concept inventories are psychometric instruments to indicate the level of misconceptions held by students on a particular subject area. The Chemical Concepts Inventory (CCI) has been widely referenced in the field of chemical education for the last three decades.[1]

Green chemistry has become a mainstream practice supported by industry, government and academia. Green chemistry includes all aspects of chemical processes that reduce negative impact to human health and the environment and is guided by the Twelve Principles of Green Chemistry.[2] The interest in green and sustainable chemistry has extended considerably in chemistry undergraduate degrees over the last few years. However, to our knowledge, no green chemistry concepts inventory has been developed up to date.

In this presentation, we aim to provide an overview of a student-led project on the development of a CCI in green chemistry and evaluation of its contents by a sample of chemistry undergraduate students, in the form of surveys and focus groups. This green CCI aimed to measure misconceptions of students on topics related to green and sustainable chemistry that are covered in the first and second years of a chemistry undergraduate degree. A list of key recommendations on teaching and learning the foundations of green chemistry will also be provided as a result of this CCI.

References

1. Treagust, D. Int. J. Sci. Educ. 1988, 10 (2), 159−169.

2. Anastas, Paul T.; Warner, John C. 1998 Green chemistry: theory and practice. Oxford University Press.

Workshop 1

Tuesday, 29th June 2021 - 2:00pm to 3:00pm

Developing online collaborative design and prototyping for a Gold Standard Project Based Learning (GSPBL) Multi-disciplinary Project

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Keywords

Project Based Learning; IDEO; Design Thinking; Ideation; Engineering; Collaboration; Multi-Disciplinary; Prototype

Abstract

The updated engineering undergraduate programs at the University of Exeter include a Multi-Disciplinary Group Challenge Project. This student-centered 1st year module was designed with principles of IDEO [1] and Gold Standard Project Based Learning (GSPBL) [2] and facilitates the application of core engineering theory to a real-world problem. The GSPBL module was designed with a blended approach, however further adaption of collaboration and prototyping activities were required due to the pandemic.

The academic team developed a method of combining Zoom and Mural to take students through teambuilding and the IDEO design process online, to collaborate as a group (often across different time zones) enabling them to practice online prototyping techniques and create a final design.

This process of Mural ice breakers, ideating and sketching solutions to demonstrate ideas in low risk, non-assessed activities, built students confidence in creativity, 'failing fast' techniques [3] and online collaboration. Teams were supported through the process of low fi prototype [4] development via Zoom and Mural using personal 3D printers, simple household materials and iterative testing and refinement. Students excelled in this environment and successfully built and tested prototypes, sharing their results with each other through YouTube and group video calls.

As future professional engineers, students will need to work effectively within multi-disciplinary teams on complex and challenging projects. We believe this online collaborative prototyping experience has deepened their learning to highlight and overcome the challenges faced during international collaboration for global engineering projects and provided an appreciation of time zone and cultural differences.

The student feedback and outcomes so far have been excellent. Students have found collaborating with this combination of online tools very productive and have reported feeling connected to their student community. We have used this technique for staff training and to welcome PGT students, with 95% reporting it as a useful and interesting way of working.

This workshop will demonstrate some of these techniques and illustrate how this method could be applied for student and staff collaboration.

Workshop outline

Participants will receive an introduction to the session before being placed in breakout rooms to take part in an ice breaker on Mural. The participants will experience the process with a design challenge and work through a part of the design cycle using online tools. Participants will create an individual design solution to the design challenge, break down their idea into key themes and collaborate to create one cohesive group design solution to the question.

The learning outcomes are:

1. Participants are able to implement the process to foster collaboration and create an experiential learning experience in their own modules or training.

2. Participants will understand how to set a design challenge and develop individual designs using Mural and IDEO techniques.

3. Participants will learn the process of breaking down an idea into main themes and how to share these within a group.

4. Participants will develop the skills to guide a group through collaboration and how to facilitate the creation of one group design/prototype.

Pedagogic Research 1

Tuesday, 29th June 2021 - 3:15pm to 4:15pm

Disciplinary literacies in STEM: What do undergraduates read, how do they read it, and can we teach scientific reading more effectively?

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Keywords

Reading; Scientific literacy; Scientific research; Research skills teaching

Abstract

Learning to read research papers is a key component of scientific training. However, many students find engaging with research literature extremely challenging. Scientific text is technically challenging, with unfamiliar terminology, challenging conceptual or technical information and complex grammatical structure all providing potential barriers to student engagement. My previous work has established that students find reading papers frustrating, and approach reading quite differently to experienced researchers (Hubbard and Dunbar, 2017).

In order to understand how best to teach scientific literature skills, it is first necessary to establish what students are expected to read. I undertook a survey of the Subject Benchmark Statements (SBSs) to determine what level of engagement with research literature was expected for undergraduates in the STEM disciplines. This identified four categories of discipline; (i) those with no requirement to engage with research literature e.g. mathematics; (ii) those that mentioned use of research literature but did not require its use e.g. Chemistry; (iii) those that expected descriptive use of literature e.g. Physics and (iv) those that expected critical evaluation of research literature e.g. Biosciences. This reveals that there are considerable disciplinary differences in when students are likely to encounter research papers, and the level of engagement with research that is expected (Hubbard, in press).

Despite these disciplinary differences, we will all be introducing our students to research literature at some point, whether at undergraduate or postgraduate level. I will also discuss what literacy research can tell us about how students read within their disciplines, and the implications for disciplinary teaching (Beuehl, 2017). This research separates out disciplinary literacy from general literacy, and establishes a need to teach reading and comprehension skills within academic disciplinary teaching (Beuehl, 2017). I will align this discussion to Patricia Alexanders' Model of Domain Learning (MDL), which describes how readers progress from acclimation through competency to proficiency. I will also highlight established pedagogies for teaching students to engage with research literature, and encourage discussion of how we can best support our students navigating this essential component of their discipline.

The Importance of Problem Solving in Maths Online Teaching

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Keywords

Problem solving; mathematical modelling; conceptual understanding; online assessment; education software

Abstract

The learning process of a particular mathematical concept can be subdivided into four levels: (1) know the definitions (2) master the algorithms (3) understand the concepts and (4) be innovative [2]. The first two levels are usually a main component in a typical mathematics curriculum. Intelligent agents using symbolic and numeric computation (e.g., Maple or Mathematica) can mainly deal with definitions and algorithms, rather than with understanding ("why?") and innovation ("why not?"). When taking open-book exams, students have access to various software packages that can help them to pass the exam. This is one of the reasons why it is important to introduce the last two levels both into curriculum and into mathematics summative assessment.

I will present findings about including both understanding and innovation aspects for two units developed at the International Foundation Programme (University of Bristol).

The Introductory Mathematics unit has a strong emphasis on mathematical modelling where students use basic calculus and algebra for solving real-life problems in economics, physics and sociology. It was shown that the comparison of multiple strategies applied to the same problem improves students' mathematics understanding [1]. I will discuss how comparison of different methods facilitated conceptual understanding and innovation. For example, applying an alternative method for solving a real-life problem in the exam made Level 3 students discover a fundamental theorem in calculus.

The Statistics unit was designed to provide students with practical experience in using statistical methodologies to solving real-world problems. In addition to the data analysis project for testing statistical reasoning skills, the written exam also includes problem solving in the real-life context. I will outline the challenge of assessing problem-solving skills both in the stats investigation and in the exam, as well as the benefit of introducing the innovation aspect into learning statistics.

For both units the study will provide evidence from the following sources: (1) samples of students' work (2) recorded live sessions (3) external examiner's comments (4) summative assessment results and (5) final students' feedback.

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Training the Lively Mind: Toward a Signature Pedagogy for Cybersecurity

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Keywords

Cybersecurity Education; Signature Pedagogy; Computer Science

Abstract

The United States government is concerned with the security of its federal networks and critical infrastructure. Indeed, as stated in Presidential Executive Order 13800, American "innovation and values" must be protected, toward the safety and security of all American citizens (2017). In their subsequent report to the president (2018), the Secretaries of Commerce and Homeland Security found that "the United States needs immediate and sustained improvements in its cybersecurity workforce situation" but suffers from both a "shortage of knowledgeable and skilled cybersecurity teachers at the primary and secondary levels, faculty in higher education, and training instructors" as well as a clear inequity in the current cybersecurity workforce (p.2). The secretaries followed by recommending improving and expanding cybersecurity education efforts in order to meet the security needs of our nation (p.3). Curriculum alone, however, is not enough to answer this call. In order to effectively prepare students in any professional field, a deep understanding of the way the experts in the field think, perform and act is essential (Shulman, 2005). Teachers must then intentionally design learning experiences that promote the development of similar attributes in their students. This mixed-method study, therefore, strove to reveal a "signature pedagogy" (Shulman, 2005) for the Cybersecurity profession. Experts in the field of Cybersecurity were surveyed and interviewed. All survey and interview results were independently analyzed and then triangulated. Results revealed a unique, pervasive "lively mind" in cybersecurity professionals. Conclusions about characteristics for effective cybersecurity education are drawn along with a proposal for a pedagogical approach that supports the revealed outcomes. The author then proposes recommendations for further research.

Sustainability 1

Tuesday, 29th June 2021 - 3:15pm to 4:15pm

A sustainability snapshot within a large post-92 university from different perspectives

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Keywords

Sustainability; Curriculum; Interdisciplinary

Abstract

Sustainability is a major global issue (UN, 2019). Universities represent an important route to sustainability (Blessinger et al, 2018; UNESCO, 2014); its inclusion within teaching and research, the modelling of good sustainability practices on campus and the potential for the university as a sustainability hub within the local community for example, facilitating social learning (Wals & Kieft, 2010). It has been suggested that transformation of education is needed in order to both model and foster sustainability learning (Leal Filho et al, 2018). Students consistently indicate they would like to see more sustainability integrated within the undergraduate curriculum (NUS, 2018). However, although institutions may include good sustainability practices, these may not be visible to staff, students or external stakeholders and visitors, thus diluting their potential as advocates for sustainability.

Within a large and diverse post-92 institution, this was explored in a project which had to fundamentally alter in response to the Covid-19 lockdown. The university website was explored (since this is the main source of external information about the institution); a small group of students on a bespoke postgraduate sustainability degree were interviewed, academic staff were surveyed, and key operational staff involved or with an interest in sustainability were interviewed to gain perspective on current university policies and practices. Several excellent examples of good university practice were highlighted, but these were not clearly collated in a single location and were therefore difficult to find. Changes to university structure over time had reduced the visibility of sustainable practices. Staff agreed that inclusion of sustainability within their disciplines was important but did not feel they had the knowledge or resources to do so, and lacked the necessary training. Postgraduate students outlined the importance of a sustainability focus within the undergraduate curriculum. However, since then a huge amount of work has been done and the university commitment to sustainability is much more visible. In this presentation, both the results of the study and the changes which have occurred within the institution since then, are outlined.

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Computing student attitudes to environmental sustainability education

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Keywords

Computing; Environmental sustainability; Curriculum development; Student attitudes

Abstract

Students have voiced concerns that their university courses do not equip them with sufficient information to understand the challenges of environmental sustainability. Although some universities (notably UWE and Keele, among others) have made significant changes to curricula, how best to approach introducing such topics is not widely known. Context is important in making decisions about curriculum changes. Such context would need to take account of subject area, professional body accreditation, pre-defined frameworks, student preferences and the level of knowledge of teaching staff. Thus, initiatives that have been successful elsewhere may (or may not) be successfully applied in a different context. To find out more about the context for computing students at Edinburgh Napier University, we surveyed students (n=50) to ask about their attitudes to environmental sustainability topics and how best such topics might be incorporated into their degree courses. We also asked about their preferences with respect to the environment being an integral part of campus life and how the pandemic had affected their environmental sustainability behaviours. The data was collected in February 2021 and we will present the survey and this data at the conference. We will also share the next steps in terms of curriculum development arising from the survey.

Enhancing Programme Management to enable Programme Leadership: A Roadmap for Programmes

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Keywords

Programme Leader; Programme Management; Succession Planning

Abstract

Programme Leadership within UK Higher Education Institutes has been described as ambiguous and complex with issues including role confusion linked to feelings of overwork and stress (Murphy and Curtis, 2013). Practical suggestions of support for programme leaders (PLs) within the literature include reference to a programme leader's 'handbook' to help and support PLs as they navigate their complex landscape and multiple tasks and duties (Murphy and Curtis, 2013; Cahill et al., 2015). The need for this support still exists today and possibly even more so as a result of the current pandemic.

To address this need, at Edinburgh Napier University (ENU), a collaborative initiative between PL in School of Applied Science, Business Improvement Consultant and Programme Administrator was initiated. The aim was to create a practical support guide for programme management, the programme roadmap, based on the Biological Sciences suite of undergraduate programmes. The suite has a PL, four year-leads with around 35 academics contributing to programme delivery and is supported by three specialist technical teams and one programme administrator with approximately 500 students.

A PL's checklist, created by ENU's Department of Learning and Teaching (DLTE), was used as a springboard. The programme roadmap, in addition to detailing tasks associated with programme management, maps tasks against roles; incorporating an adapted Responsible, Accountable, Consulted, Informed (RACI) matrix (to include Participating and Uninformed) with tasks aligned to incidence in the academic calendar, with the option of recording progress. The tool allows PLs to filter activities, timeframes and responsibilities. This allows the user to focus on the required tasks at any one point, while avoiding overburden when faced with the breadth of tasks to be carried out through the year.

