



## Connecting Higher Education

### International perspectives on research-based education

#### BOOK OF ABSTRACTS

Tues 27 June to Wed 28 June 2017

with pre-conference workshops (13:00-16:30) Mon 26 June 2017

University College London

20 Bedford Way, London, WC1H 0AL, United Kingdom

#ConnectingHE2017

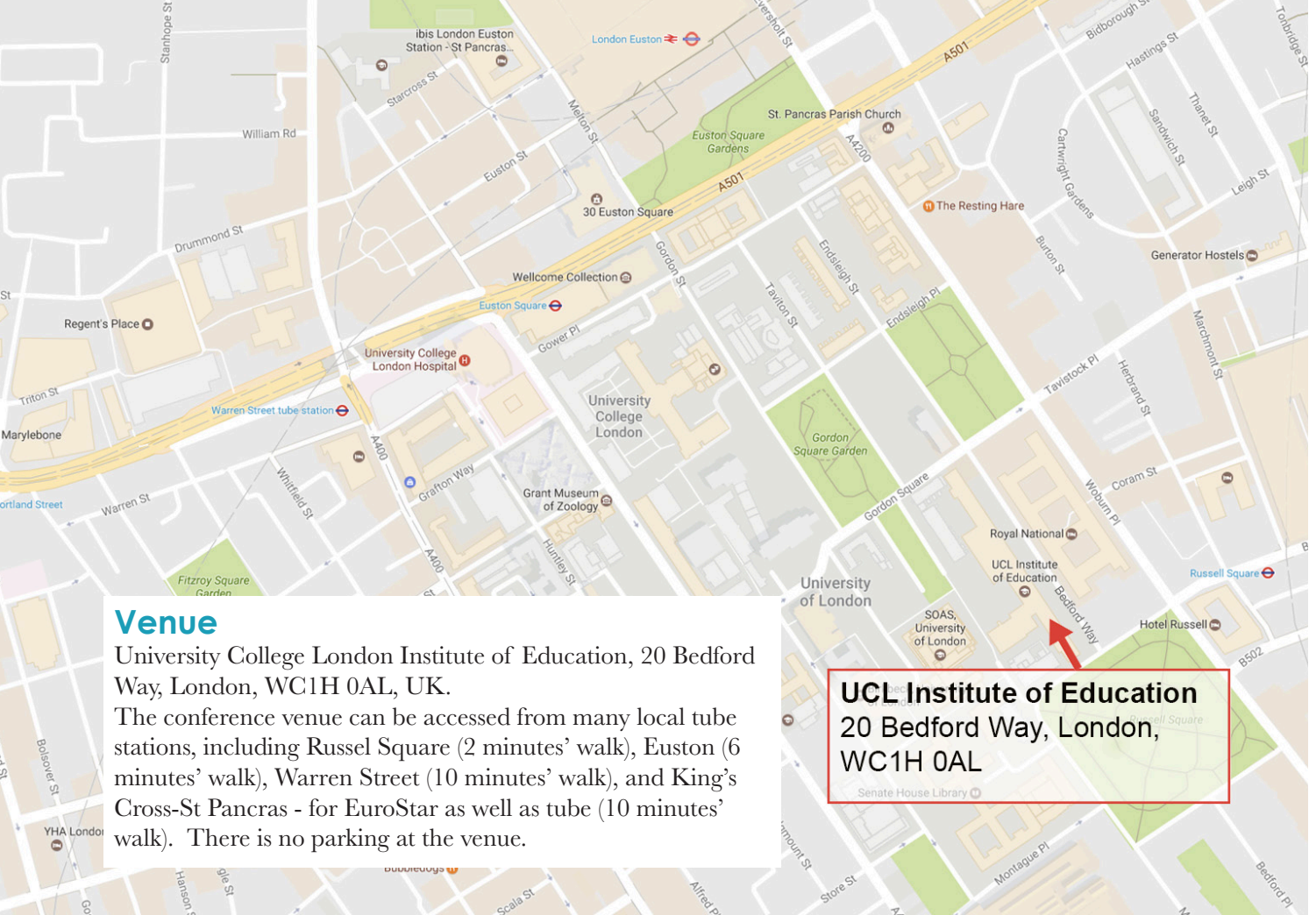
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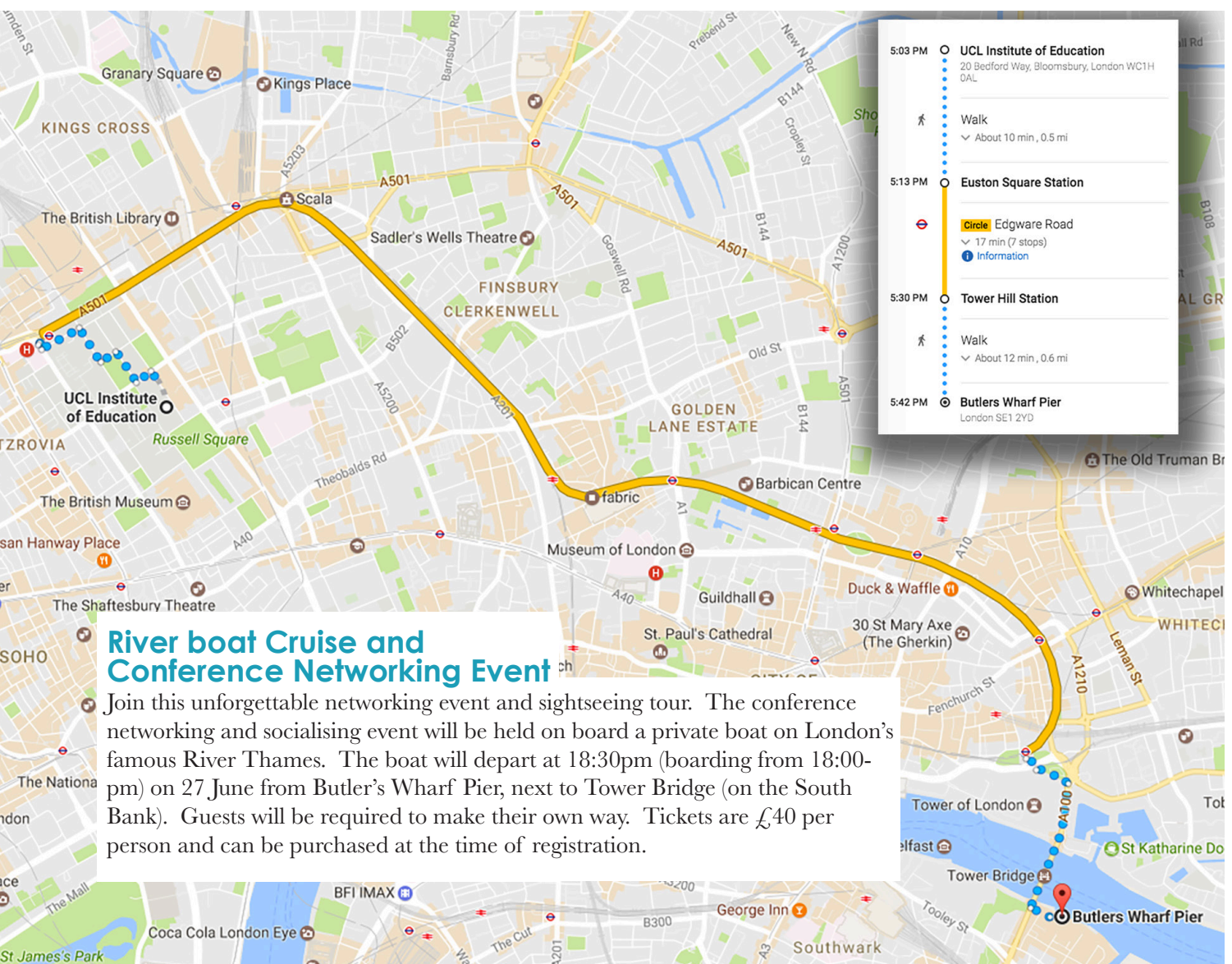


## Venue

University College London Institute of Education, 20 Bedford Way, London, WC1H 0AL, UK.

The conference venue can be accessed from many local tube stations, including Russel Square (2 minutes' walk), Euston (6 minutes' walk), Warren Street (10 minutes' walk), and King's Cross-St Pancras - for EuroStar as well as tube (10 minutes' walk). There is no parking at the venue.

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## River boat Cruise and Conference Networking Event

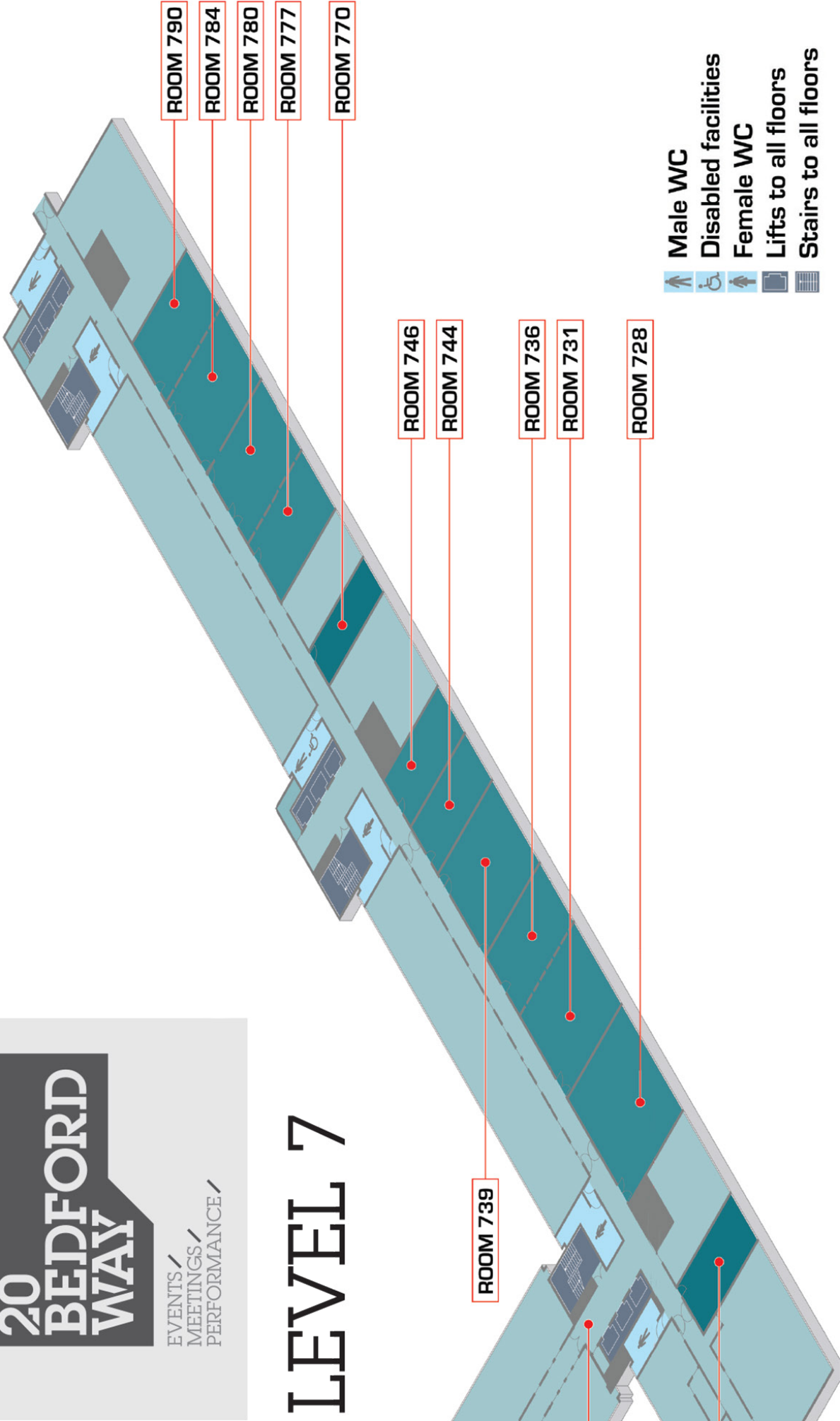
Join this unforgettable networking event and sightseeing tour. The conference networking and socialising event will be held on board a private boat on London's famous River Thames. The boat will depart at 18:30pm (boarding from 18:00pm) on 27 June from Butler's Wharf Pier, next to Tower Bridge (on the South Bank). Guests will be required to make their own way. Tickets are £40 per person and can be purchased at the time of registration.