This addresses a core challenge of being a PL: the paradox of focusing on the detail of the necessary tasks in the present while not losing the equally critical view of progress in the longer term. An important element of such a guidance document is to provide awareness of tasks proactively, rather than hoping that PLs ask the correct staff the correct questions when taking on the role, especially when transitions happen due to unforeseen absences.

The tool is a simple Excel spreadsheet to enable easy use and sharing. During its development, colleagues were consulted, feedback was incorporated and the programme roadmap adjusted. This early-stage sharing, and sharing of practice, is being continued within the sector within relevant networks.

The value of the programme roadmap is currently being evaluated, through PL feedback using university internal feedback mechanisms. Additionally, a MSc student in the Business School on

placement with DLTE will evaluate the tool in the context of the challenges that the PL role holds and role ambiguity. Semi-structured Interviews will be used to gain an in-depth insight into the PL role, its challenges, and what can better be done to make this a more effective, clear-cut role.

Sharing research findings will help other PLs and those that support PLs, and ensuing discussions will inform and enhance the continued refinement of the programme roadmap.

Transitions and Student Support 2

Tuesday, 29th June 2021 - 3:15pm to 4:15pm

Student use of digital experience insights and transitions data to develop data literacy via undergraduate MPharm research projects

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Keywords

Digital skills and capabilities; Data literacy; Undergraduate research projects

Abstract

The University of Nottingham (UoN) ran Jisc's national Digital Experience Insights surveys (1) for the first time across the institution in 2020. The findings, including those from benchmarking with the HE sector, led to over thirty proposed recommendations on how UoN could improve the digital experience of its students and staff, which were endorsed by Teaching and Learning Committee (TLC) last summer. (2) Linked to Jisc's Insights, the UoN Faculty of Science Digital Learning Committee developed its own survey that looked specifically at the digital learning transition of its students from secondary education into university.

Four pharmacy undergraduate students, as part of their MPharm year 3 research projects, will be analysing the data to make recommendations to the TLC sub-committee, the Student Digital Capabilities Steering Group, on what digital skills and capabilities should be addressed by a new package of support for first year undergraduate and postgraduate taught students. In doing so, the following recommendations to TLC are being supported:

a. To further involve students in decision-making, their representation and remit on those University committees with a digital focus should be reviewed.
b. With Insights data corroborating with the findings of the alumni digital capabilities' survey, reported in September's paper to TLC, developing students' data literacy should be a key priority for curriculum review.
c. Given the extent to which our professional services staff work with data in their roles, consideration should be given to how 'real-world' case studies and expertise from within our own organisation could be used to support the development of students' data literacy

This paper will share the experience of the four MPharm students, detailing their data literacy development, outcomes from their analysis of various data sets, whilst sharing their recommendations to the steering group.

The students report "our research can provide a basis from which the current systems in place can be revised and improved, to equip our peers with the skills they need to gain maximum satisfaction from their degree".

1. See https://digitalinsights.jisc.ac.uk/our-service/our-surveys/

2. Newall, E. Fleischer, M. & L. Murphy (2020) Digital Experience Insights: Investigating student and staff expectations of the digital environment. University of Nottingham

Forging friendships in first year: CS entrants' reflections on collaborating in a small-group, large-class setting

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Keywords

First year experience; Collaborative learning; Small group; Large class; Peer support; Online learning

Abstract

This study explores the use of collaborative learning to promote peer support and socialisation during the crucial transition to university. It focuses on students' reflections on the teamwork they experienced as part of a first semester, first year module in a Scottish university, taken from September to December 2020 by a cohort of 109 students on six computing-related undergraduate degrees. The module incorporated small-group collaboration in teams of three or four, in a weekly two-hour lab based around an online business simulation. We discuss the module's successfully implemented active learning design (Leontiev, 1978; Vygotsky, 1978).

The theoretical context of the study includes the anonymising effect of large classes (Minnes, Alvarado, & Porter, 2018); small-group interaction to foster peer support and social capital during first year (Brouwer, Jansen, Flache & Hofman, 2016); the challenges in online participation and engagement (Carter, Hundhausen, & Adesope, 2017); and promoting students' engagement by encouraging relationships with classmates (Cabo & Satyanarayana, 2018).

To assess teamwork and learning during the ten-week duration of the simulation, the teams had to produce a video presentation in weeks 7 and 10. As part of the second presentation, they were asked to reflect on their teamwork, particularly on solutions to challenges they faced having to collaborate online when campus-based classes were suspended owing to the Covid-19 pandemic. These reflections, whilst mainly formally expressed descriptions of team problem solving, also mentioned the relationships and friendships formed during group work. We felt these were of interest, given the module took place when the absence of formal and casual interaction on campus was inhibiting the initiation and organic generation of relationships.

Of the 104 students in 32 groups who submitted the second video presentation, 53 individuals gave consent for their words to be analysed and quoted in this study. Of these, 12 were happy for their first names to be used. We did not mention the study before the presentations were submitted, to avoid influencing students' responses. Instead, we emailed details of the study and consent forms after the presentation marks were released, and were encouraged by the enthusiastic agreement of those who responded.

Open coding analysis (Kinnunen & Simon, 2010) is currently taking place to discover the themes that emerge from the teams' responses. We hope to gain insights into students' views of the value of the relationships we aimed to foster by employing small-group collaboration.

What's the point of A-levels?

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Keywords

Degree outcome; Transition; Qualifications; A-level

Abstract

In HE in general, and in STEM in particular, we are wedded to fairly traditional pre-requisite qualifications e.g. you must have A-level biology for study at university. But can you be successful at degree level science without these traditional qualifications? And if you can then what are the implications?

The innovative Natural Sciences programme at the University of Exeter only requires maths plus once science upon intake and yet students study all three sciences in 1st year which qualifies them to take 2nd year modules across the science disciplines regardless of their pre-university subject choice. In a study done at Exeter and published in the Journal of Higher and Further Education, it has been demonstrated that no one science is better preparation than any other for university level study and that students can be successful at degree level in physics, chemistry and biology despite not having studied it at A-level.

If, as this study shows, it is possible to study subjects at university without the traditional background, then what should we do about it? A-levels are narrow and limit choice, so we have tied ourselves to particular pre-requisite qualifications which disincentivises students from taking a breadth of subjects. What is easier, for universities to unshackle ourselves from our traditional and ingrained pre-requisites and think about how to support skills development and students' ability to seek out knowledge for themselves, or reform of the post-16 qualifications system? Whilst the latter would probably be preferable, we know how slowly the wheels turn and these conversations have been had before and gone nowhere. Instead, within HE we must challenge our pre-conceptions and be imaginative in the way we structure our first year curricular to support a more diverse intake and provide opportunities for more people to study the subjects we love. By doing this we will increase both diversity of our student populations, and diversity of thought in our disciplines which can only improve us and bring new opportunities.

Nicola C. King & Grace Hambrook (2020): Examining the impact of pre-university qualifications on success in interdisciplinary science, Journal of Further and Higher Education. https://doi.org/10.1080/0309877X.2020.1854695

Workshop 2

Tuesday, 29th June 2021 - 3:15pm to 4:15pm

What should an inclusive and student-centred timetable look like post-COVID-19?

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Keywords

Timetabling; Commuting; Inclusion; Support; Post-COVID-19

Abstract

The student timetable is a major way by which students identify and interact with their learning environment, both in time and space, and can have a significant impact on their learning experience and levels of engagement. Widening participation has also encouraged students from a diverse range of backgrounds into university with more students commuting (many being Black and Minority Ethnic, BME), each having their own very distinct living and travel arrangements in getting to university. Our own research (from our School of Life Sciences, Pharmacy and Chemistry) has shown a strong negative correlation between travel time and 'the timetable works efficiently for me' (Question 16 of the National Student Survey) and demonstrated a London effect, where scores for Q16 are significantly lower in the capital. Such outcomes have the potential to disadvantage those students and institutions that have higher proportions of commuting students; and especially in larger cities, such as London. This is set against the fact that the majority of our commuting students are BME, many with journey times of between 30 to 180 minutes. Through questionnaires and focus groups, we identified a series of student barriers that inhibited attendance and from this developed a prioritized student-driven list of enablers to help improve timetable satisfaction. We found many of the enablers to be overarching independent of whether students were commuters or not and therefore amenable to the development of an all-inclusive timetabling strategy. Nonetheless, even with clearly defined enablers, there remain challenges in balancing the logistics of delivering significant numbers of diverse timetabled activities across a whole estate (with the additional potential to deliver perhaps more 'off campus' post-COVID-19). The COVID-19 pandemic has 'temporarily' reduced the need for most students to commute opening up new opportunities to review and experiment with online learning and teaching strategies. This workshop will explore with delegates what we feel an effective post-COVID-19 learning environment should look like by considering the interwoven relationship of not only the timetable and its constraints but also how this can be related to the teaching spaces available (whether physical or virtual), the concerns of commuting students; and the lessons learnt during the pandemic in creating more inclusive, flexible and blended learning environments for all.

Assessment 3

Tuesday, 29th June 2021 - 4:30pm to 5:30pm

Integrated Assessment in Brunel Design Programmes

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Keywords

Design engineering; Integrated assessment; Programme revision

Abstract

Brunel Design School has been undertaking a significant programme revision since Oct 2020 to respond to industry change and students' needs. The revision covers its BSc Product Design Engineering, BSc Design, and BA Industrial Design Programmes. A key feature of the revision is the introduction of 'integrated assessment' to the programme design.

'Integrated programme assessment' (IPA) was successfully implemented by the Bioscience team at Brunel (http://www.brunel.ac.uk/about/awards/integrated-programme-assessment). It refers to an assessment approach to allow students to demonstrate programme level rather than module level learning outcomes. The team provided a diagram to illustrate the traditional approach and the new approach, with IPA's benefits to address over-assessment and reduce student and staff workload; and to encourage the creation of a community with shared responsibility for students' learning.

When applying this approach to design programme revision, we encountered several challenges, 1) our staff were used to modular blocks (shown in the first row in Fig 1) rather than teaching and assessment blocks (shown in the second row in Fig 1) and some just added up existing assessment tasks in the new assessment blocks. 2) It proved difficult to develop meaningful assessment blocks as this required a lot of discussion between colleagues teaching different content; and elective modules added further complexity. 3) Restrictions of Senate Regulations and Engineering Council's 30-credit compensation (https://www.engc.org.uk/media/2870/compensation-and-condonement.pdf?dm_t=0,0,0,0,0)

We sent key members of the working groups to programme development training to better understand IPA, and adopted the integrated assessment strategy early in the programme design. Through involving staff in the process via a variety of means (e.g. making work-in-progress presentations at staff meetings, Q&A sessions, small group meetings focusing on assessment), we have managed to introduce assessment blocks, which will permit strong integration in the assessment of the concepts and skills acquired in the related study/teaching blocks, providing the opportunity for deeper learning as well as permitting a more joined-up ability to both capture student study time and balance the scheduling and pacing of assessed work.

We are finalising our programme revision and shall share our insights and lessons learned at the conference, hoping that 'integrated assessment' will inspire more efficient design education delivering in the future.

Flipped Feedback – Engaging Students with the Feedback Process

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Keywords

Assessment; Feedback; Flipped Feedback

Abstract

Student engagement with their feedback is often limited, with some students only looking at their mark and not accessing the feedback comments at all. Part of the reason for this is that students often cannot see where the feedback can be applied in the future – known as having somewhere for feedback to land. Often feedback is provided after work on a module has finished and with no further work on that module, students may lack the feedback literacy to use their feedback as feedforward for other modules or see the link to other pieces of work, even if they are not the same format.

In this pilot study, we flipped the feedback for two pieces of coursework in a module and asked students to submit a draft report prior to releasing generic feedback and a self-evaluation for the students to complete based on common errors from previous years. As part of this reflection, the students needed to rate themselves against the mark scheme, identify things they were already doing well, things they could improve on and things they need to start doing. Additionally, students were asked to identify one or two areas that they would like specific feedback on. They were then allowed to submit a final version of their report. Both versions of the report were marked using an online rubric with only very brief, generic feedback statements. Students were surveyed to determine their satisfaction with this approach, with an overwhelmingly positive response, as well as an average 9% increase in scores from draft to final version ranging from 0 to 31% improvement.

Overall the average mark for the coursework in this module rose by 7% from 55% to 62% compared to last year's cohort who did not use the flipped feedback approach. Despite marking the draft and final submission, actual staff marking time decreased as fewer comments needed to be made on submissions as students had self-identified their shortcomings. Overall this approach has shown a positive improvement of student engagement with their feedback and enhanced learning opportunities.

Engaging students through feedback at scale on an introductory programming course

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Keywords

Feedback; Rubric; Programming

Abstract

It is widely recognised that feedback is an important part of learning. Properly closing the feedback loop implies that effective feedback results in a meaningful change in student behaviour. However, often individual feedback takes time to produce, and for large cohorts of students it can be difficult to provide feedback on draft work in a timely manner.

One strategy to provide feedback quickly to a large cohort is to share the workload across multiple staff members, but this introduces an additional problem in ensuring that the feedback and marking are equitable. With this in mind an attempt was made to create an objective, reusable marking rubric to provide students with feedback on assessed coursework in an introductory programming module. In this paper we analyse data generated from feedback provided for 137 pieces of work from 4 different markers. We consider whether the attempt to create an objective rubric was successful. We also consider the impact of feedback provided for the draft coursework of 84 students on the students' final performance.

Employability, Work-Based Learning and Apprenticeships 2

Tuesday, 29th June 2021 - 4:30pm to 5:30pm

Two Years into a Level 6 Laboratory Scientist (Chemistry) Degree Apprenticeship: A Reflection

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Keywords

Degree Apprenticeship; Blended learning; Work-based learning

Abstract

Degree Apprenticeships are a new route to vocational training and higher education which are rapidly growing in popularity.[1] The University of Nottingham welcomed the first cohort of apprentices onto the level 6 Laboratory Scientist degree apprenticeship in the chemistry area in September 2019. The implementation of the course involve the design of educationally-sound online learning activities that promote the development of the knowledge, skills and behaviours (KSBs) established in the apprenticeship standards.

Here, we describe our experience on developing and delivering this degree apprenticeship course from a blended learning approach. It will provide insights onto the different aspects of the apprenticeship delivery, including blended learning approach, on campus weeks and provision of pastoral care.

This presentation will address the challenges encountered in the design and delivery of the course and will provide a preliminary discussion of the issues faced by the teaching team and how they have been addressed. These insights aim to inform the development and delivery of new apprenticeship courses.

References

1. The Future of Degree Apprenticeships, Universities UK, 2019.

Cross-disciplinary perceptions of research-informed teaching

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Keywords

Research Informed Teaching; Active Learning; Student Perceptions

Abstract

Linking teaching, research and applied practice in higher education is a goal of many academic institutions. In addition, there is a sector-wide expectation that academics should be both active researchers and effective teachers. Within the college of Health Wellbeing and the Life Sciences at Sheffield Hallam University, by reviewing the links between research, applied practice and teaching from both the student and staff perspective, we aimed to:

- Obtain an understanding of the students' and staffs' perception of research and evidence-based practice within teaching.
- Gain meaningful insights into the student experience of research and practice-informed teaching.
- Determine the importance of the research environment informing student choices to around study.

Online questionnaires targeted towards students and academic staff members were used to collect data around research and evidence-based teaching. The research questionnaires were adapted from an original design by Healey (2005) to suit the requirements of a cross-college study and gained 418 responses. To gain a deeper understanding of the analysed data, we followed up the questionnaire with focus groups held in the departments of Nursing and Midwifery, Biosciences and Chemistry and Sport. Thematic analysis was used to identify and report on patterns within the focus group transcripts whilst maintaining the rich detail of the qualitative data.

Several key themes were elicited from the surveys and focus group data. (1) Research and evidence-based practice are essential to students as it demonstrates that the teaching is current. Focus group data highlights that staff being enthusiastic about research would mean they have more knowledge of the subject area, and they would be passionate about what they were teaching. (2) Undergraduates are unaware of the research undertaken in the college before starting the course, and research activity is not a strong driver for recruitment. (3) Students felt that it was important that they were taught by lecturers involved in research. Exposure to research was felt by the students to increase their understanding of the subject material. (4) Students are aware that staff undertake research or are actively involved in discipline-specific research and practice but do not feel a part of those communities.

All years expressed how they thought the teaching quality of their courses was good however, they would like to have more seminars or workshops on course content linked to research and practice to feel more engaged with research. The findings in our college echo that on the broader literature. In response to this, targeted interviews have been used to identify ways of involving students directly in research and the outputs used to building a tool kit of case study resources.

Student agency in a chemical engineering curriculum: perceptions, connections, and critical thinking

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Keywords

Agency; critical thinking; curriculum

Abstract

Agency of learners, or the extent to which learners have scope to direct and influence their own learning activities, has been shown to be important for students across many disciplines, not least STEM, in developing key advanced skills and qualities such as self-efficacy, critical thinking, resilience and innovative problem-solving [1,2]. Employers unsurprisingly value graduates able to exhibit agency in their approach to work through such elements as self-learning ability, ability to formulate problems, and effective teamwork [3]. Here, through a student-led and student-designed research project using questionnaire methodology, we explore via the perceptions of students themselves where opportunities to exert agency may be found in a Chemical Engineering BEng/MEng curriculum. We examine the Strathclyde Chemical Engineering curriculum class-by-class and year-by-year, employing a well-known model of agency involving three 'dimensions', so-called motivational, dispositional and positional [4]. We study correlations and patterns in the types of learning activity which students perceive as enabling them to exert influence and control over learning. In follow-up one-to-one interviews we further examine the link between perceived degree of agency and critical thinking skills, as measured by standardized scales, to explore how perceived agency-delivering activities may correlate with actual developments in thinking styles and skills. Finally we further consider the impact of the recent COVID-driven shift to online learning by comparing student perceptions of the same classes when studied under pre-pandemic conditions and via remote learning. We suggest some ways in which our findings may support further development of curricula in STEM disciplines and comment on some differences between student perceptions of agency and teachers' preconceptions.

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Transitions and Student Support 3

Tuesday, 29th June 2021 - 4:30pm to 5:30pm

Transition and support experiences of first-year STEM students in distance learning universities

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Keywords

Transition experience; Student support; Distance learning universities; Online learning; Course structure; VLEs

Abstract

Some of the stressors that first-year university students face are maintaining old and creating new relationships, acquiring new learning and assessment styles, and learning how to function as independent adults (Lowe and Cook, 2003). Further, students who are home-based experience difficulties with social transition. This study explores STEM students' transition experiences from school/college to The Open University, an institution with a long tradition of distance learning. A survey was administered (February 2021) to a random university-wide sample of students, aged 18-19, who joined their first course in October 2020. Collected data in this study involved student responses in a 7-item Likert scale exploring the transition and support experiences of students, and two open-ended questions in relation to (a) what/who has supported them to adopt to university life and learning and (b) recommendations for the university to strengthen this support system. Likert scale responses ranged from 'strongly disagree' to 'strongly agree'; this study presents the proportion of agreement (agree and strongly agree) to the transition and support statements. Students' comments in the open-ended responses were thematically analysed following inductive analysis (Braun & Clarke, 2006).

Survey responses from 92 STEM students showed that the majority (78.3%) feel that the university and tutors hold them accountable for their learning. One in four students (26%) reported that they have been facing difficulties with their academic study and one in five students (19.5%) feel insecure about their academic progress. Over half of the students (55.4%) agreed that they would discuss academic-related concerns with their tutors and one in four (24%) with the university's community. With regards to their social experience 44.4% of the respondents reported that they find it difficult to establish university friendship networks and integrate into university life and 25.5% has been satisfied with socialising online with their study groups. Themes related to student support include the course structure (accessible and easy to use website, content structured in weeks/blocks, check boxes, set expectations, study planner and cut-off dates), course content (slow start of module, content in multiple formats, good instructions, self-assessment exercises, many tutorial options, opportunities for self-regulation, and optional tutorials), induction (introduction tutorials and forums, freshers events, and contact lists) and support (students support services, supportive and responsive tutors, plenty of available resources and frequent university communication). Themes related to student recommendations include interaction with other students (organised student introductions,

more visible events, opportunities to meet students of the same age and same interests), assessment (more practice questions, more explicit instructions in assignments and formal writing training), and support in transition (academic writing training, time management training, smaller blocks, more introduction tutorials). These findings enhance our understanding of first-year STEM student support in distance learning and have important implications for designing suitable distance learning environments.

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Lowe, H., & Cook, A. (2003). Mind the gap: are students prepared for higher education?. Journal of further and higher education, 27(1), 53-76.

Exploring and supporting undergraduate students' digital learning transition from school to university

Stephanie McDonald, Cristina De Matteis, Elizabeth Newall, Fiona McCullough, Lisa Mott, Barbara Villa Marcos, Vibhu Solanki, Nicholas Rea, Rossana Wright, Steven Bagley, Steven Bamford, Qingqi Wang and Anshul Lau

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Keywords

Digital learning; Student experience; Transition

Abstract

There is a widespread assumption that students entering university may be 'digital natives', and individuals who have grown up with technology embedded in their everyday lives will also be able to use these tools effectively to support their learning. Research suggests, however, that there is variation in students' experiences of digital technologies. Adopting an evidence-based approach to gain insights into our undergraduate students' digital learning experiences and perspectives upon entering university is thus essential to supporting their transition and learning at university.

We present findings of a project supported by the University of Nottingham Faculty of Science Education and Student Experience Grant Scheme (2019-2020), exploring incoming undergraduate students' experiences of digital learning in secondary education. We conducted an online survey and focus groups with first year students across the seven schools in the Faculty of Science at the University of Nottingham, around the following themes: students' use of technology to support their learning at school or college, views on digital learning, and experiences of their learning environment at the start of their undergraduate studies. A number of the survey questions were adapted from the JISC Digital Experience Insights student questionnaire (2020). This was intended to allow comparisons between the data from this study and the results obtained from the Digital Experience Insights survey at the University of Nottingham in 2020. Key findings from this study are discussed, together with their use in informing the development of new approaches to support students in their transition to digital learning at university.

Moving beyond a threshold – developing writing skills in a Bioscience undergraduate cohort

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Keywords

Communication; Essay writing; Learner agency; Threshold concept

Abstract

Over the last 3-5 years, we have noticed a steady decline in the written communication skills of our undergraduate Bioscience cohort. In response, 3 years ago, we started providing formative essay-writing workshops for the level 5 cohort. Initial analysis showed that the attendees performed better in subsequent essay-based assessments, as compared to the non-attendees ($P < 0.05$, non-parametric Mann-Whitney t-test). In the first year, attendance was disappointingly low and student feedback was sought on how to increase attendance. One method used was showing the next cohort the improvement in grades achieved by those attending and, whilst attendance remained relatively poor in the second year of the project, it has increased to approximately 50% (~120 students) of the module cohort in the third year. There were several modifications in the final iteration, which was during the Covid-19 pandemic, in that the assessments had been changed to an essay as coursework rather than a timed exam, which seemed to focus the students' minds on the format of an essay; for some students, this was their first attempt at communicating information in essay at university. Furthermore, workshops were reduced from four to two, provided as live-stream and recorded, while a summative peer review process was included.

Preliminary data indicate that attendees had a significantly higher mark over the three years of the project though we have not yet elucidated whether this improvement was due to the essay workshops and/or improved learner agency. Students graded the peer reviews that they received and there was a strong correlation between the essay mark and the peer review grade, which could be interpreted to indicate that better essays were possibly due to improved understanding of the criteria for a good essay. Lastly, we will be looking at student demographics to elucidate a potential effect on workshop attendance and grade outcomes.

Preliminary conclusions would indicate a benefit of the essay workshops through enhanced student assessment outcomes; further thought is required to optimize improvements and understand how these can be achieved.

Pedagogic Research 2

Tuesday, 29th June 2021 - 4:30pm to 5:30pm

Design and application of the LivChoices web app to signpost programme pathways for C100 Biological Sciences students

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Keywords

Cross-disciplinary curriculum; Module signposting; Programme design

Abstract

Students are often unsure which area of biology they enjoy the most, so choosing which of the 11 undergraduate programmes to study in the School of Life Sciences at the University of Liverpool, can be a daunting and confusing process. There is increasing recognition that a cross-curricular approach to studying biology allows students to develop more-diverse skills and encourages an interdisciplinary approach to research (Gross LJ 2004). The C100 Biological Sciences programme at the University of Liverpool was designed with this in mind, allowing students to choose to transfer to single-discipline programmes in year 1 or 2, or maintain flexibility of choice and graduate with a BSc in Biological Sciences. The programme allows students to explore their interests and navigate in several directions across the curricula, from single-discipline programmes that span subjects from molecules and cells to whole organisms. The Biological Sciences (C100) programme allows students extensive flexibility of module choice. However, with ~290 students choosing from ~150 modules across three years, planning a cohesive course of study was previously confusing for C100 students and posed many challenges for programme staff.

The C100 team designed and created LivChoices (www.livchoices.com) to address these needs to provide a streamlined, visual signposting tool to guide students through their module choices throughout their programme. As well as providing vital 24/7 access for current students to navigate their module choices, LivChoices now provides a fantastic opportunity to promote the programme to visitors at Open Days and Applicant Discovery Days. Students and parents welcome the opportunity to map out programme pathways and exit degree options in the comfort of their own home. Students at our partner University, Xi'an Jiaotong-Liverpool University (XJLTU) can opt to complete the final 2 years of their degree in Liverpool via the 2+2 study route. Due to its overwhelming success with home students following its 2018 launch, the app now has a version specifically designed for XJTLU students based on their Year 1 curriculum learning outcomes, to help guide students through their module choices before they even arrive in Liverpool.

Questionnaire-based surveys of the 2017/18 Year 3 cohort highlighted that students feel strongly that they were able to design a cohesive but flexible programme of study over 3 years. In subsequent years, this was further reflected by the increasing numbers of students who choose to remain on the C100 programme, rather than transfer to single-discipline programmes (5% of the cohort transferred out in 2017/18, reducing to only 1% in 2020/21).

The development of this app has revolutionised and simplified the module selection process for hundreds of students across both Liverpool and China in just a single year. The team are continuing to develop the app to integrate new tools that will further enhance the student experience, such as example students and their career pathways and study abroad options for partner institutions.

Gross LJ. Interdisciplinarity and the undergraduate biology curriculum: finding a balance. Cell Biol Educ. 2004;3(2):85-87. doi:10.1187/cbe.04-03-0040

Students as Partners in Scholarship of Teaching and Learning – Lessons from Practice

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Keywords

Scholarship of Teaching and Learning; SoTL; Students as Partners; Student Partnership

Abstract

The importance of student partnership is well established in the literature and of late, this has included consideration of students as partners in the scholarship of teaching and learning (SoTL) [1]. eSTEeM, the Open University centre for STEM pedagogy, has in recent years been developing its approach in engaging with students as partners in the scholarship of teaching and learning (SoTL). An outline model was produced and presented at Horizons in STEM HE 2019 [2]. The model aimed to provide a range of ways in which students could contribute, from relatively low-level involvement such as sense-checking questionnaires, to leading focus groups and conducting interviews, to full partnership in every aspect of the project.