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	✓ About 10 min, 0.5 mi
5:13 PM	○ Euston Square Station
	Circle: Edgware Road
	✓ 17 min (7 stops)
	Information
5:30 PM	○ Tower Hill Station
	Walk
	✓ About 12 min, 0.6 mi
5:42 PM	○ Butlers Wharf Pier
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20  
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# Keynotes & Panels



## Tuesday 27 June

### Opening address and welcome - International contexts: Enhancing synergies between research and education

**Prof Dilly Fung** (Professor of Higher Education Development, UCL)

### Panel event - Higher education in the twenty-first century: Challenges and opportunities

**Prof Michael Arthur** (Provost and President, UCL),

**Prof Simon Marginson** (Professor of Higher Education, UCL),

**Prof Pascale Quester** (Deputy Vice-Chancellor & Vice-President Academic,  
The University of Adelaide),

**Prof David Wilkinson** (Provost and Vice-President Academic, McMaster University),

**Dr Diana Beech** (Director of Policy and Advocacy, Higher Education Policy Institute)

Co-chaired by **Prof Simone Buitendijk** (Vice-Provost for Education, Imperial College London),  
and **Prof Dilly Fung** (Professor of Higher Education Development, UCL)

### Keynote 1 - Using research-based education to address inequalities of race and gender in higher education

**Prof Kalwant Bhopal** (Professor of Education and Social Justice, University of Birmingham)

This keynote will explore student inequalities in higher education. The presentation will argue that despite recent policy developments and changes in the student body, inequalities continue to persist in higher education. The study will draw on recent research which explores higher education transitions for students in the final year of their degree as they make transitions into the labour market or post graduate study. The talk argues that universities must analyse data for student progression, identify gaps and provide strategies for how lack of progress for some groups can be addressed.



## Wednesday 28 June

### **Panel event - The student's role in research-based education**

**Sorana Vieru** (Vice-President, National Union of Students),  
**Prof Anthony Smith** (Vice Provost Education and Student Affairs, UCL),  
**Prof Mick Healey** (Higher Education Consultant and Researcher),  
**Emily Power** (undergraduate student, McMaster University)

**Co-chaired by Bernadette Foley** (Association Dean Education, The University of Adelaide), and **Jenny Marie** (Senior Teaching Fellow, UCL)

The student's role in education is currently open to debate: Consumer? Partner? Recipient of knowledge? Knowledge creator? Powerless member of the Higher Education system? Active shaper of the role of Higher Education itself? Conflicting views of the student's role have been expressed by student bodies (Wenstone, 2012), government advisers (Browne, 2010), Higher Education thinkers (Brew, 2006) and institutions (McMaster University, 2012; The University of Adelaide, 2013; UCL, 2014).

Is there a single role that students should undertake or should it be more flexible? Can students be both consumers and partners and which takes priority when they conflict? Once a student has created knowledge, can they receive it unproblematically? How do we deal with questions of inclusivity and power sharing in the modern Higher Education sector? This international panel will explore these questions and more in conversation with the conference participants as we consider the implications of research-based education for the part students have to play in Higher Education.

### **Keynote 2 - Higher Education in Emergencies: Leveraging virtual learning in humanitarian settings**

**Prof Barbara Moser-Mercer** (Professor of Conference Interpreting and founder and Director of InZone, University of Geneva)

This keynote will focus on the potential of higher education in emergencies. Leveraging virtual learning in humanitarian settings could be considered as one of the new frontiers of higher education in the age of global migration. As a growing number of institutions of higher learning and NGOs enter this space to launch digital higher education initiatives for those forcibly displaced, assumptions around scaling through technology largely influence project design and implementation. There is a gap in knowledge and understanding of the specificity of the humanitarian context, especially the last mile where learners live and work. When it comes to designing and implementing higher education in emergency initiatives the attendant risk is one of potentially doing more harm than good.

### **Concluding remarks - Looking back over the last two days to look forward**

**Dr Arshad Ahmad** (Assoc. Vice-President, Teaching and Learning, MIIETL, McMaster University),  
**Prof Dilly Fung** (Professor of Higher Education Development, UCL),  
**Prof Philippa Levy** (Pro Vice-Chancellor Student Learning, The University of Adelaide)

**Chaired by Dr Didi Griffioen** (Amsterdam University of Applied Sciences)

The senior leaders on the conference steering group from UCL, the University of Adelaide and McMaster University will wrap up the event in this joint-discussion.



Tuesday 27 June 2017





## **1. Breaking down the silos: Building a taught interdisciplinary engineering programme.**

**E. Tilley, J.E. Mitchell, A. Greig, and E. Sorensen**

Engineering in the 21st century is an interdisciplinary profession, and yet the majority of engineering degrees are achieved by students who navigate through curriculums which represent classically identified engineering disciplines. Globally, Higher Education Institutions are slowly making the shift to change the way engineering is being taught so that the classroom experience better reflects the workplace environment that many students will enter into upon graduation. How best to make such a transition is still entirely up for debate. Non-trivial issues such as: setting the right balance of core technical content with skills-based and practical learning, effective assessment models, interdisciplinary options and, as is most topical at the moment, embedding workplace learning and/or placements as part of the curriculum, as all major discussion points when considering a change to existing engineering pedagogy. Considerations of changing existing programmes or creating new ones also play a large part in how such changes would manifest at any given HEI.

Four years ago, UCL embarked on a review and reform of the curriculum for the majority of its undergraduate engineering programmes. The reforms aimed to create a distinctive programme featuring a connected-curriculum and drawing on the excellent research-base of UCL. A founding premise was that although a strong disciplinary foundation was vital, modern engineering problems do not respect such disciplinary boundaries. Therefore, modern engineering graduates must be able to work in multi-disciplinary teams on interdisciplinary problems. They must have a strong basis in fundamental mathematics and engineering science, but must also have highly developed problem solving and communication skills. In addition, the modern engineer should understand the context of the problems they address, appreciating the ethical, societal and financial connotations of their design decisions. It was thought that to produce such engineers, an integrated curriculum which develops all these areas simultaneously would be required. The programme that resulted from has been named the Integrated Engineering Programme (IEP) and students who first embarked on this programme, a cohort of nearly 700, started in September 2014 and students have been taking part every year since.

This workshop will detail aspects of the IEP and provide information on how we developed interconnected activities which forms the backbone of the undergraduate curriculum across all the engineering departments at UCL. It is supported by three papers which highlight and explore key foundational, structural and pedagogic aspects of the programme which has been adapted by departments and embedded into their existing undergraduate degree programmes. Papers are written by members of participating IEP departments including

Electrical and Electronic Engineering, Mechanical Engineering and Chemical Engineering as well as members of the Management Committee which now sits as its principal governance – a committee that has evolved from being an Operations Team to one which is synonymous to a Departmental Teaching Committee.

## **2. The Transformative Nature of RBE & SSP: Students as Change Makers**

**Lauren Clark**

Research-based education (RBE) through staff-student partnership (SSP) is seen by many as a move toward a more democratic approach to teaching and learning in a massified system characterised by large class sizes and the student-consumer. Empowering students to become co-producers of knowledge instead of simply consuming knowledge, as in Freire's (1970) banking model of education, not only encourages critical engagement with knowledge, but also increases the depth of understanding and retention of information. There are many different ideas about what constitutes RBE, ranging from producing new knowledge through research to simulating a research environment in which students discover knowledge that is new to them (Levy, 2012). These differing views of RBE bring to light several questions regarding the purpose and of the project, the degree of autonomy and power awarded to students, the degree of active participation, and the level of partnership with academics and how all of these impact the transformative nature of RBE.

There are many different models of student participation in the literature, but for the purposes of this paper I will explore Arnstein's (1969) ladder of participation, Dunne & Zandstra's (2011) model for students as change agents, Levy's (2012) modes of inquiry-guided learning, and Healey & Jenkins' (2009) model of undergraduate research and inquiry. All of these models focus on different levels of student participation in research, the kinds of pedagogy often associated with the different levels, the relationship with knowledge and, to some extent, the transformative potential of RBE. Through the analysis of these different models of participation, I will develop an argument for the importance of purpose in the transformative nature of RBE and SSP, and the necessity for true partnership in successfully empowering students as change agents. Fielding (2004) draws attention to the importance of reflecting on the reason for the use of student voice and how it can be used for the wrong reasons. Accommodation, accumulation and appropriation (Fielding, 2004) are ways in which information gained through research can actually be used against students and perpetuate the status quo. This is why students need to be active agents in the change they inspire—they can control the use of their voice. There are also implications for the university using the “student voice” to make changes—it perpetuates the conception of student as a consumer to be listened to and appeased, whereas the student as change maker portrays the student

as an active collaborator in change (Dunne & Zandstra, 2011, p. 4).

Student ownership of their voice and the changes being made is important on several levels: it ensures that the changes being made are really for the benefit of the education of students, it encourages students to become more active in their university and in life, and it may empower students to see the inequalities that exist in HE and challenge the status quo through SSP and research projects. Thus, involvement and partnership with students from the beginning is important for those universities and programmes that want to initiate students into “becoming part of the academic project of universities rather than consumers of knowledge” (studentasproducer.lincoln.ac.uk). Although much of the literature presented in this paper focuses on British higher education, I think this critique of the transformative nature of RBE and SSP can (and should) be extended to wider discussions of the use of students as agents for change and co-producers of knowledge in other contexts. In highlighting RBE and students as change agents, I want to draw attention to the idea that we should critically reflect upon and challenge all educational projects, even those that are considered transformative. In this paper I will also reflect on my own participation in a student-led initiative, as well as a project that involved staff-student partnership. It is my hope that by using my own experience, as well as some examples from other universities in the UK, readers will be better able to see both the potential and the complications that may come with using RBE as a way to encourage student engagement and transformation.

### **3. Reattaching the cart to the horse: The benefits of a gradual progression from structured to guided inquiry for the development of research skills**

#### **Elizabeth Becket**

The benefits of providing undergraduate students with positive, constructive opportunities to develop research skills (including hypothesis generation, sound experimental design, selection of appropriate data analysis methods and succinct oral and written communication) are widely recognised.

Proponents of an open inquiry approach to learning (whereby instructors facilitate students to raise appropriate research questions to trigger student-generated investigation) claim this achieves a higher level of inquiry than would be gained from more prescribed or tightly guided activities, with students developing greater skills and promotes higher order thinking (Chinn & Malhotra, 2002; Berg et al., 2003; Krystyniak & Heikkinen, 2007). Whilst cumulative research suggests that structured inquiry may be insufficient for developing critical and scientific thinking (Berg et al., 2003); is it always appropriate for instructors to avoid these practices in favour of student-led open inquiry approaches; and is this always to the benefit of the learner?

Perhaps rather controversially, this paper discusses the potential disadvantage of introducing open inquiry to large cohorts of undergraduate students before attaining knowledge of fundamentally important subject area concepts and mastery of basic scientific skills. Our findings suggest benefits to student experience and learning outcomes if there is a gradual transition from structured to guided levels of inquiry before students are expected to operate in a highly autonomous mode. Here we present an example of a positive shift in student satisfaction and improved mastery of specific research skills following a change from open-inquiry student-led level II physiology practicals to a series of more guided inquiry activities in which research skills and concepts were progressively introduced and students had an opportunity to apply new knowledge in a systematic, meaningful and less daunting way. With a prior open inquiry research practical format, groups of 4-6 students within a level II undergraduate physiology class worked together to formulate their own research question relating to a single research theme and worked to address their hypothesis (often using themselves as subjects) throughout the 12-week course. Perceived benefits (by the course coordinator, course instructors and some students) were that research practical activities were non-prescribed; students developed ownership of their projects and were encouraged to work with a high level of autonomy. However, student experience questionnaires revealed considerable levels of dissatisfaction with research practicals, with students expressing frustration that they had not yet developed the skills necessary to formulate and test a meaningful, novel research question relating to a physiological theme of which they had limited understanding. To enable students to complete the research project within the time frame available, students were required to submit a research proposal outlining their specific research question and methodology early in the semester. Given the early stage in the semester students typically had limited knowledge of the physiological concepts and were not au fait with gaps in the research literature needed in order to construct appropriate and logistically feasible research questions. This often led to the formulation of research questions that were either too simplistic or logistically difficult to address. In such cases course instructors prompted students with a revised or new research questions to be tested to enable them to proceed. This type of facilitation was made challenging by the increasingly large cohort size in recent years (~55 groups of 4-6 students). Analysis of student performance in a research skills test at the end of semester revealed that their grasp of key concepts (particularly relating to experiment design, utilisation of adequate controls and statistical analysis) was inconsistent and often failed to meet learning objectives.

The practical component of the course was therefore revised to a more guided inquiry format whereby student groups rotated through 4 practical sessions, each of which related to the theme of the preceding lecture



block. Online research skill workshops and quizzes on experimental design, ethical conduct and statistics (which students engaged with prior to the commencement of practical sessions) allowed students to incorporate this learning into practical activities. Student satisfaction scores and performance on assessment questions relating to experimental design and statistical analysis approaches were higher in the two years following course restructure compared to the preceding years. Our observations suggest that whilst open, student-led inquiry has strong perceived benefits; care should be taken to design courses in a way that promotes the progressive attainment of research skills and should recognise that there can be considerable value in more structured and/or guided research activities depending on the students stage. Introduction of open inquiry without a suitable level of facilitation and guidance may actually have a negative impact on student attitude, level of student engagement and mastery of research skills.

#### **4. Students as agents of change: Creating more student-focused marking criteria**

**Alastair McClelland, Julie Evans, Rosalind Potts, Alice Cai, Florin Gheorghiu, Duncan Kavanagh & Anastasia Vikhanova**

This paper will present two examples of collaborative working between staff and undergraduate students on undergraduate Psychology programmes, with the aim of developing more transparent marking criteria and feedback forms for formative essay based assessments and summative experimental research reports.

Psychology undergraduates have a number of opportunities within weekly small group seminars to develop the writing and critical analytical abilities that are required to be successful within this evidence based discipline. Significant resources are assigned to the first year of their study in order to enable students to make the transition from school level assessment criteria to those required at a higher education level. However, a core issue for academic assessment is the student understanding of what is required of them, allowing them to write a piece of work that they know will meet the criteria set out in a particular marking rubric (Jönsson, 2014).

We define a marking rubric here as a tool that lists the criteria for assigning a grade or a mark to a piece of work which is used by students to help them achieve a particular level of quality and by staff to grade and give feedback on assessments (Arade 2005). The use of marking criteria or rubrics is also essential in order to standardise assessment and to ensure that marking is reliable across a number of different markers (Hitt and Hemsley 2009).

Our student feedback indicated that students found the marking criteria difficult to understand; e.g., “I just didn’t know what to do in order to get a First, it’s really vague”. Furthermore, students did not feel able to assess their

performance before submitting their work and did not understand how to improve their grades, with respect to the marking criteria. Additionally, only one generic marking rubric existed for all types of assessment and which had been in use for some time, when it was evident that the essays and laboratory reports had somewhat different requirements.

Two studies used a focus group methodology to investigate the transparency and functionality of the generic marking criteria. One study focused on essay based assessments and invited undergraduate students and then staff to comment on the current criteria. On the basis of information gained in these sessions, a set of new criteria were developed. These were then used by staff and students to mark a number of sample essays and high reliability was evident. The student response to the new criteria was positive and some of their comments will be presented.

The second study used a similar methodology but looked at marking criteria for a different format of assessment; experimental research reports that students submit for summative assessment. The development of writing skills in this format is different to that required for a more discursive essay based assessments. Undergraduate students, postgraduate teaching assistants (who act as laboratory report markers) and staff were involved in focus group discussions of a new marking rubric. On the basis of these two studies, new and different rubrics have now been introduced into two programmes at UCL; BSc Psychology and BSc Psychology and Language Sciences.

#### **5. How can research-teaching links be strengthened in postgraduate courses?- 35 Surprisingly Simple Strategies**

**Paul Joseph-Richard**

The aim of this paper is to integrate current patterns of practices used in the promotion of Research Informed Teaching (RIT) in HE institutions. This is achieved in two ways: by collecting strategies that are conceptualised in the existing literature through an in-depth literature review; and by identifying the lived experiences of HE teachers in promoting RIT through an analysis of institutional case studies published between 2005 and 2015. Although many useful strategies, particularly at the institutional level, have been proposed in the past (e.g. Jenkins and Healey, 2005; Elsen, Visser-Wijnveen, van der Rijst and van Driel, 2009; Turner, Wuetherick and Healey, 2008; Jenkins et al. 2003), how and what individual teachers, who are often overwhelmed by their workload (Rohn et. al. 2016), can do to promote RIT in a given situation remains sparse and scattered. It is important to provide the busy practitioners the much-needed granularity on this complex area of practice. Considering the fact that Teaching Excellence Framework’s proposed quality criteria include the extent to which “the learning environment is enriched by linkages between teaching and scholarship, research or

professional practice,” this paper is considered timely.

This paper contributes to the existing literature by integrating several practical, ready-to use strategies for advancing RIT, using a new set of categorisations that are based on research evidence, context, process, technological tools, impact, outputs, and RIT mind-set. These strategies are underpinned by the well-known theoretical frameworks of RIT, proposed first by Griffiths (2004), and later modified (Healey, 2005) and further refined by others (Healey and Jenkins, 2006; Pan, Cotton and Murray, 2014). These scholars have clarified that teachers can use any of the approaches labelled as, research-led teaching (the most orthodox form of HE teaching, where students learn about research findings of others), research-oriented teaching (where students learn about the research process), research-based teaching (where students undertaking inquiry-based learning), and research-tutored teaching (where students, in small groups, engage in research discussions with a teacher). Healey and Jenkins (2006) have also suggested that a combination of these four approaches may lead to effective learning experiences. They had an explicit preference for research-tutored and research-based approaches because they promote active student participation. This paper builds on that proposition, by demonstrating the ‘how’ of those approaches, by bringing together several student-centred approaches to promote RIT. Research, in this paper, is defined as “a process of investigation leading to new insights effectively shared”(REF 2010).

In this paper, 35 ready-to-use strategies to promote RIT in HE institutions will be explained. They can effectively be applied individually on their own or in combination with others. I also propose that these strategies can be used to achieve research-teaching integration at individual (e.g. lecturer/unit/student level) and collective (team, department, school, and institution/national) levels. Although these strategies are useful to all levels of teaching, they are mainly positioned at teaching campus-based, post-graduate level students, as integration of research and teaching at this level continues to be problematic (Charlier, Brown and Rynes 2011). Further, Zhu and Pan (2015) note that “despite numerous studies of the research-teaching nexus, applying research-informed teaching (RIT) to taught-postgraduate education has been largely overlooked” (p. 1). This paper addresses this gap.