As seen elsewhere [3, 4] the implementation of student partnership is a complex problem, demanding consideration of multiple factors, including establishing expectations and boundaries.

In this short talk we will outline our experiences from SoTL projects in which students have been engaged as partners. The student roles in these projects include well-defined and relatively isolated roles, full partnership, and a more amorphous “general involvement”. We include perspectives from both staff and students, and will present benefits of student involvement to both parties and the project in itself, alongside difficulties encountered and lessons learnt from the process.

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Learning & Teaching Adjustments within the Mathematical Sciences in Response to the Covid-19 Pandemic

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Keywords

Mathematics; Covid-19; Adjustments

Abstract

In response to the global Covid-19 pandemic departments of mathematical sciences within the UK and Ireland have needed to adapt their teaching approaches and methodologies for 2020/21 to incorporate not only government social distancing requirements, but also periods of national lockdown and the fact that a number of students will have chosen to study entirely online and often overseas. In planning for the many different and possible scenarios, universities have implemented a range of emergency measures and regulation changes to provide a framework for adapting teaching, learning and assessment approaches, and at a subject level, departments have needed to correspondingly respond to specific disciplinary needs.

Within the mathematical sciences, there existed a desire to collectively understand how departments had adapted their teaching, learning, assessment and support practices to identify not only short-term changes as a consequence of the Covid-19 pandemic, but to explore whether there now exist successful emerging teaching practices or approaches arising from this experience that might be continued once adjustments necessitated by Covid-19 are no longer required.

This talk will report on the results of a survey, undertaken as part of an undergraduate student project in January/February 2021, of approximately 40 mathematical sciences departments, detailing their experiences of adapting their teaching delivery. Particular themes that will be discussed with the talk include approaches to delivering mathematical content, facilitating groupwork, changes to modules and module structures, examinations and assessment, and identified student challenges. The talk will conclude by identifying common teaching and learning themes that mathematical sciences departments have identified as being areas for further exploration and/or wider implementation.

Assessment 4

Wednesday, 30th June 2021 - 9:30am to 10:30am

Evaluation of students' employability skills development and the use of radar diagrams in Personal Development Planning

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Keywords

Radar diagrams; Personal development planning; Skills development; Employability skills

Abstract

Increasingly in recent years, there has been concern about the employability skills of UK graduates in certain Science Technology Engineering and Mathematics (STEM) disciplines. Problems highlighted were that graduates sometimes lacked the transferable skills necessary for employment, and/or awareness of when they had developed them (Wakeham, 2016). Electronic Personal Development Planning (ePDP) is widely used as a means of helping students to develop and recognise employability skills. Through reflection, students identify their strengths and weaknesses, and plan for improvement, thus developing independent skills for future personal and professional development (Cowan and Peacock, 2017). While there is evidence that this can be beneficial, e.g. in interview performance (Lackner and Martini, 2017), practices across UK HEIs are highly variable, student engagement is frequently poor, and academic staff have differing attitudes to facilitating PDP (e.g. McKenna et al., 2017a; Peyrefitte and Nurse, 2016).

S112, Science: concepts and practice, was a new module at the Open University in 2017 (60 credits, FHEQ level 4). Each assignment included self-assessment for employability skills development using radar diagrams, and reflection on them. We explored students' perceptions of their skills development, and the efficacy of radar diagrams for recording this. The use of radar diagrams for electronic Personal Development Planning (ePDP) in distance learning was novel in the Open University; our insights could be helpful to many other institutions.

A sample of students' self-assessment scores were collated (n = 20). An anonymous online questionnaire was also sent to 636 students (115 responses) to capture opinions on skills development and using radar diagrams. Finally, two focus groups were held with three S112 tutors at each to establish tutors' perspectives on their students' skills development and use of radar diagrams.

Students demonstrated development of some employment-related skills, particularly communication, collaboration and time management, but not business and customer awareness. While many students recognised their improvements, confidence could be affected by negative experiences, e.g. in teamwork. The use of radar diagrams was not popular, with most only engaging to gain marks. Radar diagrams should be offered as an optional ePDP tool, with more work to support and encourage initial self-assessment and engagement.

Curriculum review for 1st year Mechanical, Aerospace and Civil Engineering

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Keywords

Curriculum review; First Year; Mechanical Engineering; Aerospace Engineering; Civil Engineering

Abstract

Previous research has shown that there is an increasing need for adaptability, creativity and innovation in the engineering curriculum. Continued growth and internationalisation, and developments in school education have led to larger and more diverse cohorts of students in terms of formation and expectations. This, coupled with the digital evolution of teaching and learning, has demanded change. In this paper we present the process by which we have carried out a School-wide curriculum redesign across the first years of Civil, Aerospace, Mechanical, Mechanical-Electrical and Engineering Design degrees at the University of Bristol, UK.

A steering board oversaw the setting of skills requirements, learning outcomes, assessment guidelines and teaching plans through a series of staff workshops. Student focus groups and student data contributed to the results. Unit development proceeded with an unprecedented level of team teaching for a research-focused University. Curriculum mapping and unit content planning was carried out. Overlaid upon this was a mapping of assessment based on skills development, incorporating formative opportunities that helped students prepare appropriately for the summative requirements of the unit. Visual representation ensured appropriate scheduling of content and assessment and allowed better student workload management. A detailed teaching scheme was produced, giving a session-by session plan of the taught syllabus. A total cohort of over 500 students presented a significant challenge to the unit teaching teams.

The 'lived student experience' from a pilot first year in 2020, incorporating many of the ideas, was assessed via semi-structured interviews in focus groups. The emerging themes were analysed and some recommendations for the full rollout in 2021 were made.

The multi-year process of curriculum review, from conceptual design to pilot rollout, following a constructive alignment model, has allowed the development of a curriculum more adapted to today's learners and to the modern University. Challenges and tips for those embarking on a similar process have been discussed.

"Discussion boards don't work": Evaluation of a course blog for teaching with Second Year Bioscientists

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Keywords

Discussion boards; Collaborative learning; Student engagement; Covid-19

Abstract

Covid-19 and associated lockdowns have been a disruptive influence on many aspects of life, including Higher Education. Change, however unanticipated, is not necessarily bad, and the pandemic has offered scope for innovation and experimental approaches to pedagogy.

This presentation will outline our experience replacing a terminal examination paper with an assignment in which students used a Blackboard discussion board throughout a first semester, second year Biomedicine module to develop a "Shared Resource Collection". Participants were required to post reviews of materials (primary-research papers, review articles, videos, websites, etc) linked to the core content of the programme. They were required to share at least one post in each of four submission windows, but were encouraged to add comments and additional posts for further credit.

To evaluate engagement with the new assignment, the frequency, timing of upload, and quality of posts and comments has been assessed. Additionally, students were invited to respond to an anonymous survey examining their perspective on the task.

The a priori scepticism of a colleague who declared "Discussion boards don't work", in the sense that students do not engage with them, was not substantiated by the present investigation. Nevertheless, a number of practical issues were encountered during the roll-out of this assignment. The presentation will therefore conclude with advice for colleagues, from any discipline, considering running a similar activity with their students.

References

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Majid et al. (2015) Preferences and motivating factors for knowledge sharing by students Journal of Information & Knowledge Management 14: 1550004

Equality, Diversity and Inclusion 3

Wednesday, 30th June 2021 - 9:30am to 10:30am

Study skills for scientists - are students prepared for the transition to a science degree?

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Keywords

Transition; Skills; Inclusivity

Abstract

Along with the many pastoral difficulties facing students during transition to University the development of academic and professional skills can be challenging. The reform of A levels has led to an increase in the diversity of qualification entry profiles across the sector in students applying to study science. It is suggested that some qualification pathways may be better at preparing students for university study [1] and that an inclusive curricula may help to improve retention and progression amongst students from vocational pre entry routes [2].

This project aims to identify the confidence in and experience of key scientific study skills in students with different entry profiles transitioning to degree level science courses, and inform interventions to support achievement, retention, and progression. Preliminary analysis of student attainment data across Bioscience and Chemistry courses at Sheffield Hallam collected over the last two years has identified groups of students with certain entry profiles who are more at risk of either not engaging or failing to achieve at level 4.

Currently, qualitative and quantitative questionnaire data collected from 94 first year bioscience and chemistry undergraduates is undergoing analysis to determine how well prepared students are in key scientific study skills when transitioning to degree level study. Analysis also aims to identify whether there are subsets of students (e.g. BAME, mature learners) who highlight specific challenges within these skill areas. Subsequently, focus groups will be carried out to provide further in depth qualitative analysis, allowing the students to reflect on their first year of study and how prepared they felt they were for transition to higher education.

Data from both questionnaire and focus group analysis will be presented.

The outcomes of this project will help us to better understand how we can support early academic study skills in science students from different post 16 qualification entry profile backgrounds. Findings will also provide an evidence base for discussions with partnership schools in preparing students for transition. By identifying specific challenges faced by individual groups, whether that be qualification or personal profile based, study findings will build on literature reporting pre A level reform data and contribute towards informing a more inclusive level 4 curriculum to ensure that progression to degree level study is successful for all students.

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[2] Hurrell E, Shawcross E and Keeling E (2019) How does a vocational qualification (BTEC) prepare students for a degree in Biosciences at a research intensive university? New Directions in the Teaching of Physical Sciences 14(1)

Supporting Students' Scientific Writing in the Age of COVID: Taking Kingston University's SEC Academic Success Centre (SASC) Online

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Keywords

Online learning; Inclusion; Student support; Pedagogy

Abstract

The SEC Academic Success Centre (SASC) is a support service within the Faculty of Science, Engineering and Computing (SEC) at Kingston University which provides students with confidential advice on academic writing and study strategies, including report writing, presentations, note taking, time management, exam revision and referencing skills.

Prior to the COVID-19 pandemic, SASC provided these services in person; once we entered lockdown, just as we were approaching a very busy period for assignment submissions across the faculty, we had to find a way to take the service online – and quickly. Without face-to-face contact with students, we had to find an innovative, digital approach to supporting students at a critical time.

We decided to make use of the submission area of our Virtual Learning Environment (VLE), Canvas, for students to upload draft copies of their work for our team of advisors to review. Students could also request virtual one-to-one appointments with our on-duty advisors. We also created weekly seminars for our foundation and undergraduate students, as well as our postgraduate students via MS Teams. We found that the final component, the weekly seminars, was particularly popular, attracting around 200 students per session at the end of the 2019/20 academic year.

With these seminars, feedback suggested that students particularly liked that they could just drop in and ask a question without needing to attend an entire session. Being available – and visible – online made SASC far more accessible and inclusive to all students and was less disruptive to their study time. We also liaised with our library team so that we had a library representative in attendance at all sessions. These sessions covered topics including 'What is SASC?', time management, question analysis, presentations and research skills, as well as a regular forum for Q&A.

This session will present findings based on student feedback from these sessions and data from the end of the 2019/20 academic year. Preliminary findings include the observation that students we had not seen or heard from before suddenly had a new avenue open to them; this online learning experience has proved extremely popular and has created new channels for communication with students which we would like to continue in the post-pandemic world.

An Appraisal of Apprentices' Satisfaction and Engagement

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Keywords

Engagement; Higher Education Apprenticeship; Satisfaction; Wellbeing

Abstract

Higher education apprenticeship programmes are different from the traditional full-time or part-time ones in many ways such as the methods of assessment, the funding model and strategy, and the learning and teaching style (work-based learning). Literature suggests that these have implications for the engagement of apprentices when compared to their traditional full-time or part-time counterparts. Consequently, the need for "distinctive teaching, learning and assessment strategies" for apprentices is recommended. Despite the plethora of literature in learning and teaching, and apprenticeship model, there is a dearth of literature on the influence of the features of higher education apprenticeship on the satisfaction and engagement of apprentices. Using semi-structured interviews and questionnaire survey of apprentices at Kingston University London, the current study filled this gap. The study found that 'the appreciation of being paid while studying by apprentices' and ''the appreciation of obtaining a professional membership upon graduation" are the features of higher education apprenticeship that rank first and second respectively. The two highest-ranked satisfactory factors for apprentices are 'employers allocating them enough time to study' and the 'availability of IT facilities such as Virtual Learning Environment (VLE)'. The interviewees support this and most of them expand on it, covering the negative implications of having limited time to study which are not limited to poor mental health and wellbeing and poor student experience. The survey also shows that there are negative and positive co-relationships between 10 features of higher education apprenticeship delivery (such as employers prioritising business over apprentices' academic programme) and nine satisfaction indicators not limited to 'employers allocating apprentices enough time to study' and 'availability of IT facilities such as VLE. In relation to engagement, there are negative and positive co-relationships between eight features of higher education apprenticeship (such as employers prioritising business over apprentices' academic programme) and 10 student engagement indicators such as 'apprentices critically connecting/evaluating work activities and learning' and 'apprentices have the sense of belonging to the school/university'. The recommendations include that government, higher education institutions and employers should collaborate and develop strategies to ensure that apprentices get enough time for independent studying. This will contribute to improving their mental health and wellbeing and learning experience. Further studies that will draw on the perceptions of employers and academics such as lecturers is recommended. Employers, higher education institutions and the government will find this study beneficial.