## **6. Global Online Inter-university Teaching (GO-IT): Students as researchers in participatory academic communities**

**Gwyneth Hughes, Rikke Toft Nørgård**

Teachers at universities today are facing complex professional change processes related to the growth of blended and online collaborative learning (Hughes, 2009). Simultaneously, teachers are being called upon to engage students actively and directly in research

processes (Leat & Reid, 2012; Bland & Atweh, 2007; Fielding, 2001) and present their work to external and/or international audiences (Fung & Carnell, 2016). As described in these papers, this can be accomplished in different ways and to differing degrees – ranging from including student voices in research, enabling them to collect/analyse data in other people’s research projects, making them co-participants or even creators of their own research projects carried out alongside teachers as researchers (Bland & Atweh, 2007; Howard et al., 2002). It is in relation to this latter ‘radical’ (Fielding, 2001) sense of engaging students as researches that the present work positions itself. Here, students, teachers, and researchers work together in different ways and with international outlook and outreach to establish ‘participatory academic communities’ (Aaen & Nørgård, 2015).

However, such international outreach, collaboration, and dissemination in the form of students that travel abroad, student exchange schemes such as Erasmus exchanges, or use of visiting international or external lectures is often a costly and time consuming affair. Furthermore, exchanges are often cumbersome (requiring formal partnership arrangements) and only available to a very limited number of students and occasions (Moore & Simon, 2015). By contrast, the educational design of Global Online Inter-university Teaching (GO-IT) presents a revenue-neutral possibility for widening students’ possibilities to experience themselves as researchers in participatory academic communities carrying out ‘real research’ that has an actual impact outside the classroom (Aaen & Nørgård, 2015). In prior work we have shown that this kind of academic belonging is of great importance for students within higher education when it comes to motivation, student experience as well as meaningfulness and value of HE (Hughes, 2010; Nørgård & Bengtsen, 2016). The creation of participatory academic communities engaged in the world is however not easily obtained as the pressure to implement digital technologies in online education, integrate research practice in teaching, and engage with local and international society often creates an experience of a watered-down digital classrooms: artificial research projects where students feel more like research assistants without real impact in the world or ability to follow their own research interests and agendas (Fielding, 2001; Bland & Atweh, 2007; Howard et al., 2002; Mathiesen, Nedergaard & Nørgård, 2017). With GO-IT we intentionally try to design against these prevalent structures and reconceptualise teaching as something engaging these challenges directly and wholeheartedly.

Global Online Inter-University Teaching as presented here is a joint collaboration between two or more universities from different countries where academic staff engage in some of all of the following in an effort to create a collective participatory academic community for students and teachers as researchers without formal arrangements and associated costs:



- Running GO-IT webinars or online video sessions where students and teachers meet as researchers across countries/universities to ‘think globally’ together
- Sharing and developing pedagogic expertise and research knowledge through GO-IT between institutions with a focus on hybrid HE, participatory academic communities, and connected curriculum
- Joint participatory action research with a focus on developing global independent research capability in students through establishing inter-university participatory academic communities.

The paper presents a GO-IT interdisciplinary partnership between UCL, London and Aarhus University in Denmark with other international links. The partnership has included international teacher-researchers, student-researchers and external visits. The first iteration of GO-IT was run during the spring of 2016 from Aarhus University. In the spring of 2017 sessions will run from both Aarhus University and UCL and UCL staff will visit Aarhus University to run an academic staff development course on GO-IT. Through GO-IT research and education were intimately linked in ways that moved students beyond the confinements both classroom and campus through creating connections between curriculum and academic communities beyond the institution. Through dialogues, critical debates, presentations of research findings and academic Q & As, students and teachers met online as researchers inquiring into these field to form research-informed practice across the globe. Cross-cultural exchange developed into intercultural and international research collaboration (De Witt et al. 2015). One outcome of GO-IT has been students and teachers publicising international research together in the form of a peer-reviewed research article (Mathiesen, Nedergaard & Nørgård, 2017).

Evaluation of the partnership and the impact on students is ongoing and includes critical reflections by GO-IT partners, focus groups with potential GO-IT participants and student reflections on the process and outcomes of the collaborative experience. Drawing on some preliminary evaluation data the paper will explore the benefits of GO-IT and its wider implications by answering the following questions:

- What are the benefits for an academic/teacher running sessions or seminars for students from a different country/institution?
- What is an effective process for setting up GO-IT relationships and then exchanging expertise and pedagogies for a shared online environment?
- What will a diversity of students gain from linking research and education in participatory academic communities with staff and students from other countries?
- What are the ethics of care and risks when moving from exchange of one-off teaching sessions into more sustained blocks of shared international teaching?

## 7. Does students’ intention to do research change when involved in a “RB learning” redesign of graduate courses?

**Maria Helen Camacho Rivadeneira**

### **Research context, theoretical orientation**

In the Ecuadorian context, the Ministry of Education played a major role in an overhaul of university master programmes to become more research-oriented. This educational reorientation pushed interest in adopting innovative approaches towards the teaching-research nexus (TRN).

In this particular setting, a 4-year research project was set up to redesign existing university curricula and to move towards Research-Based Learning (RBL). RBL – building on the Healey & Jenkins (2009) classification - implies a curriculum designed around inquiry activities in which students conduct research activities. Building on a pretest-posttest experimental research design, students involved in an RBL version of the course were compared to students in a non-RBL version. A differential impact was studied on student’s “intentions to do research”. Building on research about mediating/moderating variables impacting RBL, the present research adopted the Theory of Planned Behaviour (Ajzen, 1991) to develop a theoretical framework. As precursors for “intention to do research”, we put forward that autonomous motivation, perceived behavioural control (self-efficacy), behavioural beliefs and subjective norm will differentially affect the impact of the RBL experience. Additionally, we consider the interaction effect of co-variables: engagement, age and gender.

### **Hypotheses**

We hypothesize studying in a RBL version of a course will result in a significantly higher intention to do research as compared to students in a non-RBL version. Next, we hypothesize RBL has a differential impact on the mediating variables: autonomous motivation, perceived behavioural control (self-efficacy), behavioural beliefs and subjective norm in the way RBL affects intention to do research. Following this hypothesis, we also consider the interaction effect of engagement, age and gender.

### **Design/Method**

A quasi-experimental pretest-posttest design was set up, involving 52 engineering students, enrolled for the course “Water Resource Management” and “Biodiversity and Biodiscovery”, at a public university. Pre- and post-tests consisted of (1) a self-efficacy scale (perceived behavioural control), based on Bandura (2006) (2) a scale to determine “intention to do research”; (3) “behavioural beliefs” and (4) “subjective norm”, based on Ajzen (1991); and (5) the Intrinsic Motivation Inventory of (Deci & Ryan, 2000). Background questions focused on gender and age. To measure engagement, we monitored the efficiency of turning in completed tasks.

A 6-week RBL intervention was designed, requiring students, on a weekly base, to carry out specific research activities. Each activity was based on a step in the research cycle (e.g., writing an abstract, developing a poster, analysing data). Students in the control condition were required – during a comparable amount of time – to adopt basic teaching-research nexus activities, such as simply reading the same research article. All student activity was managed and monitored through an online learning management system.

## Results

The ANOVA analysis results reflect a clear trend, reflecting how RBL students attain slightly higher levels of “intention to do research”. However these differences are yet not significant. As explanations for the current findings, we point at the research design involving also students in the control condition in basic research activities; thus also boosting their intention to do research. Next we point at the rather short duration of the study (6 weeks). An additional explanation is related to the sample involving students of 6 different programs in this general course.

## Conclusions and wider implications for HE

Being promising, the present research results push RBL forward at a broader scale. The RBL approach has invoked – at a more general level - an innovative way of thinking about the teaching-research nexus in the local university settings. From a focus on a single-course innovation, a focus at a programme level approach of RBL has become visible. Workshops have been developed and implemented to develop competencies about RBL. Two complete master programmes have been redesigned and implemented. An agenda for future RBL research could include qualitative studies to map differences in students. In addition, new studies should be set up in a single specialised course setting, involving more students. A mixed method design could help developing a richer picture (interviews, focus groups, video analysis). Lastly, studying the teachers as key actors in the TRN, could develop an additional perspective on RBL.

## 8. Decolonising curricula through making connections

**Lynn Quinn, Jo-Anne Vorster**

In South Africa and elsewhere students are arguing that it is time for universities to reject the iniquitous influences of coloniality on higher education practices. In particular, they are demanding the decolonization of curricula so that what and how they learn is more clearly connected to their lived experiences and ways of being of their communities of origin. The concern is that the knowledge drawn on currently in curricula comes predominantly from the global North with little acknowledgement of the important contribution to disciplinary knowledge of scholars from the global South. The nearly universal adoption of the Western knowledge traditions creates, for many students, a sense

of ‘a hierarchy of superior and inferior knowledge and, thus, a sense of superior and inferior people’ (Grosfoguel 2007:214).

The call to decolonise curricula has been met with a range of responses from academics across the disciplines. Some academics are perplexed by the demands from students; they feel protective of disciplinary boundaries and identities. Some have embraced the challenge and have realised that they cannot continue to design curricula and teach as before. As academic developers whose role it is to contribute to all aspects of teaching and learning in our institution (and nationally) we felt it was important for us to explore, with the academics with whom we work, what decolonising curricula could mean. To this purpose we arranged a series of Curriculum Conversations in which academics shared ways in which they have responded to the calls for decolonizing curricula. From these Conversations we produced a set of curriculum transformation case studies.

Our encounter with the work on Liberating the Curriculum at UCL, underpinned by the idea of ‘making connections’ (Fung and Carnell 2016) led us to use the key principles of Connected Curriculum to analyse the case studies. We found that the core principle that ‘students learn through research and enquiry’ is demonstrated in a number of the case studies. In addition, we argue that there are, inter alia, four key (overlapping) areas in which connections are made to respond to calls for decolonisation:

- 1) connections to research and knowledges beyond the traditional canons;
- 2) connections between the knowledge and pedagogy in a course to the lived realities of students;
- 3) connections which will enable students to navigate a supercomplex and ever changing world;
- 4) connections to a range of places, people and societies, including to students’ local communities and beyond.

In our presentation we aim to show how making connections beyond the traditional cannon in a range of ways has allowed us to begin to conceptualise how curricula can be decolonized.

## 9. Undertaking a condensed, student-led research project in one week: from inception to dissemination

**Harriet Shannon**  
**Background**

Evidence-based practice is the cornerstone of the physiotherapy profession. Ensuring that postgraduate physiotherapy students undertake high quality, clinically relevant research is of paramount importance both to the individual and the profession. In a 2014 student survey, ‘undertaking the final research project’ was the area causing the most stress and anxiety to postgraduate physiotherapy students. Students stated that they felt unclear as to how the research process worked in its



entirety, and how to translate theoretical research knowledge into practice. This applied particularly to international students who may not have been involved in research at an undergraduate level.

### **Aim**

To develop a series of teaching sessions where students could develop and undertake a condensed research project during the first week of term.

### **Methods**

Teaching sessions were designed within a framework of co-operative inquiry, as a participative form of learning. During the first session, students were introduced to a research problem that had been successfully addressed by a previous postgraduate physiotherapy student. The problem was selected specifically to involve healthy adult subjects (rather than patients) and minimal equipment. As a group, students were then tasked with developing a research question, and designing a study that would address the research problem. During subsequent sessions within the week, students were tasked with collected data, inputting it into a spreadsheet and using it to answer the research question.

The sessions were guided using a questioning approach, to encourage the students to confront the complexity of undertaking the research process. Minimal feedback was offered during the sessions, because it was important for students to make mistakes and then reflect on them. During the reflections, ways of improving the research process were discussed. On the final day of the first week, the postgraduate student who had successfully undertaken the research project in the previous year gave a 10 minute presentation of his/her project. This is the final component of the research project/dissertation module so gave students an opportunity to see the 'finished product' of a successful student.

### **Results**

By encouraging students to work together on a project, issues such as blinding, piloting and having a robust protocol could be highlighted within the context of the research study. Students could try different approaches to data collection without the anxiety that they would be wasting time or spoiling their own projects. An unexpected outcome of these sessions was that, since the students were working together on a single project within the module, they learnt the value of teamwork and cooperation. This can be difficult to emphasise to students within the competitive academic arena. Giving students the opportunity to view a final student project presentation, and ask questions, gave the students a sense of what they should be striving towards. Feedback from students was extremely positive: 'Really good insight into the research project and useful tips on forward planning,' and: 'This was a very useful, practical learning opportunity of what could otherwise be a dry topic.'

Project supervisors also noted that the cohort of students had a better understanding of research that would be realistic, achievable and clinically useful within the timescale of the postgraduate course.

### **Implications**

Allowing students to undertake a condensed research project in preparation of their own postgraduate research is a valuable method for demonstrating the research process. Students can learn from each-other, and from their own mistakes, without it jeopardising their own research. This method could be applied to many other disciplines where students need to grasp the concept and constraints of undertaking research within a relatively short timeframe.

## **10. Can First-Year Undergraduate Students Do Research?**

**Xulin Gao, Kara Loy, Ryan Banow**

Research in academia conventionally commences when graduate students or senior undergraduate students first undertake a research project. However, pushing research into earlier stages of undergraduate students' academics, even in large classes, can be very beneficial yet challenging because most students have no experience in research plus they may still be adjusting to university life. An Undergraduate Research Initiative at the University of Saskatchewan invited faculty to add a research component into first year undergraduate classes to align research and teaching. This is a joint endeavour between the Offices of the Vice-President Research and the Vice-Provost Teaching and Learning. Our instructional team decided to offer course-based research in a first year physical geography class in the winter term of the 2015-2016 academic year: Geography 120, Introduction to Global Environmental Systems. This course initiates students' understanding of the interaction between human activity and the natural environment, posing challenges against the potential for solutions essential to making the world a better place in the future. Even with an enrollment of 133 students, an individual research project was required of each student. The research project was integrated with course learning outcomes and subject matter. It started at the beginning of the course and included students' identifying a research question, collecting and analyzing data, and presenting their results in a research poster. A graduate student was hired as research coach to facilitate students' realizing their research projects. At the end of term, a public poster event was organized to showcase students' end products in a high traffic location on campus. The logistics and unknowns were sometimes perplexing but the endeavor was largely successful. Through this approach, we found four interesting outcomes compared to previous iterations of the class. 1) The most challenging part for students was the research question formation. 2) Students were excited to be able to conduct research in an area of interest to them. This was confirmed by the nearly fulsome participation. 3) Doing in-class research actually improved

student performance as seen in the higher overall average grade and the decreased failure rate. 4) Most importantly, students who attained the highest exam marks were not those who attained the highest research project marks. The best student researchers were those with above average grades who were most invested in their projects. This final finding can be explained in two potential ways. First, students with the highest exam marks were not as interested in a research project due to the fact that it only counted for 15% of the total class grade and they did not want to spend a lot of time on it. Second, students with the highest exam marks were not necessarily the most effective researchers. If the second explanation is accurate, it will dramatically affect our department's admission criteria for graduate students in the future.

However, this conclusion needs to be confirmed by more data. As such, the project will be repeated again, with further investigation planned, and expanded into other class offerings at the same level within the department.

### **11. Developing international experiences of student-staff partnerships in learning, teaching and research in H.E.**

**Mick Healey, Beth Marquis, Christine Black, Sam Dvorakova, Rachel Guitman and Kelly Matthews**

“Engaging students and staff effectively as partners in learning and teaching [and research] is arguably one of the most important issues facing higher education in the 21st century” (Healey, Flint and Harrington, 2014, p.7).

‘Students as partners’ has become a hot topic in higher education in the last five years. Perhaps not surprisingly the term is often used loosely and its meaning is contested. Here we refer to student-staff partnership as “a collaborative, reciprocal process through which all participants have the opportunity to contribute equally, although not necessarily in the same ways, to curricular or pedagogical conceptualization, decision-making, implementation, investigation, or analysis” (Cook-Sather, Bovill and Felten, 2014, p.6-7). As Matthews, Cook-Sather and Healey (2017) point out “this is a radical cultural shift from staff making decisions to benefit students toward a mindset where students and staff are working together – as colleagues, as partners, as trusted collaborators – with shared goals.”

This paper explores an international research project investigating the experience of students and staff participating in the first ‘International Summer Institute on Students as Partners in Learning and Teaching in Higher Education’, held at McMaster University in May 2016. The aim of the summer institute (SI) was to build the capacity and understanding of staff and students to develop, design and implement initiatives to promote the practice of students as partners in learning and teaching in higher education. Over 100 delegates participated from seven countries in roughly equal numbers of students

and staff. Participants engaged either in one or two 2-day workshops or in a 3-day Change Institute, at which seven teams of staff and students were supported to plan the implementation of a Students as Partners initiative. The SI was facilitated by students and staff from Australia, Canada, UK and USA.

Following the SI, we analysed the challenges participants ascribed to student-staff partnership, and the features of the SI they thought particularly useful in helping them to navigate them (Marquis, Black and Healey, in submission). Rather than simply assessing the value of the SI, these findings point to potential features that may be helpful for supporting the development of approaches that engage students as partners in research, curriculum design, and other teaching and learning initiatives more broadly. In this paper, we will report on follow-up research conducted approximately 9 months to 1 year after the SI to understand if, and how, participants’ experiences of partnership and their perceptions of features necessary to support it have developed. In particular, this research will explore the following research questions:

1. How do 2016 SI participants currently understand and experience partnership, and how (if at all) has this changed since the SI?
2. To what extent do they perceive their participation in the 2016 SI as supporting their ongoing partnership work in their home contexts?

A mixture of Skype and face-to-face semi-structured interviews will be undertaken to explore these questions in the Spring 2017. Like the project broadly, these will be conducted by student co-researchers, working in partnership with staff from three countries.

The findings from the research will be discussed in relation to two of the themes of the conference – engaging students in research, and students as partners in curriculum change. Importantly, implications of our research for reconceptualising higher education for the future through research-based education will be discussed.

### **12. Research-based learning: implementation strategy and models from Maastricht University**

**Ellen Bastiaens, Walter Jansen**

In the 1970s Maastricht University (UM) was the first university in the Netherlands introducing problem-based learning throughout its Bachelor's and Master's programmes. In 2008, with funding from the Dutch Ministry of Education, Culture, and Science, Maastricht University developed a new format for problem-based learning in the Bachelor phase. This resulted in an excellence programme named ‘Maastricht Research Based Learning’, or MaRBL. In the MaRBL programme, third year Bachelor's students are selected to partake in an academic research project. Depending on the academic programme, students can initiate their own research projects (for instance at the faculty of Psychology



and Neuroscience) or students can join an existing research project (for instance at the Faculty of Arts and Social Sciences). Over the past years each Bachelor's programme at UM has developed a design for MaRBLe fitting the structure of their programme and in some instance also addressing national regulations (for instance the national demands in programmes at the faculty of Law, called 'civil effect'). Under supervision of senior academic staff all students work for a period of four to six months on their research project, which in many cases results in a Bachelor's thesis.

Students receive around 18 credits for their MaRBLe project. Currently, MaRBLe has been implemented in all the UM Bachelor's programmes and over the past six years it has attracted about 1.500 students that participated in the programme. The ever growing list of MaRBLe-project output that appears in academic articles, conference proceedings and research awards shows the effectiveness and quality of MaRBLe in our opinion. Since MaRBLe was intended for just a selection of our student population, EDLAB – The Maastricht University Institute for Education Innovation initiated a UM-wide education innovation project focusing on the further implementation of research skills within Bachelor's programmes for all Bachelor's students. On a course level, this project emphasises the necessity of the integration of research skills and gives hands-on tools to realise this. Think for example about ways to integrate content and skills courses and how one could promote interdisciplinary group work through connecting with external partners and make students engage with 'real-life' questions. On a curriculum level, the project stresses a trend and ambition in academic education to develop learning trajectories in curricula and pinpoints this to the training of research skills in a curriculum. Moreover, to support both students and staff in such learning trajectories, we propose the creation and use of online information platforms. Ultimately, in order to make these innovations penetrate the university's curricula, strategies for staff development are presented as well.

In our paper we will focus on themes like:

- How and where are decisions about the adoption and implementation of research-based learning made within institutions? Who are the stakeholders?
  - What is the institutional discourse around research based education? How can be dealt with disciplinary and individual differences in the interpretation of research-based learning?
  - How can we convince teaching staff to adopt research-based learning strategies? What are the obstacles and possible incentives for them to do so?
  - How can we establish and monitor whether research-based learning is actually working well?
  - How can research-based learning be best integrated on a course level and what are the implications of research-skills learning trajectories throughout a curriculum?
- We will support these themes with examples from our

own university, taking different organizational settings and disciplines into consideration, concluding with some generic lessons learned that we would like to share with staff and institutions that are on the eve of introducing complex changes into their educational programme.