Active Learning 3

Wednesday, 30th June 2021 - 9:30am to 10:30am

Does taking part in a healthy lifestyle challenge enhance student learning and change their attitudes to people living with obesity?

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Keywords

Obesity; Healthy lifestyle; Active learning

Abstract

Obesity is a global issue, with over 1.9 billion overweight adults, and around 400 million overweight children and adolescents. Being overweight is associated with increased risk of non-communicable diseases such as cardiovascular disease, type II diabetes, some cancers and musculoskeletal disorders. Diets and healthy lifestyle programmes that aim to help people to lose weight can be easily accessed, however, most people who lose weight will regain it over time. Teaching about obesity and weight management is a sensitive topic, and some students may not be aware of the challenges that someone overweight or obese faces when trying to lose weight.

On an undergraduate module we co-created a healthy lifestyle challenge with medical science students. Students kept a food and physical activity diary for three days, and then analysed each other's diaries and gave feedback on the positive and negative aspects of their diet and lifestyle, and recommended one healthy lifestyle challenge to be followed for 21 days. Each student received their feedback and either agreed with the recommended challenge or created their own. Typical challenges involved eating 5-a-day, giving up chocolate, avoiding junk food, and walking 10,000 steps a day. During the challenge students supported each other via a closed Facebook group, and posted about their progress. Students kept a diary of their progress and submitted a reflective piece of writing about their experience. Students were asked to complete surveys about their experience of taking part and whether it affected their attitudes to people living with obesity. Results were analysed using descriptive statistics and paired-sample t-tests via SPSS (v27.0). Student feedback was collected from their reflective writing assignment and module feedback.

The results showed that following the challenge 79% of students did not think it was easy for people to lose weight, and 90% said taking part had given them an insight into the challenges of trying to sustain long-term changes to diet and lifestyle. However, despite students reported increased empathy it did not change their underlying attitudes to people with obesity.

Student feedback suggests that students enjoyed the 21-day challenge and found it helped them to understand the weight management topic, due to experiential learning from taking part. Future research will delve more deeply into the reasons behind this.

Using a SLICC (Student-led Individually Created Course) and the RDF (Researcher Development Framework) to capture the experiential learning of a cohort of interdisciplinary PhD students on an industry project

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Keywords

Experiential learning; Student-led; Knowledge exchange; Researcher development

Abstract

The Student-led Individually Created Course (SLICC) is a reflective learning and assessment framework using an e-portfolio and providing academic credit for experiential learning. Students define their own learning experience and outcomes, with a clear structure supported from the outset by their SLICC tutor (Riley et al., 2017).

In this paper we outline our experience of co-designing a new SLICC course, in close collaboration with an industry partner, and a cohort of PhD students.

The PhD students were from the EPSRC and MRC Centre for Doctoral Training in Optical Medical Imaging (OPTIMA) which aims to train interdisciplinary researchers in optical technologies to address key clinical questions. OPTIMA students undertake 180 credits at SCQF11 (RQF/EQF 8) in healthcare innovation and entrepreneurship, and the SLICC was developed to represent a 20 credit course delivered virtually during the lockdown in response to the Covid-19 pandemic in Spring 2020.

The SLICC framework helped students own and co-create their learning experience with the industry partner, Canon Medical, which led to a deeper student engagement drawing on their own research expertise. Eight students worked in pairs to co-develop their projects with Canon Medical. The four projects focused on clinical pathways including; cancers, Parkinson's disease, and Multiple Sclerosis. It built on the existing multidisciplinary curriculum of the CDT programme. For instance, the students drew on their learning from their 2nd year core course "Translational Studies – Innovation & Entrepreneurship Masterclass".

To assess the impact the course had on their development, and for us to understand the impact of the SLICC model in term of employability, we chose to use the Researcher Development Framework (RDF) developed by Vitae (2010) as part of the e-portfolio. Then, with the students, we built in interim evaluation and final evaluation of the course, with informal feedback sought from the industry partner after the interim and final reviews.

The students' learning experiences were transformative in nature, individually and collectively and the SLICC mechanism combined with the RDF empowered the students to plan their skills development, and recognise their own experiential learning with respect to developing as a researcher.

Our work shows that the SLICC format can be flexible and agile, providing a fully online mode of learning with external partners adapted to different Masters' level courses and with integrated study curricula for CDTs and other cohort-based PhD programmes to look at evaluating work

placements, capstone projects and students' consultancy projects with respect to researcher development.

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Vitae Researcher Development Framework 'Vitae, © 2010 Careers Research and Advisory Centre (CRAC) Limited' www.vitae.ac.uk/rdf

Problem-Based Tuition in Blended Environments

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Keywords

problem-based learning; blended learning; group work online

Abstract

Problem-Based Tuition (PBT) is a scaffolded form of PBL that we have developed over the past 15 years to deliver an interdisciplinary science (Natural Sciences) degree [1], [2], [3]. We discuss the issues arising in adapting PBT to a blended delivery in response to the COVID19 pandemic. We compare this experience with the adaptation to blended learning of a PBL module in a Chemistry degree. We report on the adaptation of structured guided reading, lectures and group facilitation. The adaptation of group peer-marking from summative to formative assessment will be discussed. In group work we found students reluctant to engage in facilitated discussion with the facilitator present in the virtual breakout room. Interaction through the synchronous use of OneNote proved a better medium. In both cases, we found it important to provide extensive initial practice in the use of the relevant software for group discussions (Blackboard Collaborate and OneNote). In neither case did moving group work online produce any further problems. In chemistry, where the project outcomes were less prescribed, students showed greater creativity than previous cohorts in the use of technology to present their results. From an educational point of view the adaptations to taking the problem-based approaches online were largely either neutral or positive.

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Laboratory Work 2

Wednesday, 30th June 2021 - 9:30am to 10:30am

Challenges and Opportunities for Online Practical Work in Sub-Saharan Africa

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Keywords

Science Education; Practical Work; Challenges; Learning Technologies

Abstract

Practical work is an integral part of the teaching and learning process in STEM. It helps in promoting manipulative skills, encouraging observations and description, creating motivation and interest for learning science, developing creative thinking and problem-solving ability, developing critical attitudes as well as developing conceptual understanding and intellectual ability. Hence there is a need to mitigate the present loss of opportunity for conventional practical classes by adopting online practical work in science. Such changes may have long term advantages. There is long standing evidence that the use of interactive computer-based simulations can provide powerful learning opportunities and the repertoire of online practical work is expanding rapidly, promising even greater impact.

There are considerable ongoing challenges in providing effective and efficient teaching of practical science. This is a global phenomenon with damaging consequences on national skills and economics progress. However, the difficulties are felt most acutely in those countries that lack resources or educational capacity. Often, physical teaching laboratories are outdated and are not appropriate to teach contemporary science.

This study examines issues and prospect for online practical work in SSA. It includes a brief summary of the present position and presents the views of stakeholders gathered using interviews. The semi structured interviews investigated their attitudes towards introducing new learning technologies and approaches in the teaching and learning of practical work in science. This study is not limited to higher institutions but also extend to the secondary level of schooling.

The results showed that many of the stakeholders interviewed are very enthusiastic about the opportunities embedded in online practical work most especially in the pandemic era. They also assert their readiness to embrace new technologies in STEM practical work but also warn of the challenges, notably the lack the teaching skills required to engage learners in online practical work. The study examines this and other issues, e.g. technology infrastructure and funding, and recommends extensive training of science educators on the use of online learning technologies for practical science engagement.

Cloud Computing in Computer Science Education

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Keywords

Cloud computing; Computer Science Education; Evaluation framework

Abstract

Across the Computer Science industry cloud computing technologies have facilitated major changes in the way software is developed and deployed. Cloud technologies enable computer scientists to develop systems that consider the full software lifecycle including the configuration of the infrastructure and environment where the software will be deployed. However, teaching of Computer Science (CS) in higher education remains largely dependent on physical hardware on-site and practical teaching that emphasises and isolates the design and implementation stages of the software lifecycle. The deployment environments provided in higher education are often designed and implemented upfront by IT support so the skills required to integrate the environment and production of code in a procedural way are often hidden from the student learning and restricted to local services that are supported by central IT. This means key skills in practical problem solving, that align with cloud enabled software engineering, that requires an understanding of computing infrastructure and environments are often not delivered to students. This talk will explore the challenges of integrating cloud computing in a Computer Science curriculum and describe a framework developed to evaluate the technical, practical, legal and ethical merits of using cloud services for teaching Computer Science skills with reflections on our experience and analytics of the usage statistics using the cloud in teaching a range of Computer Science modules.

Home Lab kits: a COVID anomaly or a learning innovation to promote 'playful' Engineering? Reflections on their development, delivery, and impact on learning

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Keywords

Home lab kit; Engineering labs; Practical skills; Learning by doing

Abstract

Teaching core laboratory practical skills of investigation, instrumentation, and measurement, together with the processes of data collection, analysis, and reporting, is widely accepted to be essential in the early years of STEM undergraduate degree courses. However, access to on-campus facilities were severely restricted during the COVID-19 pandemic, significantly impacting on students' experiences in this core skills area.

In the early summer of 2020, the School of Civil, Aerospace and Mechanical Engineering (CAME) at the University of Bristol swiftly partnered with RS Components to develop a personal home lab kit to support a wholly distance-learning practical unit for around 600 first year students. The

rapid deployment of an internationally couriered lab kit solution created a few logistical difficulties which are touched on in this paper.

Whilst students clearly would have preferred access to the normal lab environment, several positive affordances of the personal lab kits were observed. The teaching team noted, and encouraged, notable reduction in the treatment of measurement and instrumentation devices as 'black boxes', significantly enhanced opportunity for creativity and playful inquisition, and an emphasis on the development of effective experimental reporting.

Although initially conceived to provide an immediate solution to restricted access to labs, the kits provide significant benefits in low-stakes exploration of practical engineering lab problems. This has led to the decision to roll these out into a 'post-pandemic' future, where they will be used to augment traditional lab activities to provide a richer learning experience.

Blended and Online Learning 2

Wednesday, 30th June 2021 - 10:45am to 11:45am

Exploring belonging in an online world: perspectives of staff and students

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Keywords

Online; Belonging; Social

Abstract

An unprecedented and rapid global shift to online learning took place in response to Covid-19 restrictions in 2020 (Bao, 2020; Crawford et al, 2020; Longhurst et al, 2020; UN, 2020). Previous research at Kingston University suggested that the first lockdown led to a decreased sense of belonging among both students and staff within the SEC faculty (Mulrooney & Kelly, 2020). Belonging enhances staff and student wellbeing and sense of connection with each other and their peers, impacting upon job satisfaction and academic engagement and attainment respectively (Freeman et al, 2007; Hausman et al, 2009; Thomas et al, 2017). Online and blended learning is likely to be retained at least to some extent post Covid-19, so ensuring that best practice is carried forward, both in terms of academic and social aspects, matters. This project, currently ongoing, seeks to ascertain student and staff perspectives using both qualitative and quantitative methods. To date, 50 staff and 70 students have completed the online questionnaire; while interviews have been held with 23 staff and 45 students. Qualitative data will be analysed using basic thematic analysis, while quantitative data will be collated and statistical analysis for response differences by demographic characteristics will be explored. Initial results suggest that both staff and students value aspects of online teaching and learning (e.g. increased flexibility and access), whilst finding other aspects difficult (e.g. impact on social side of learning). The workshop will enable participants to explore the major themes which arose, using a series of short activities. Attendees will simultaneously gain knowledge of our findings whilst contributing to our understanding of their views.

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The Virtual Palaeosciences Project: connecting, innovating and sharing online pedagogies in a traditionally hands-on field

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Keywords

Palaeoscience; Ecology; Geography; Geology; Fieldwork; Virtual teaching and learning; Online teaching; Community

Abstract

In Spring 2020, when the university teaching sector had to scramble to get teaching material online in response to coronavirus closures, a group of palaeoscientists decided to take a community approach to tracking down virtual resources and supporting each other in the creation of new resources, both to address the immediate crisis and as a longer-term project seeking to increase accessibility and enhance classroom, field and lab classes. We decided to organise a quick workshop in May 2020, and within a couple of months had nearly 200 members from over 20 countries. The palaeosciences – the study of past environmental change, a subject mostly taught within Physical Geography in the UK but also practiced and taught by academics in archaeological science, ecology, environmental science and geology sections – are typically taught in a strongly hands-on way, with field work and laboratory work including both wet lab work and miocroscopy, and the transition to online was initially regarded as “impossible” by some colleagues.

Our main aim is to create a shared archive of virtual palaeoscience teaching resources to support the learning and teaching of environmental change as both a short-term COVID19 response and

for the longer-term improvement of learning, accessibility and outreach within and beyond the academic community. This includes:

- collating existing resources and making them available in different formats
- working together to create new resources and sharing the necessary skills
- creating a supportive community of practice to both share practical experience and to carry out pedagogic research into the transition to online and blended learning in the community.

The ViPs project is created by the palaeosciences community for the community, and intends to make it easier for educators, students and the curious to find existing resources, share expertise in creating and using resources, and bring together the community to support each other. Changing technology and its availability can offer new / different opportunities within the learning environment (and shifting student expectations) and the current situation gives us opportunity (and a push) to begin to address this.

In this presentation we will reflect on our first year as a group and share initial results of research into the experience of palaeoscientists transitioning into blended and online learning in response to the current pandemic.