### **13. Rapid and collaborative learning design for research based universities**

**Clive Young, Nataša Perović**

How can we engage and enable our time-pressured academics to design rich blended and online courses (modules)? Most leading research based universities now have aspirational strategies to develop future-looking, digitally rich, flexible courses attuned to students' expectations for engaging, professionally related learning experiences. Yet we know only a few of our pioneering academics currently have the design skills, technology knowledge and above all time to remodel their programmes to the creative standards the future of education demands. Deep institutional change must by definition engage mainstream academics but current methods of learning design consultancy and 'away-day' workshops are support-intensive and time consuming, therefore poorly scalable. This contradiction frustrates educational ambition at all policy levels.

Recognising the need for a radical rethink, the digital education team at University College London (UCL) has pioneered an effective 'light touch' alternative team-based approach. 'ABC' is a high-energy hands-on workshop; in just 90 minutes teaching teams work together to create a visual 'storyboard'. The storyboard is made up of pre-printed cards representing the type and sequence of learning activities (both online and offline) required to meet the module or programme learning outcomes. Assessment methods, cross-program themes and institutional policies are all integrated into the process. The key to this approach is pace, engagement and collaboration. ABC has been found particularly useful for new programmes or those changing to an online or more blended format. The approach generates high levels of engagement, creative informed dialogue and group reflection about curriculum design among even time-poor academics.

The intentionally paper-based process itself is as significant as the outcomes. Storyboarding is an established technique from film-making that illustrates a narrative as a sequence of scenes. The ABC version provides visual overview of the learner experience externalising the course structure therefore making it immediately discussable by the team.

The storyboard's sequences are learner activities, classified into six type cards using a simple and easy-to-learn taxonomy based on the highly respected 'Conversational Framework' created by Prof. Diana Laurillard (Institute of Education, UCL). Example activities are provided but teams are able and encouraged

to add their own activities to the cards. Trials showed the creative hands-on, analogue format of the workshop together with the presence of colleagues and support staff stimulates a wide-ranging discussion. This generally includes the purpose of the course or programme, teaching methods, alternative technologies and assessment methods and above all the student experience. The storyboard approach also reinforces the notion that the design is a purposeful, discussable and transparent narrative describing the student experience over time. Extensive testing at UCL and other institutions has shown high levels of transferability, academic enthusiasm and satisfaction. The workshops run so far seem to have immediate impact in terms of stimulating a level of collaborative 'educational design thinking' in a range of academic contexts.

#### **14. Students as pedagogic researchers**

**Julie Blackwell Young, A. Cameron & A. Robertson**

Supporting deeper engagement in learning, and promoting pedagogical approaches which encourage greater partnership between staff and students has benefits for students and institutions and is advocated in recent academic literature (Bovill, Cook-Sather, Felten, Millard, & Moore-Cherry, 2015). 'Students as Partners' is a fundamental concept within the Abertay Teaching and Learning Enhancement strategy (reflecting our Student Partnership Agreement) and one approach has been to engage students as investigators in pedagogic research. Our perceptions of the benefits of adopting this methodology align with the literature and include improving students' experiences of teaching and learning, supporting students to effect change and shape their university experiences, as well as making the education process an active rather than a passive one (McCulloch, 2009, Streeting & Wise, 2009, Thomas & May, 2011).

In this presentation the pedagogic student researcher models being used within Abertay Teaching and Learning Enhancement Fund (ATLEF) projects will be explored. A prerequisite criterion of these projects is that students must form part of the research team. In 2016, a further initiative was piloted whereby students, as opposed to staff, designed and lead pedagogic projects - academic and professional service staff, as well as the Students' Association, provided support. The highlighted ATLEF models will be located within contemporary developments in higher education and theories on student engagement (e.g. Bovill, et al. 2015). The visibility of pedagogic research to both staff and students in a primarily teaching-centric institution will be a focus of discussion but the challenges in conceptualising the idea of students as partners in this process will also be considered.

This presentation will reflect upon the benefits articulated by the student researchers – for example, enhanced employability skills derived from team-work, invested responsibility, application of research methods, project

leadership, and linking with industry. They comment that their knowledge and understanding is broadened and that there are rewards in knowing that they are influencing institutional policy and practice. Engagement with these projects has also afforded students the opportunity to give conference presentations, publish with staff in peer-reviewed academic literature, and some graduate destinations have been as a direct result of the students' research work.

Finally, links with the Teaching Excellence Framework, student voice and engagement, student recruitment, employability, and the proposed use of student researchers to collect learning and teaching data in our next round of discipline Periodic Reviews, will be outlined.

#### **15. How diverse is your reading list? Addressing issues of representation in the sciences and social sciences**

**Lesley Pitman, Karen Schucan-Bird & Hazel Smith**

This session focuses on issues of diversity and representation in the curriculum and on the particular problems of making reading lists more diverse in the sciences and social science. It aims to provoke lively debate and provide practical tips for reviewing the content of your reading list. First, we will set out some theoretical justifications for why diversity in our curriculum is important. Second, we will outline methods of how to review your reading list. Third, we will identify practical challenges and philosophical critiques of this endeavour. The speakers have led two projects funded by the Liberating the Curriculum strand of the Connected Curriculum at UCL. Lesley Pitman and Hazel Smith have focused on a second year module in genetics, whereas Karen Schucan Bird has led a project at UCL IOE to investigate gender, geography and ethnicity in systematic reviews of research.

#### **16. Symposium. Teaching-based research: Models of and experiences with students doing research and inquiry – results from a university-wide initiative in a research-intensive environment**

**Camilla Østerberg Rump, Tine Ravnsted-Larsen Reeh, Hanne Nexø Jensen, Tine Damsholt, Marie Sandberg**

The purpose of this symposium is to explore and compare a multitude of different approaches to implementing research based teaching in a specific institutional setting. The four case studies are characterized by including teaching based research, see e.g. Wilcoxon et al., 2011, where students coproduce knowledge together with teachers. Two case studies, (3) and (4), also relate to students engaging in research-like activities, where students are engaged in inquiry, but do not produce new knowledge as such. One project was done across faculties (3), one was done in the humanities



faculty, but cut across faculties (1), one was done in the theology faculty (2), and one was done in the science faculty (landscape architecture and biochemistry) (4). The background of the institutional setting is a research-intensive university with approx. 5,831 academic staff and 40,000 students. Following a 4 year's strategy with a strong emphasis on research, pressure from scientific staff led to a 2012-2016 strategy with teaching as main focus of enhancement at the University. In a process of application by individual or groups of teachers, 8 thematic projects were initiated of altogether £ 9.7 million. In this symposium we report results from the project entitled 'Research Based Education', a four-year project of approx. £ 1 million. The project group consisting of the case study owners was established to share experience, generate synergies, and develop concepts. The group has met two to three times a year. The over-arching purpose of the project was to integrate research and teaching in order to qualify the students and their academic skills by organizing lessons in ways which introduces the students to the key research methods and processes of the subject. Several questions have been raised during the project. How do teachers and students experience the process of co-creation of knowledge? When teachers and students engage in teaching based research, students become co-creators of knowledge. This has raised issues in some of the projects. As has been pointed out by Chang (2005), there may be occasions where students would feel they are just 'cheap labor' for the teachers, when they are engaged in actual knowledge production together with the teacher.

This has raised issues in some of the projects. As has been pointed out by Chang (2005), there may be occasions where students would feel they are just 'cheap labor' for the teachers, when they are engaged in actual knowledge production together with the teacher. This was seen with some students, and can be explored from the perspective of distribution of authority as it is in presentation (1), where students and teachers in different disciplines were interviewed about their views of and experiences with research based teaching. It can also be viewed as an issue with ownership, as it is (briefly) in presentation (4), and the challenge also represent itself when students and teachers practice the linking research and teaching in joint supervision (3).

The idea of the Humboldtian university was that students and teachers 'sat around the same table and explored the world', so to speak. Can we revive that format in order to cater for the elite and strengthen the research teaching nexus? This is the idea of presentations (2) and (4). In presentation (2), students could apply for participation in a course where students and teachers together explored a research question in church history. In presentation (4), the joint supervision format sometimes worked in this way. sometimes worked in this way.

Healey (2005) has proposed a two-dimensional model

distinguish between different research-based forms of teaching:

- Research-led: Students are mainly an audience, emphasis on research content
- Students learn about current research in the discipline. Research-oriented: Students are mainly an audience, emphasis on research processes and problems
- Students develop research skills and techniques. Research-based: Student are active, emphasis on research processes and problems
- Students undertake research and inquiry. Research-tutored: Student are active, emphasis on research content
- Students engage in research discussions.

Can we use Healey's model to design an instrument to evaluate research-based teaching? This is explored in presentation (4) where students in a 2nd year biochemistry course and students in their whole first year of the landscape architecture program have answered a 19 items questionnaire pre and post instruction. The responses are analyzed using descriptive statistics to compare pre and post responses and a factor analysis to see if Healey's model is reflected in the students' answers.

Wider implications: Through the exploration in the case studies of the questions above, we have gained important insights across disciplines and faculties about how to strengthen the integration of teaching and research in a research-intensive environment. Collaboration in the project group has led to inspiration and new insights across the university, and an anthology will cover the relevant insights and syntheses (expected to be launched in the autumn). A web-portal with case examples have been established to inspire teachers across the university: <http://fbu.ku.dk/english/examples/>.

All in all, we find that the studies across the four cases have wider implications by offering important different perspectives on vices and virtues of research-based teaching practiced as teaching-based research.

### **(1) Integrating research and teaching – distributing authority?**

**Tine Damsholt and Marie Sandberg**

Turning academic learning into a matter of integrating teaching in research projects (and vice-versa) implies a rethinking of not only the teacher's classroom authority, but also of the way research authority becomes distributed to students. It can be argued that integrating research and teaching ideally requires the researcher-teacher sharing a state of 'not-yet-knowing' with the student-researchers and that a variety of activities can count as feeding into the joint knowledge production. However, when examining students' and teachers' concrete experiences of such distributions of authority, not everybody finds them meaningful or enabling learning. The presentation explores some of the implications of teaching-research integration in practice through the use of collaborative research methods. The

practice-based examples and experiences with research-teaching integration are based on ethnographic material: classroom observations, as well as in-depth interviews with students and researcher-teachers in Humanities and Science at the University of Copenhagen.

## **(2) Connecting Education and Research Projects in Academic Talent Development** **Tine Ravnsted-Larsen Reeh**

Pressure on the finances, an increase in the amount of interdisciplinary research projects supported by external funding, and a substantial growth in the amounts of students at the universities have had a tendency towards disconnecting the classical research - education nexus. However, this need not be the case. The paper shares the results of three different pilot studies to reconnect research and education through the development of special elements of academic talent development within the ordinary education. The paper also addresses a complex of gender related problems that – somewhat to the surprise of the teachers – arose and could be said to have consequences for the prospects of the students both within research and within society.