Evaluation of NUMBAS software for creating undergraduate chemistry online lab resources

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Keywords

Electronic lab reports; Co-creation of the curriculum; Online learning

Abstract

There is a growing body of evidence supporting the benefits of electronic resources for pre and post lab teaching in the sciences. For example, pre-lab tasks have been shown to reduce cognitive load, introduce lab techniques, highlight safety considerations and increase students' confidence[1,2]. Electronic post-lab reports can save time marking and provide immediate feedback as well as offering students stepwise hints to help them work out questions they have difficulty with, and can also generate a large supply of practice questions until the student is happy with the topic. These smart worksheets can be combined with video footage to create a completely virtual lab experience. The need for such resources has been particularly prevalent since face-to-face lab teaching has not been possible during the global Covid pandemic.

There are a variety of routes to creating smart worksheets for electronic lab reporting both in-house and from commercial companies. In this talk we evaluate the use of the free software NUMBAS[3] to create a virtual lab for our 1st year chemistry undergraduates. The talk will describe the process of creating a resource by people with no specialist computational background and no programming experience. The resource created was tested by staff and students who compared it to another version of the e-lab created by a commercial company, as well as to traditional paper-based lab reports used in previous years. We will report on their critical

evaluation from the perspectives of user experience of students and on staff's assessment of its potential use in teaching undergraduate chemistry.

The project was led by a final year undergraduate student, and we will describe the advantages of involving students in co-creation of the curriculum from the viewpoints of both staff and students.

As well as describing our experiences of creating the resource and the results of our preliminary study, we will discuss how NUMBAS could be used in other aspects of teaching as well as in the lab.

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Equality, Diversity and Inclusion 4

Wednesday, 30th June 2021 - 10:45am to 11:45am

Practitioner examples of improving accessibility in online tuition

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Keywords

Accessibility; Online teaching practices; Disability; Inclusive practice; Distance learning

Abstract

For over 50 years, the UK Open University (OU) has supported distance learning, with more than 2.2 million students over that period. It is currently the largest provider of higher education in the world for people with declared disabilities: in 2019/20 approximately 31,000 students declaring a disability studied with the OU (Open University, 2021).

When delivering and supporting education at scale, a level of standardisation is important. However, one size does not always fit all: support must also address individual students' needs and this is particularly true when supporting students with disabilities. In contrast, it can also be the case that materials/processes designed to support an individual or small group of students, if offered more widely, can benefit the learning of a larger cohort (for example many sighted students say that figure descriptions created for visually impaired students support their learning too).

This presentation will discuss an ongoing scholarship project which explores the practices that OU STEM Associate Lecturers (the OU's tutors) employ to adapt their teaching practices to respond to the needs of individual students with disabilities. The study currently focuses on the tutor perspective. Data was collected using a mixed methods approach, including a questionnaire survey (N=100) followed up by a number of individual interviews (N=22). Data analysis used a combination of descriptive statistics and thematic analysis of qualitative data. Preliminary findings will be presented and will be categorised according to common adjustments and more tailored approaches.

These common adjustments included providing material in advance of teaching sessions, accessible amendments of teaching material, and specific adjustments during live sessions to support particular needs. Tailored approaches included working together with disability services and a student's advocate, as well as one-to-one adjustments such as creating short video clips/screencasts to explain key concepts. In interviews, tutors emphasised the importance of a study support approach, of not making assumptions based on a student's declared disability but rather developing a dialogue to explore students' needs using informal conversations to build trust and confidence.

Given the response of the HE sector to the current COVID 19 pandemic, including the transfer of campus-based teaching to online, these findings are likely to be of interest for many in the HE STEM sector and beyond for online and blended teaching situations.

Widening Participation by Effective Outreach in Chemistry

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Keywords

Chemistry; Outreach; Engagement; Enrichment; Pedagogy

Abstract

Background:

It is well documented in literature, that learners from a socially deprived background are underrepresented in Higher Education (Gorard & See, 2009; Gorard, 2010). The social inequalities for these learners means that they are often 'hard to reach and difficult to motivate' due to the multiple barriers they have to overcome (Simon, Mallaburn & Seton, 2020). The 'Chemistry for All' (CfA) initiative was a 5-year longitudinal outreach programme funded by the Royal Society of Chemistry to investigate the barriers for engagement in chemistry in England, beyond compulsory school age. The key findings from the project indicated that 29.5% of the learners involved had increased their confidence in science/chemistry whilst 29.9% had increased their knowledge of suitable career pathways in science/chemistry (https://www.rsc.org/new-perspectives/talent/is-chemistry-accessible-for-all).

Objectives:

This North West HEI was one of the four university outreach providers that delivered a longitudinal outreach programme. The programme was based upon five key themes: Theme 1 – Enrichment; Theme 2 – Enhancement; Theme 3 – Motivation; Theme 4 – Aspiration; Theme 5 – Careers. All activities were high-energy that enriched and enhanced the science/chemistry curriculum for these types of learners (Mallaburn, Seton & Goodwin, 2018). Through partnerships with local schools, an intensive set of interventions have accompanied students through their educational journey from ages 12 – 16. This talk will provide an insight of the programme design and impact of the project from a provider's perspective and how the outcomes of their programme informed the CfA final report and recommendations. A mixed method approach collected evaluation data from each event from students and annual overviews from teachers regarding the impact of the programme.

Discussion and Conclusions:

The data from the students indicated high engagement and enjoyment with the activities, especially practical work. The students benefitted from a student-centred ethos where they were empowered to take charge of their own learning. They particularly enjoyed independently working with university student role models from similar demographic backgrounds. Throughout the five years, the confidence in these young people was evident as they developed a sense of 'belonging' in the university settings. In this study, sustained and progressive outreach interventions are more effective than ad hoc single events and could lead to a review of university outreach provision in the future. The data from the overall CfA report provides key recommendations for policymakers, outreach providers, schools, teachers, and parents, which are informed from our findings.

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Demographic gaps in physics attainment and degree outcomes

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Keywords

Demographic gaps; Attainment; Degree outcomes; Physics; Higher Education

Abstract

Within physics education research, it is well established that men on average outperform women in tests of conceptual understanding, especially the Force Concept Inventory (Madsen et. al 2013). There is also some limited evidence for a comparable ethnicity gap on the FCI (e.g., Henderson and Stewart 2018). Evidence for attainment gaps in course grades is more limited, and differences across other demographic factors are comparatively unexplored.

For UK higher education as a whole, demographic differences in degree classifications have been observed with respect to age, gender, ethnicity and disability (Richardson and Woodley 2003; Richardson 2008, 2009). For gender, women are found to be more likely to get a “good” degree (2:1 or 1st class) than men; while for ethnicity, non-white students are found to be less likely to get a good degree than white students. The difference is particularly marked for Black students and the difference is considerably larger than the gap observed for gender.

In this talk, we review the literature on attainment gaps in physics. We then present the results of an analysis of degree outcomes in physics and physical sciences, based on publicly available data from the Institute of Physics and Advance HE. Using odds ratios, we contextualize the results of the analysis within UK higher education and examine the changes over time. We find no evidence of a large gender difference in physics degree outcomes and tentative evidence indicating any ethnicity gaps in physics are comparable to those observed across higher

education. Comparing the results of this analysis with the literature, we suggest reasons for the discrepancies and possible directions for future work.

Transitions and Student Support 4

Wednesday, 30th June 2021 - 10:45am to 11:45am

Professional Practice, Accreditation and Citizenship: Embedding Equality, Diversity and Inclusion in Engineering Programmes

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Keywords

Equality; Diversity; Inclusion; Citizenship; Accreditation; Engineering; Professional Practice; AHEP; CEng; Curriculum Development; 21st Century Skills; Maker Space

Abstract

Equality, Diversity and Inclusion (EDI) is an incredibly important and welcome update in the revised 4th edition of the UK-SPEC [1] for implementation from December 2021. The Accreditation of Higher Education Programmes (AHEP) coverage of EDI has also been 'strengthened to reflect the importance of these matters to society as a whole and within the engineering profession' [2]. This essential and specific defining of EDI as part of professional engineering registration and accreditation is an historical milestone, reflecting the hard work of many inspirational individuals in the global movement for EDI. Our students are passionate about EDI and engineering educators must illustrate the importance of EDI knowledge, professional skills and real-world application in context locally (within professional relationships and collaboration) and consideration of EDI issues globally (e.g. the inequalities suffered through the impact of climate change and the pandemic).

As we approach the 2nd year of rolling out our updated Engineering Programmes at the University of Exeter, we are striving to create a digitally connected, project based and inclusive curriculum to develop 21st Century Skills. Our GSPBL approach [3, 4] strives to build a culture where students connect with global challenges, adapt to rapidly changing technologies and build strong partnerships with staff and peers in an innovative design and technical making community. We plan to seize this opportunity to uphold our University of Exeter core values, our commitment to EDI and integrate EDI professional standards into our updated engineering programmes to ensure our wonderfully diverse students feel equal, included and respected within our engineering programmes and our engineering graduates exemplify EDI professional standards.

Engineering academics will participate in University workshops aimed at decolonising the curriculum, specific engineering education workshops are planned to integrate Race Equality into our curriculum development using the recently published advice for designing inclusion into engineering education [5] through the 4-pillar model (Culture, Content, Delivery, Practice). Our EDI team launched 3 new UG Scholarships to support black students and reduce inequality in academia [6] and a PhD Studentship for black students is currently in progress. Our EDI team continue to promote gender equality and are striving to implement the Athena Swan 10 key charter principles. A recently appointed Lecturer (Design and GPBL) has a key role to improve student outcomes and prioritise EDI practice in the culture and customs of our new 60-person

maker space (2022). She will manage and ensure inclusivity by addressing gender imbalance in practical skills, working alongside students with educational challenges and English as a second language and support all students through ideation, prototyping and iterative experimentation to learn from failure and move from incremental to radical innovation.

During the final months of this academic year, our team will be going through the aforementioned process of curriculum development for the updated engineering programmes including the integration of EDI. This presentation will document our best practice research findings, early lessons learned and examples of EDI integration within our updated engineering programmes.

Maintaining Engineering Students' Sense of Community through a Peer Assisted Study Scheme

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Keywords

Peer learning; Study support; Online delivery

Abstract

The School of Civil, Aerospace and Mechanical Engineering at the University of Bristol has been running a student-led Peer Assisted Study Scheme (PASS) across each if its undergraduate programmes for three years. Normally operated as small groups in timetabled face-to-face sessions, the pandemic forced all PASS sessions for the 2020/21 academic year online. This study reflects on this process, drawing on qualitative and quantitative data collected from students both as participants and leaders in the PASS scheme.

Whilst students (as participants) were very keen to have the opportunity for PASS sessions face-to-face, they didn't report the online delivery method as a primary barrier to engagement. For the minority of students that saw PASS as providing little or no improvement to their university experience, the main barriers were poor scheduling and lack of time, followed by the practical limitations of online learning like poor internet connections.

The PASS leaders found the online environment more challenging, particularly a reluctance of students to turn on cameras and microphones, which harmed the intended collaborative nature of the PASS sessions. They also cited awkwardness, unfamiliarity with other members of the cohort and the physical environment in which students were working online as limiting factors.

Key outcomes of the study were that students who did not attend the PASS sessions felt less connected to the university during than those that did, and that the PASS scheme made a significant positive contribution to students' confidence, sense of community and wellbeing throughout a challenging period of their university careers.

Workshop 3

Wednesday, 30th June 2021 - 10:45am to 11:45am

A Table-Top Role-Playing Game (TTRPG) for developing Higher Education employability skills

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Keywords

Employability; Graduate Outcomes; Game-Based Learning; Roleplaying Games

Abstract

Academic Writing Skills: 67, Presenting at Conferences: 74, Dealing with Pesky Administrative Tasks: 92. working in any profession comes with its own set of skills, and there are clearly some people in any organisation that are better than others. This workshop uses the unique style of a role-playing game (RPG) character sheet to create a fun approach to developing a curriculum vitae (CV). The approach was developed for Higher Education students but can easily be applied in other settings.

It is standard practice in the application for a job, vocational opportunity or for entry onto an education course to submit a CV. The CV traditionally outlines a candidate's education history, key skills, achievements and experiences. In education settings teaching students the basics of CV constructing and more importantly identify their skills is a common occurrence. CV sessions are often subject to poor engagement and enthusiasm from the learners, possibly due the learners failing to see the immediate relevance.

Role-Playing Games (RPG) are very varied in their form but normally include the creation of a fictional character. The attributes e.g. strength and skills e.g. climbing of the character alongside personal details are often recorded on a character sheet. The character sheet represents a record of the character at the 'moment-in-time' and improves in line with their experience in the game.

This session represents a plan for a teaching session on CVs and skill development using a RPG character sheet. Creating and sharing a fictional character presents a neutral and entertaining way to show the importance of presenting yourself on a CV. It also helps learner self-identification of strengths (levels) and areas to develop.

Closing Keynote Presentation

Wednesday, 30th June 2021 - 11:45am to 12:15pm

Fragmented transitions: Reflections on student progression to and within university

Professor Jon Scott FRSB, Higher Education Consultant and Emeritus Professor of Bioscience Education, University of Leicester

Abstract

Over the last 15 months school, college and university students have experienced significant academic and social disruption as a result of the COVID-19 pandemic. In this discussion we will reflect on aspects of the student learning experience, both as they progress to university but also the impact on current first years who will be progressing to the second year of their studies.

Biography

Jon is a higher education consultant and Emeritus Professor of Bioscience Education at the University of Leicester where he was Pro-Vice-Chancellor for Student Experience. Jon's research interests have included assessment and feedback, academic integrity and belonging and retention. He also strongly advocates for reward and recognition for teaching. He is a Principal Fellow of AdvanceHE, was the UK Bioscience Teacher of the Year in 2011 and won a National Teaching Fellowship in 2012. Jon is a longstanding QAA Reviewer and UKPSF Accreditor for AdvanceHE.

Posters

A Reflection on Designing Virtual Learning Experiences During a Pandemic

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Keywords

Reflection; Online Teaching; Virtual Learning Experiences; Learning Technologies; Planning and Teaching Methods

Abstract

I believe learning occurs as a result of educational experiences, especially when teaching core skills and competencies. Teaching online does not mean this experience should be compromised, and the development of these skills should not be hindered. This analysis is a reflection of my teaching to final year pharmacy students completing their pre-registration placement out in practice.

I reflect on my planning, how I facilitated teaching and created the opportunities for students to learn, develop and share. My reflections align with post-modern conceptualisations of teaching.

The planning process evaluates how all the components of the learning experience should connect to make my vision a classroom reality. My planning begins with connecting the learning outcomes, the teaching experience and the assessment. Because all three of these components support each other the students are placed into a situation where learning is inevitable. This is followed by an emphasis on my students, the Presage stage of the 3 P's Model of Student Learning shows the importance of knowing my students and ensures my planning is not based on any type of Folk Pedagogy.

Teaching methods ultimately create the learning experiences. In line with the Three Levels of Teaching I ensure my sessions are taught at the highest level focusing on what the student does. All activities promote engagement and inclusivity, consistent with the Principles of Good Undergraduate Education. I analyse the use of case studies with real-life examples, formative assessment and feedback, all important teaching attributes. I also explore the use of learning technologies which allow student collaboration and keep my students engaged at the highest level of Miller's Triangle. I evaluate the utilisation of Padlet and Microsoft Teams reviewing the value that they can bring.

Through this reflection I critique how I construct virtual learning experiences.

Evaluation and Refinement of Undergraduate Haematology Education

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Keywords

Haematology; Pedagogy; Authentic Assessment; Undergraduate; Biomedical Science

Abstract

Haematology is one of the four key disciplines in Biomedical Science, yet recent communications from the Institute of Biomedical Science (IBMS) suggest that only 4 percent of biomedical scientists are specialists in this discipline. It is a requirement that IBMS accredited undergraduate Biomedical Science programmes deliver blood sciences and transfusion. Anecdotally, many HEIs fulfil this requirement (historically and currently) through the casual employment of specialist practitioners, rather than being delivered via a tenured academic. In short, institutions may use a clinician who has no academic experience, or an academic with no clinical experience – but very rarely both.

Haematology has a strong practical laboratory component in addition to complex theoretical information, thus undergraduate provision must harness both academic and clinical approaches. This presents interesting opportunities to develop a suite of relevant competence-based practical activities and authentic assessments, supported by relevant underpinning theory that is employer-responsive.

Here we present our journey to deliver a high-quality undergraduate haematology and transfusion science module, that simultaneously acknowledges the constraint of working in a non-clinical environment with the need to give students industry-relevant practical, and theoretical knowledge. We also outline our next-steps to further improve the quality of teaching in this highly specialised and under-represented life-sciences discipline.

Exploring the effect of an Augmented Reality Initiative on Cognitive Load, Spatial Ability and Chemistry Achievement

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Keywords

Augmented Reality; Cognitive Load; Chemistry Education; Spatial Ability

Abstract

This work presents the evaluation of an asynchronous online chemistry initiative employing an augmented reality (AR) application, developed by the researcher, to enhance first-year undergraduate student's understanding of the topic of VSEPR. A pretest-posttest design was used to conduct the study. A total of 39 students completed the activity using either the augmented reality tool or 2D drawings. Students were administered an 11-question chemistry learning test (focusing on three areas: bond angles, molecular geometry, and species identification), alongside a measure of spatial ability (Purdue Visualization of Rotations Test). In addition, students were also asked to complete a two-factor ("intellectual accessibility" and "emotional satisfaction") chemistry attitude measure, the Attitude toward the Subject of Chemistry Inventory (ASCI V2).

AR provides a seamless interface that combines both the real world and the virtual world. Users interact with virtual objects that are superimposed on real environments, providing the most natural and genuine human-computer interaction experiences. A key pedagogical affordance of AR is the ability to manipulate virtual objects, allowing students a better understanding of spatial concepts through manipulations of the properties and relationships of objects that would be too small or too large to examine effectively in a non-virtual environment. By using AR, in a way that encourages students to engage on a deeper level, students can make deep and lasting connections within their knowledge base.

Students' perception of both the activity and the augmented reality application were captured through semi-structured interviews. Furthermore, students' cognitive load was measured via an adapted version of the three-factor Cognitive Load Scale (CLS) during post-test to compare students' intrinsic, extraneous and germane processing during the activity phase of the experiment.

An Assessment of the Usefulness of Diagnostic Quizzes for Level 2 Open University Programming Modules

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Keywords

Diagnostic; Assessment; Programming

Abstract

Diagnostic assessment tools are a means for educators to help assess the strengths and weakness of their learners, especially before the teaching provision starts. The main purpose of such tools is to collect data on the knowledge and skills deficits of the prospective learners, inform the learners about their readiness to engage with the study experience, offer the learners the means to address any knowledge or skills gaps before the teaching provision starts and more importantly to help tailor the learning and support provision through targeted interventions.

In this paper we report on our experiences adapting the Are You Ready for Your Studies Quizzes (ARFYQ) for the Level 2 core OU Computing modules. Our work sought to address the fundamental question as to whether Level 2 Open University Computing students are ready to start studying Level 2 modules, particularly the programming ones (given the lack of pure programming modules at Level 1), and to identify any issues Level 2 students may face with the actual ARFYQ and the support strategies offered. Students', tutors' and module teams' perspectives have all been considered and contrasted.

The research activities have consisted of two main tasks: the data collection and data analysis. Data collection consisted of identifying the candidate modules, carrying out structured discussions with module teams, conducting an online survey and a set of interviews, as well as two focus groups. The data analysis consisted of the statistical and comparative analysis of the collected data as well as a tentative matching of the ARFYQ scores with the assessment scores on the different modules.

Through discussions with module teams, we sought to understand the rationale behind the adoption of the ARFYQ and the module teams' perception of their usefulness and added value, this has informed the focus groups' format and discussions. We have run two online focus groups with teaching staff (tutors) from the different modules. We were particularly interested in gaining an understating of the students' engagement with the quizzes and the usefulness of the support interventions.

An online students survey was used to understand the students' perception of the usefulness of such quizzes in assessing their readiness to start studying. This is important not just in terms of justifying the use of such quizzes but also to improve them in line with the students' experiences. We also analysed the student performance on the quizzes and tentatively matched it with the performance on the modules' assessments. In this poster presentation we will present our research findings and reflect on the experiences and the lessons learned from the adoption of the ARFYQ for Level 2 Computing OU modules.

Microbiology introduction sessions on Zoom: swabs, masks and belly button fluff

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Keywords

Online learning; Active learning; Large group teaching

Abstract

Large group lectures have faced just criticism over their traditional didactic and passive style, with approaches such as flipped classrooms, active and blended learning being championed as methods to rejuvenate lecture practices (Akçayır & Akçayır, 2018, Garrison & Vaughan, 2008, Michael, 2006). The arrival of Covid-19 in the UK in Spring 2020 led to the swift transition from face-to-face to online teaching. At some point within the 2020-21 academic year many institutions were able to have limited high-impact, face-to-face, small group teaching such as laboratory classes. Large group lectures, however, have been replaced with pre-recorded video lecture material and large group live online sessions across the UK Higher Education sector and indeed much of the globe (Marinoni et al., 2020).

Here a case-study is presented for the conversion of active learning sessions within a large group lecture and laboratory class to an online, live, large group platform. Historically, students on a range of Biosciences and Healthcare courses within a large group lecture had swabbed skin sites and objects and inoculated agar plates within the lecture theatre and then attended a follow up laboratory class to observe their microbial growth. Here, in a large, online, live session, the students voted for various skin sites and objects to be swabbed by the teaching team, before a follow-on zoom session to share the results of the incubated plates with the students.

These online sessions covered all the relevant teaching material covered in historical mode of delivery and provided a platform for rich and vibrant discussion with the students. The lectures were well attended and received excellent student-led feedback. The format of the sessions, with students determining the direction of experimental work remotely, allows for an active learning environment which can be applied to other STEM subject areas.

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Garrison, D. R., & Vaughan, N. D. (2008). Blended learning in higher education: Framework, principles, and guidelines. John Wiley & Sons.

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Expanding the field- Classifications and perceptions of digital fieldwork

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Keywords

Fieldwork

Virtual Fieldwork; Blended Learning; EDI; Bioscience; GEES

Abstract

Within Bioscience and GEES disciplines fieldwork is defined as a signature pedagogy. Whilst the benefits of fieldwork and the impacts on distinct domains of learning are well documented; for some barriers to participate and negative affective outcomes of fieldwork remain.

Classifications of fieldwork practice often focus solely on in-field fieldwork. This research focuses on the recent agile field of digital fieldwork, and the role of the virtual world to address pedagogic challenges within fieldwork.

A post-positivist review of the literature begins to define practice across all fieldwork delivery modes. Resulting in a single fieldwork classification system that combines in-field and in-world approaches that can be used to plan progressive, multi-modal fieldwork experiences for learners.

Using a mixed method, grounded methodology stakeholder analysis the perceptions and experiences of digital fieldwork are sought.

- How can the views of students, HE institutions, subject associations and industry be used to better inform design principles and pedagogical approaches within digital fieldwork?
- To what extent can digital fieldwork be a tool to promote EDI within fieldwork and outdoor learning?

Building community and exploring research through the Life Sciences Undergraduate Seminar Series

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Keywords

Building community; Sense of belonging; Research seminar series

Abstract

Building bridges between teaching and current research in research-intensive academic departments remains a challenge. Undergraduates are often not exposed to a significant amount of current scientific research until towards the end of their degree which can make for a challenging transition to post-graduate study. In addition, undergraduates can often feel disconnected and distant from the research conducted in their own department and departmental community, something which has been highlighted by the COVID pandemic. The online Undergraduate Seminar Series was developed last year in the Department of Life Sciences, Imperial College London, with the aim of fostering a sense of community and belonging remotely. The seminar series provides undergraduates, particularly towards the start of their degree, with an opportunity to genuinely engage with departmental research through a series of non-assessed optional seminars and discussion sessions. The undergraduate seminar series was very well-received last academic year and is ongoing in 2021. Here, we provide a reflection on lessons learnt from the seminar series and consider how we can foster an increased sense of community for undergraduates in a research-intensive department.

Sport Science Student Perceptions of Learning and Teaching during the COVID19 Pandemic

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Keywords

Sport Science; Perceptions; COVID-19; Laboratory skills; Technical skills; Face-to-face teaching; Campus-based teaching

Abstract

The emergence of COVID-19 resulted in a dramatic change to Learning and Teaching in Higher Education. Sport Science undergraduate students faced an unusual situation, requiring a blend of online and on campus teaching, with practical and laboratory sessions restructured to reduce the risks within this environment. Such stark changes to the expected learning environment and potential risks of group interaction might be expected to influence students' perceptions of, and engagement with the teaching and learning experience and could impact outcomes, such as acquisition of key skills. This study aimed to determine the views and behaviours of Sport Science students to gain insight into their perceptions of COVID-19 and their campus-based learning and teaching experience in order to evaluate attitudes to learning and risks.

A cross-sectional study was undertaken through an online questionnaire comprising of 25 questions including multiple choice, Likert-type and open-ended questions themed around 'perceptions and experiences', 'university life' during the COVID-19pandemicand 'adapted

behaviours'. The questionnaire was distributed to 125 undergraduate Sport Science students in September 2020 and analysed using SPSS Version 26 and the Framework Method.

Seventy-four students completed the questionnaire, of which 50% were first year students newly enrolled on the course and 47% were female. The majority of students (79%) were aged 26 or under. Of respondents, 88% (n=65) agreed COVID-19 was a dangerous virus but only 62% (n=46) were afraid of getting COVID-19, with 88% (n=65) worried about the impact on their studies and their ability to fully participate.

There were mixed feelings about the return to campus-based teaching, with students reporting 'excitement' despite feeling 'anxious', some were 'confident', whereas others were 'nervous' and 'uncomfortable'. Some students enjoyed more blended learning, whereas others "found it hard to concentrate working online" and "missed the social interaction" and face-to-face communication with students and lecturers. The main anxieties were related to placement and job opportunities, with students feeling employment prospects would be affected due to the pandemic.

Students reported more anxiety associated with online learning and commuting, compared to on-campus risk. A minority felt pressured into attending campus-based teaching (22.5%), yet none reported concern or felt pressure to attend from the university. Of respondents, 77% were comfortable attending classroom-based activities and 75% were comfortable attending practical/laboratory-based activities even when social distancing could not be maintained but

where appropriate safety precautions and mitigations (PPE, social distancing etc.) were in place and felt reassured these measures would maintain their safety whilst on campus.

This is the first study to investigate Sport Science students' views and their willingness to engage in what could be perceived as risky settings. The students acknowledged the risk of COVID-19 but were not averse to attending campus and were confident to engage with face-to-face teaching. Students were comfortable with the university and course approach of smaller class sizes, social distancing where possible and the use of enforced PPE. They were more concerned about the experience of online-learning, loss of social interaction and student support than mitigated risks associated with on campus group learning environments.