## **(3) Joint supervision of thesis work** **Hanne Nexø Jensen**

When resources for supervision decreases, joint supervision may be of advantage. In a joint supervision model, supervisors gather 3-7 students and supervise them jointly (possibly split a class into a number of groups). This may be a way of bridging the gap between teaching and research. A supervisor may introduce the students into hers or his research group and invite them to deal with different aspects of his/her research in their thesis. The students' work might feed into an ongoing debate or students and supervisor might engage with an external partner solving a problem and generating new knowledge. Pedagogically, the model includes several elements from a research process: formulating a research question, making a research design, conducting an investigation and writing up a paper, and a peer review process. Two major challenges are at play for both students and supervisors: Time and competences (how to “do joint supervision”).

## **(4) Developing an instrument for evaluating research-based teaching**

**Camilla Østerberg Rump, Dorte Christiansen Elmeskov, Frederik Sørensen, and Anders Tolver**

Three modules were redesigned to engage students in research or research-like activities (inquiry). We developed an instrument asking students about their expectations to research-based teaching, which can be administered pre and post instruction. We would expect an increase in students' expectations to research-based teaching if they have a good experience. The instrument is based on Healey's model (2005) of four types of research-based teaching. It was administered pre and post instruction to three classes in landscape architecture and biochemistry.

Results show that for biochemistry the students' expectations rise. For landscape architecture they decline. This could be explained by the students experiencing too little outcome in relation to time spent. A factor analysis identified two factors. We expected factors to relate to the four types of research-based teaching in Healey's model. The factors were far from. Rather it seems that the students distinguish “ordinary teaching” from more independent work by students.

## **17. Symposium. The co-created classroom: a model for 21st century research-based education** **Beth Loveys, Cathy Snelling, Sophie Karanicolas, Rebecca Tooher**

“Partnership in learning and teaching is a way of staff and students learning and working together to foster engaged student learning and engaging learning and teaching enhancement.” (1) p.15

This symposium focuses on emerging practices in co-creating curriculum at the University of Adelaide. Four presenters will each focus on a different aspect of the research-teaching nexus: course design, learning and teaching activities, assessment tasks, and learning outcomes (2) These activities have been identified as key in infusing research practices and experiences into student learning (3). The University of Adelaide has made substantial progress in incorporating research-based education (RBE) into the curriculum across all undergraduate programs. Since 2014 all students undertake small group discovery experiences (SGDE) in every year of their program (4). Use of flipped classroom techniques make space in the curriculum for enquiry-based and self-regulated learning (5). A focus on career readiness has seen increased attention given to the development of generic graduate attributes alongside deep content knowledge and skill acquisition (6). Increasingly we are seeking to better engage with students as partners in their learning and an emerging practice is the development of co-created curriculum. In this symposium we will discuss our experiences in using curriculum co-design across different aspects of RBE and will invite the audience to participate in co-creation - working with us to identify key implications for the future of RBE.

## **Students as partners in course design**

The Bachelor of Health and Medical Sciences (BHMS) includes only two compulsory courses outside of the students' chosen major. These two courses aim to develop students' academic literacy and generic graduate attributes rather than expertise in disciplinary content domains. Design challenges posed included: incorporating distinct disciplinary differences in research skill development across the breadth of the BHMS curriculum; engaging students in skill development early in their academic career when their focus is often on content knowledge acquisition; and creating meaningful interaction in very large classes.



We decided that the development of these courses would benefit from co-design utilising the expertise of BHMS students and teachers.

We held a co-design workshop based on the Stanford d.school design thinking methodology (7) with 32 students and staff working in triads or pairs. Worksheets, notes and photographs from the workshop were collected and analysed to generate a series of design principles which guided the development of the courses delivered in 2017.

### **Students as partners in research-based assessment design**

In 2016 a new course, Plant Production and Global Climate Change, in new degree program, Bachelor of Applied Biology was proposed. It provided an excellent opportunity to use co-creation methodology. Second and third year students and academic staff participated in a co-creation workshop focused on designing a specific assessment task. Participants working in groups with a student:staff ratio of 4:1 were provided with broad learning outcomes to be achieved by the assessment task and were given complete freedom, but with strict time limits, to design and structure an assessment task around these outcomes. The assessment task created emphasized both enquiry-based learning and mastery of key discipline specific research skills and methods (8). Using co-creation resulted in the production of unique student centred assessment tasks which successfully addressed the learning outcomes. The main challenge for this co-creation activity was ensuring a cross section of students in terms of their engagement, motivation and cultural background.

### **Students as partners in identifying best practice principles for enquiry-based learning**

Enquiry-based learning is an integral part of undergraduate curricula at the University of Adelaide. In a 2016 project to develop good practice principles for this pedagogy, students and staff worked as partners in a co-creation workshop. Beforehand, 32 undergraduates and 16 teachers participated in an online questionnaire to identify critical 'pros and cons' of their enquiry-based learning experiences. In the subsequent co-creation workshop, they formed 2:1 student: teacher ratio groups, to collaboratively develop good practice principles to underpin enquiry-based curricula design. These collective outcomes will be an integral part of enquiry-based learning professional development based on authentic evidence of what 'works' - and what 'doesn't'. Designing the co-creation workshop to allow students to be equal contributors, not just 'listened to' or 'surveyed' for their opinions was a major challenge. However, the workshop exceeded expectations as the 'tangible' student engagement was only matched by the 'palpable' teacher engagement.

### **Students as partners in developing online learning resources**

Flipped classrooms make space in face to face learning encounters for enquiry-based learning, supporting RBE. However, students need to be supported to learn in the self-regulated manner (5) that underpins flipped learning and acceptance of this modality by students can be a major challenge. To address this, this project engaged students as partners to co-create learning resources supporting first and second year students' uptake of flipped learning using student derived evidence. Final year students working with flipped classroom teachers have developed guidelines to benchmark effective flipped classrooms. Co-created instructional videos on topics that the students' themselves have deemed suitable for flipping underpinned the delivery of this project. While the major challenge has been working around students' timetable commitments, the richness of the discussions between students and teachers on the project team have identified common issues that need to be addressed to more effectively engage students in flipped classrooms and enquiry-based learning.

### **18. Symposium. Truth or dare: research informed teaching in applied universities?**

**Tansy Jessop, Clare Kell, Mohammad, Golam Jamil and Winnie Qi Wu**

This symposium consists of a position paper and three papers; one of which is based on research undertaken in four applied universities. The position paper stakes a claim for research informed teaching in applied universities, outlining strategies for implementing research-based learning, and debunking common myths about the nature of research informed teaching. The three research papers address the implementation of RIT; the problem of finding a shared understanding across disciplines; and the transformative potential of research based learning in assessment and pedagogy.

### **Transformational, empowering, democratic: why RIT matters for all students**

This position paper sets up the case for RIT as a vital approach for all students. It challenges the common misperception that RIT is an exclusive pedagogy for the brightest and best students, most appropriate to research-intensive universities among research-active staff. It also challenges the 'facts first' idea that students can only undertake research once they have sufficient disciplinary knowledge under their belt. The paper sets out strategies for developing a through-line of research based learning in undergraduate degrees using case studies and examples, and drawing on new paradigms of curriculum development.

### **Mapping RIT activity using Jenkins and Healey's four quadrant matrix**

Academics (n=120) from a variety of disciplines in four applied universities in England and Wales mapped RIT activity in their own courses across the four-quadrant

matrix (Jenkins and Healey 2005). The researchers collected data about what prevented full engagement in all aspects of research informed teaching. This session explores the findings, based on a thematic analysis of comments. Surprisingly, academics mapped activities more heavily in the student-focused upper quadrants of activity, particularly the research-based quadrant. The researchers question whether this is because RBL is easier to identify in dissertations and final year projects, and probe in further granular-level analysis of the named activities. These provide a more ambiguous picture of RBL and RIT more generally. Academics described obstacles to RIT as being lack of time, confidence and know-how, as well as fear, risk and student resistance to different pedagogic approaches. The paper concludes with strategies to combat these barriers to RIT.

### **Developing a shared understanding of RIT in an applied university**

This paper is based on interviews with 30 academics in five schools at one university. The sample of academics included research-active and teaching-focused ones, and those who teach in both applied and theoretical disciplines. Interview questions explored disciplinary definitions and traditions of research, pedagogy and research informed teaching. The purpose of the research was to ascertain whether there are differences in understanding of RIT across the research-teaching 'divide', and how disciplinary approaches to research and teaching differ and influence approaches to research informed teaching. The findings highlight that sciences and applied disciplines provide more opportunity for undergraduate students to practise research methods, but that experiments are often predictable. Creative disciplines have a strong understanding of students as producers, value choice and independence, and elicit unpredictable outcomes. The paper concludes by staking out the common language, and offering insights into applied and disciplinary approaches to RIT.

### **Research based learning (RBL) as transformative pedagogy**

The researcher analysed course documents from four applied programmes of study in one university using six research-related goals about the integration of teaching and research (Verburgh 2013). Two types of documents were reviewed: a) course descriptors and b) assessment briefs. These produced a rich picture of variations in the research-active elements on each course. The data from the course audit was then compared with student responses to questions about how they learn on the new Assessment Experience Questionnaire (Version 4.0). Findings demonstrate that courses which contain more research-based tasks drive up scores about student engagement, independent learning, analytical skills and problem-solving capability. These findings indicate the potential of RBL to encourage students to become active, meaning-seeking individuals. The results of this small-scale study provide new evidence of increased student

intellectual and metacognitive skills developed through research-based teaching, learning and assessment, providing fresh direction for future research about the links between assessment and RIT approaches.

## **19. Symposium. Interactive session exploring the controversial question: Why is the Curriculum White?**

**Hazel Smith, Amali Lokugomage, Ariane Smart, Sayeeda Ali, Mira Vogel, Victoria Showunmi and Teresa McConlogue**

The purpose of the session is to:

- Explore what is meant by liberating the curriculum
- Share experiences and practices on developing a more diverse curriculum
- Provide a platform to have an open discussion on 'diversity' in an academic space
- Build on existing strategies to continue the work currently taking place.