Using 'Design Team Meetings' to embed feedback in an authentic context

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Keywords

Authentic; Feedback; Employability

Abstract

Second year civil engineers at the University of Bristol carry out a unit on building design where they learn about the role of other professionals including architects, acousticians and mechanical and electrical engineers. The unit is based around an authentic project where students work in groups to set a brief and carry out the conceptual design of a building.

The unit is taught using the principles of authentic learning [1] and the project is set within the framework of the RIBA plan of work [2]. To enable the students to get formative feedback on their progress on the project a 'Design Team Meeting' is organised. At the meeting students are required to present their design to a group of professionals including an architect. They need to chair the meeting and set the agenda (as an architect would in professional practice) and to minute the meeting so they have a record for future updates to their design.

By using a professional framework and organising the meeting as they would be in industry (based on the unit organisers decade plus experience working in industry) students are able to join the community of practice [3] and familiarise themselves with the language and behaviours required by a professional engineer.

Whilst authentic learning has been well documented, the idea of providing feedback 'in character' is not currently included in Lombardi's framework. The authors suggests that by delivering feedback whilst staying 'in character' students are more open to the comments. Whilst work to gather evidence on this is ongoing and needs to be substantiated, the general feedback from students suggests they both enjoy the event and see its effectiveness in preparing them for employment.

Finally whilst the Design Team Meeting has now been running for 5 years this year we were required to deliver them on-line. There were many lessons learnt in setting them up in this new format, and this presentation will include reflection on the delivery of this novel feedback mechanism in this new way.

References

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2. RIBA Plan of Works, https://www.architecture.com/knowledge-and-resources/resources-landing-page/riba-plan-of-work#available-resources

3. J. Case, 'Education Theories on Learning: an informal guide for the engineering education scholar - Tool 4: Community of practice', Higher Education Academy, 2008.

A reflective case study evaluating the affordances of a rapidly co-created dual video channel streaming resource to enhance engineering video augmented labs

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Keywords

Blended Learning; Labs; Video; Enhanced learning technologies

Abstract

The Civil, Aerospace and Mechanical Engineering (CAME) school at the University of Bristol were swift to implement changes, such as home lab kits, to support practical lab skill development in the 2020-21 pandemic. However, changing guidance on attendance at university meant that many students became separated from their kits and resources. So, rapidly developed

innovative solutions were required to ensure all (~600 students) could meet the learning objectives of the School's lab unit with video alone if necessary.

A dual video channel streaming resource enabling watching a pre-recorded experiment from 2 different camera angles was co-created with input from the students, Digital Education Office (DEO), academic staff, professional services staff and technical staff. Multiple short development and feedback cycles were completed within a week, with academic staff and students offering feedback whilst the video-augmented lab learning resource was developed.

This co-created resource drove forward student ownership of their learning experience and students reported that they were more likely to engage with the material in the twin stream format than a linear video. Students reported no technical difficulties across all mainstream operating systems and hardware platforms. They expressed appreciation of the developed solution to enhance their distance learning experience.

This poster presents the reflections on the development process which led to the enhanced streaming resource that seemed likely to improve video engagement, as well as students' thoughts on the resource once it was integrated in multiple lab sections in their online course.

Summary Sheets: A scaffold for more effective, active note-taking and cognitive processing of (remote) lectures

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Keywords

Summary Sheets; Note taking; UDL; Transitions; Active learning; Student Lecturers; Co-creation; Flipped classroom; Remote learning

Abstract

Effective lecture note-taking is a critical skill that students require for the comprehension and connection of key concepts, underpinning successful transition to HE and academic success. However, students' note-taking skills are often poor, exacerbated recently by the shift to online learning. Learning theories such as constructivism and Kolb's experiential learning cycle emphasise the critical importance of students constructing their own learning in an active manner. Active synthesis of summary notes fosters deep learning in which key principles are processed, understood and assimilated in a meaningful way. The principles of Universal Design for Learning (UDL) thus encourage teachers to provide flexible ways for students to engage with, process, present, link together and self-assess their learning. This promotes the application of higher-level cognitive skills; if students have effectively note-taking and processing skills, then they are more likely to be able to apply and analyse critically their subject, identify areas of weakness and develop self-efficacy skills.

Here, the novel concept of "Summary Sheets" is presented as a transformative pedagogic tool which provides a more effective mechanism for note-taking, connection and processing of ideas which provides the foundations for deep learning. Summary Sheets are UDL-friendly structured frameworks, usually including colour and diagrams and always mostly blank, that are explicitly

linked to the learning outcomes from a particular lecture or a block of teaching. Students can complete their summary sheets whilst or after a didactic (remote) lecture, in readiness to apply their knowledge in an active way during (remote) workshops and tutorials. When designed effectively, summary sheets can replace the need for students to annotate a PowerPoint during a lecture. Instead, note-taking becomes an active process where content is simultaneously assimilated, processed and summarized, leading to deeper learning and identification of threshold concepts / barriers to comprehension.

Findings indicate that the use of Summary Sheets by a large, diverse cohort of ~250 Biomedical Science, Medical Science and Nutrition students can increase student engagement, participation in flipped classroom and live class activities, satisfaction and achievement in the remote teaching and learning environment as well as during face-to-face teaching. Students who are given Summary Sheets in the first year are then encouraged to create their own learning scaffolds going forward. This academic year, Summary Sheets have not only been provided to first year students by lecturers but also created by second year Student Lecturers.

Summary Sheets also encourage good practice in remote teaching and assessment. Carefully crafted summaries encourage students to engage with pre-recorded material, allowing live sessions to be used for knowledge testing rather than didactic delivery. This facilitates a successful flipped classroom approach which is helpful when teaching large student numbers. Summary sheets can serve as open-book notes for remote examinations, which can subsequently be made more challenging by requiring students to apply their knowledge, thus requiring higher-level cognitive skills.

The STAR approach: re-thinking undergraduate science teaching with notes from the Suzuki Method of music education

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Keywords

Sherwood; STAR; Suzuki; Music; STEM; Bioscience; Inclusion

Abstract

Do you believe that all students can master their subject, or are some naturally “better at science” than others? Students perceive STEM subjects to be challenging from a young age. The notion that some students are inherently more capable than others can be propagated in HE by lecturers’ language and teaching approach, leading to a self-fulfilling prophecy whereby students who self-identify as “less able” make less progress. Attainment gaps need urgently to be tackled by more inclusive approaches with higher expectations for all.

The Suzuki Method, a holistic musical education approach, postulates that every student can master their subject given an optimal learning environment. The core belief is that ability is not inborn but can be acquired by any student. Surprisingly, teaching music using the Suzuki Method shares fundamental similarities with STEM teaching; both require mastery of small building

blocks of theoretical knowledge, complex integration of multiple ideas and the ability to apply theory to practical performance.

Dr Jane Sherwood (1969-2019) was a Suzuki cello teacher and Senior Lecturer in Biomedical Science at De Montfort University for almost 25 years. The STAR approach is named after Dr Sherwood, who drew inspiration from her music teaching philosophy to provide an inclusive teaching approach with high aspirations for all. The STAR approach is a holistic philosophy of learning with five key points of focus for teachers and students: positivity, person, partners, practice and progress. This novel pedagogic approach fosters a barrier-less climate for learning in which STEM students are nurtured with care and rigour in an integrated, flexible and inspiring way.

Trialling the STAR approach with a large, diverse cohort of bioscience students has yielded promising results, with enhancements to student engagement, participation, connection, achievement and satisfaction. The STAR approach is transferable to all disciplines and is highly effective for remote learning.

Breaking through the glass ceiling: addressing the attainment gap through student and staff perspectives

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Keywords

Attainment; Diversity; Inclusion; Equality

Abstract

Existing literature has identified Black, Asian and Minority Ethnic (BME) students enrolled in higher education institutes (HEI) are subjects of attainment disparity, inequitable distribution of resources and therefore, opportunities. It is the imperative of HEI's to foster equality, transparency and harbour an inclusive environment. This study investigated whether BME students feel a sense of inclusivity and if institutional services cater to their academic and pastoral needs. Audio-recorded, semi-structured interviews and ethnically homogenous student-led focus groups were held with over a hundred students and staff members belonging to midlands-based institutes. Thematic analysis was used to manage, summarise and analyse the data. The objective of the research is to provide a student centric stimulus, stemming from BME experiences to help recognise the necessity of diversifying the curriculum and academic practice. Preliminary data highlights the need for enhanced support networks for the BME student body and suggested existing members of staff be culturally versed with issues which are of a concern to BME students. Both staff and students agreed a considerable need for increased representation of BME academics and a structured pathway to promote existing BME members of staff to more authoritative positions. However, the results also emphasise model practice in mitigating attainment gaps through university led initiatives, such as the peer mentoring scheme, the enhanced placement programme and the establishment of the BME staff network. This research hinges on the core values of the conference and correlates strongly to the

thematic area of embedding race equality, diversity and inclusion, while acknowledging the importance of undertaking an autonomous approach.

Student and Academic reflections on co-design of final year pharmacy masters module

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Keywords

Student-academic; Co-design; Experiential learning

Abstract

The Pharmacy Leadership and Management (PLM) module provides an experiential learning simulation drawing on leadership and management skills coupled with clinical problem-solving. Designed to reflect a wide range of the skills detailed in the Initial Education and Training of Pharmacists (GPhC 2011), teams of up to 6 students run their own primary care based pharmacy business competing against each other over a total of 12 days.

PLM is a well-established, highly efficient yet logistically complex final year module, which was challenged on how it operates and delivers world-class teaching during a global pandemic.

Students this year are participating in the redesigned module both remotely online and in person. During the simulation each pharmacy nominates a representative and from the 10 representatives, 2 are elected to form a student-academic committee.

The academics in PLM noticed the difficulties in adapting operationally large modules based on the feedback from the Teaching and Learning Committee (TLC) and Local student forums, due to the frequency of the meetings, changes could only be made to benefit future cohorts. The creation of a student-academic committee was designed to provide greater student access to the PLM academic team, allow more creative co-design of content and provide a more rapid response to student needs during the module. Weekly meetings before, during and after simulation create opportunities for resolution of student queries and create a platform for the committee to actively innovate during the module. The students within the committee have started to demonstrate signs of module ownership, interacting with academics and students across all four years.

Using active research methods, students and academics will reflect on the learning experiences via reflective essays. Students will present their reflections on the committee and the impact of student-led initiatives on the module.

Encouraging and supporting group interaction and discourse in a one week session

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Keywords

Online learning; Gilly Salmon; Building online community

Abstract

The final months of the MSc in Food Production Management course comprises a 60 credit research project. Preceding this, students take part in a "Core Skills" module which leads them through a smaller scale version of the project, from initial concept to submitting a written report and presenting a poster. Students are facilitated through a process of developing a research question, aims, objectives and hypotheses, before having to think about experimental design and data collection and analyses. These early ideas of framing a research question often overwhelm students, and if they are not well-formed the quality of the whole project tends to collapse. In pre-Covid years, this experimental planning session involved students taking part in interactive role-play exercises in a classroom to develop their ideas, pitch them to academics, and improve them following feedback. This year, this session fell during a lockdown when face-to-face teaching was prohibited. Instead, the Gilly Salmon 'Five Stage Model' was utilised to support students through a week-long framework of e-tivities on Teams, culminating in a live session. Through the week, daily interactive tasks led them through the stages of 'access and motivation', 'online socialisation', 'information exchange', 'knowledge construction' and by the live session 'development' of their research question. Compared to previous years of face-to-face teaching, where students arrived unfamilliar to their one-off session, this model led to greater confidence in the sharing of ideas in breakout rooms, and a more dynamic and constructive session. Through the knowledge construction of forming aims and objectives, students were more confident in developing a strong, underpinning hypothesis and proceeding with their report. In this poster we will share how we used this model in one week, and how colleagues can adapt it to their own practices to make a real difference to even a one-off activity.

Online tutorials: The value to students of Q&A tutorials to support assessment on a Level 1 module

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Keywords

Online tutorials; Q&A tutorial; Supporting assessment at level 1; Value to students of Q&A tutorials; Tutor experience of Q&A tutorials

Abstract

Many online tutorials have a structured didactic style and are a top-down approach to learning. For a variety of reasons, the online environment can hinder student active participation. However, students see these online tutorials as valuable but are consuming them in different ways, such as reviewing recordings (Butler, Cook and Hayley-Mirnar, 2018).

This scholarship project is assessing the place for less formal Q&A tutorials to support assessment on an Open University Level 1 environment module. The approach is bottom-up,

where students lead the direction of the tutorial and complement, rather than replace, existing tutorials.

Forty-eight Q&A tutorials are being delivered, and an anonymous poll of student confidence in completing assessment run at the end of each event. As well as this, the students are being surveyed twice to understand how they value the tutorials and their experience of attending them. Student-led focus groups, for students who attend at least one Q&A tutorial, will take place. As well as this the tutor perspective on delivering the tutorials is being gathered, with the aim of producing a best practice guide for tutors.

The data has not been fully analysed yet, but early results indicate that students are choosing to attend the Q&A tutorials. The vast majority feel more confident about completing their assessment, most would attend Q&A tutorials in the future and would recommend them to other students. Tutors report that most students attend the whole tutorial, rather than asking their question and leaving, and that students mostly use the 'chat' panel to ask their question rather than speaking. Early ideas on best practice include managing student questions by dealing with one aspect of assessment at a time and having a standard set of slides covering common questions, such as referencing and maths examples.