### **Background**

#### **What is Liberating the Curriculum?**

At UCL there are institution-wide initiatives that affect the curriculum, for example, our recent successful Race Equality Chartermark and Athena Swan submissions. The Connected Curriculum Liberating the Curriculum group's aim is to work closely with UCLU Liberation Networks and UCL Equalities and Diversity to challenge Eurocentric and male-dominated curriculum, and find ways to fairly represent black, queer, disabled and feminist contributions. Find out more about our work here.

### **Emerging questions**

How does this affect you? As a lecturer, do you want to represent diverse thinking in your module? Do you want to hear about others at UCL who have done this? This workshop, will enable members of the Liberating the Curriculum group to respond to questions, explain their work and report on curriculum change at UCL.

## **20. Connecting research and teaching - Comparing the strategies of German, Dutch and English governments to educate knowledgeable professionals through higher education**

**Didi Griffioen, Antonia Scholkmann and Paul Ashwin**

There is a great concern about the employability of high-level professionals within the 21st Century knowledge economy. As the Communiqué of the Conference of European Ministers Responsible for Higher Education states, the "higher education programmes, including those based on applied science, to foster innovation" hold the potential to foster innovation across Europe. The acquisition of research competences is stressed as a necessary prerequisite for the current and future functioning of innovative high level professionals in Europe (Conference of European Ministers Responsible for Higher Education, 2009). Furthermore, professional practices are increasingly complex and knowledge-based,



while societies also expect professionals to be accountable for their professional choices (Griffioen, 2016). The connection between research and education is considered crucial in this perspective (Barnett, 2012; Onderwijsraad, 2014). Whilst the role of research in higher education has been widely discussed, it has been mainly from the perspective of the design and implementation principles for courses (e.g. Healey, 2005), or curricula (Verburgh & Elen, 2013), to the perceptions of research integration of students (VisserWijnveen, van der Rijst, & van Driel, 2016), faculty (Schouteden, Verburgh, & Elen, 2014), and managers (Boerma, Griffioen, & Jong, 2013). While these perspectives are closest to educational practices, governmental guidelines and strategies help to structure the context in which these practices are created. In addition, despite the general conceptual European perspective on the function of research in employability and the function of research (Karseth & Solbrekke, 2016), it remains unclear how different national governments in Europe ensure the provision of knowledgeable professionals that are required for their societies.

In the present paper, we analysed the strategic visions and steering mechanisms of three European governments—the Netherlands, Germany and England—in relation to the role of research in undergraduate higher education. This is in line with the call to provide more comparative studies (Teichler 2014). We analysed national policy documents, which can be interpreted as the respective governments’ agendas for defining the role of research in undergraduate higher education. For the Dutch context, those were the last three of the strategic agenda’s the Dutch government provides for higher education on a regular basis (OC&W, 2007, 2011, 2015). For the German perspective included were recent policy papers from the German Council of Science and Humanities on the on the relation between higher education and the labour market (WR, 2015; WR, 2014); several papers of the German Rectors’ Conference related to the labour market (HKR, 2010), Bologna (HKR, 2010), and instructional reforms (HKR, 2008). Additionally, older documents were included to clarify strands of the discussion that led to the current developments (HRK, 2007; WR, 2007; WR, 2006). The English analysis is based on the recent Green (BIS 2015) and White (BIS 2016a) papers on Higher Education in England, as well as the technical documents that support these (BIS 2016b, DfE 2016), as well as the Quality Assurance Agency (QAA) Quality Code (QAA 2016).

The documents were analysed in a deductive-inductive procedure, in which a set of pre-set questions was applied in combination with keyword searches to the material, and additional categories were retrieved during analysis – eventually resulting in category refinement. Initial categories were 1. The envisioned function of higher education in society; 2. the envisioned aims and goal of higher education (“What to educate for?”); 3. The envisioned topics and content of the education (“What

to educate?”); 4. The instructional means advocated to reach those goals (“How to educate?”) and 5. The role of research in education.

From a comparative perspective, the results of this on-going analysis show a trend to highly differentiated governmental rationales and strategies regarding the integration of research into higher education. The preliminary results show differences the national governments’ view on society, higher education’s role in relation to employment, definitions of employability, the role, function and position of research in undergraduate education and mechanisms advocated to reach the envisioned role of research. The German perspective, on the one hand, tends to be normative and input-oriented: the respective documents give ample rationale why research should be considered an integral part of undergraduate education, both with respect to employability and societal implications. The English documents, on the other hand, show a clear picture of outcome-oriented rationales, defining what and why research is desirable in undergraduate education to the demands of employers and the labour market, more specifically. The Dutch perspective shows a middle way in between those two extremes, where societal and educational visions are formulate normatively, however they get reconnected with the affordances of the labour market and the idea of education serving innovation and economic growth.

As a synthesis the impact of commonalities and differences on the role of research in higher education under the three national perspectives will be analysed. In the presentation implications of these analysis will be elaborated and discussed.

## **21. The benefits from staff-student partnerships in pedagogical and institutional research: an evaluation research study**

**Isabel Huet, Hendrik van der Sluis, Steve May and Steve Woodfield**

The benefits of staff-student research partnerships or collaborations at the individual and institution level are widely reported (Healey, Flint, & Harrington, 2014; Little, 2012). The Higher Education Academy report “Engagement through partnership: students as partners in learning and teaching in higher education” (HEA, 2014), focuses particularly on the benefits of staff-student partnerships in the UK for student learning and teaching enhancement. It reports that partnerships increase student engagement, sense of belonging to the academic community, and success in learning, that student engagement in collaborative work with staff is key to their learning gains and achievements and that for this reason it has been reinforced and promoted in many institutions worldwide. However, the evidence is frequently taken from “case-studies or anecdotal reports that students like it” [2:60]. The impact of these partnerships in terms of learning gains has not

been extensively investigated. The partnerships in this study take the form of staff student collaborations in educational or pedagogical research that is shaped by the rationale of research-based education: students learn in a research or inquiry-based mode, constructing not only knowledge within a specific disciplinary field but also by developing a set of transferable skills. According to several authors (Brew, 2013; Dickerson, Jarvis, & Stockwell, 2016; Healey & Jenkins, 2009; Huet, I., Baptista, & Ferreira, 2013) learning in a research environment fosters the intellectual and practical capabilities of students, allowing them to become more independent, autonomous and critical learners, and consequently better prepared to succeed in their studies and adapt more successfully into employment and/or consider potential academic career trajectories.

The Student Academic Development Research Associate Scheme (SADRAS) is a programme initiated in the academic year 2012-13 at Kingston University, to stimulate and support partnerships between students and staff. SADRAS encourages staff and students to undertake pedagogical or institutional research to improve the student academic experience at the university; it works to enable students, as part of a learning community, to actively contribute, for example, to course development and curriculum design, and enhance the learning environment. A key aim of the scheme is to instil the student partners with a greater sense of engagement and belonging through working closely with staff and to enhance their research skills and hence their academic persistence and proficiency. The scheme is also aligned with institutional policies to promote a research-informed education environment; foster participation and engagement among the Black and Minority Ethnic (BME) undergraduate students; and develop academics skills amongst all students (Noakes, May, Sluis, & Gay, 2013; van der Sluis, May, Locke, & Hill, 2013).

Beside the rationale for and the outcomes of engaging students in research-based education the paper will present the results of two evaluation research studies, conducted in 2013-14 (Huet, van der Sluis, & May, 2016) and 2016-17 (ongoing), with students and staff that collaborated as research partners outside the formal curriculum. The purpose of this study is to probe the expectations and perceived learning gains related to SADRAS from students and staff participating in the projects, with a focus on identifying the development of research competencies by students. The findings presented in this paper form part of a larger study that aims to evaluate the overall SADRAS programme.

The data from 2013-14 reveal that staff and student collaborations supported by SADRAS have acted as change agents within the institution and have contributed to students' learning gains, in particular to the development of their research competencies. Staff were both engaged and motivated in developing

educational or institutional research projects that would benefit the student learning experience at the university. The opportunity for undergraduate students to work together on a research project resulted in positive experiences for both staff and students. The benefits of these collaborative projects and the opportunities to develop research competencies, which are transferable to the world of work, were clear to the students. For example, staff and students experienced the SADRAS projects as contributing to the students' sense of autonomy, responsibility and independence, which, with the current emphasis on employability skills (Mason, Williams, & Cranmer, 2009), is an important finding of this research. Moreover, participating in 'real research' has stimulated the SADRAS students' understanding of research approaches, methodologies and methods. Students developed competencies such as information handling, presenting information in different formats appropriate to the audience; and cognitive abilities such as evaluation and analysis. For most students participating in SADRAS was their first exposure to an important aspect of academic practice, which had sparked further interest in research, strengthened their confidence to succeed with their current studies, and stimulated their ambitions to continue with further studies in higher education. Building on these findings (Huet, van der Sluis, & May, 2016) the 2016-17 study will confirm the previous findings as well as explore further how students have been constructing knowledge in collaboration with each other and with staff. The authors believe that is of crucial importance to understand the difficulties/problems students face throughout their research journey, how they overcome the identified problems and how they perceive the impact of their work for the wider university and for improving the students' learning experience.

## **22. Learning analytics together with student opinions: improving the design of the online learning environment.**

**Hayley McGrice, D.A. Thompson, B.R. Loveys and P. Munguia**

Improving student engagement with and use of learning management systems (LMS) and learning technologies interfaces (LTI) is a challenge faced by tertiary education institutions worldwide. Three critical success factors identified in e-learning technology are: (1) ease of access and navigation, (2) interface design and (3) level of interaction (Volery & Lord, 2000). Students who engage in internet educational technologies tend to score higher in traditional student engagement measures, such as level of academic challenge, and these students also are more likely to engage in higher order thinking, reflective learning, and integrative learning in their study (Chen et al., 2010). In 2014, the University of Adelaide learning technologies team conducted a survey of overall student satisfaction with the LMS Blackboard, called MyUni. When asked 'How can the university improve your experience with MyUni? 23% of the 2450 respondents made suggestions relating to a need for improvements



in consistency and structure between different courses. Comments included “Have some consistency in how information is put up on MyUni” and “More logical and fixed hierarchy with less ability for the coordinator to create an overload of links”.

In response to this demand, the University of Adelaide trialled the Learning Pathway, a learning technology interface designed for the LMS Blackboard platform, developed by the University of Queensland, into twelve courses from the Faculties of Science, Engineering, Computer and Mathematical Sciences and Health Science. The tool visually presents on the home page, what students need to do and need to know each week. A JavaScript presents course materials and activities in the form of a clickable pathway that quickly and easily guides users to relevant course material to help learners “see” the pathway for achieving learning objectives. Collaborations between the University of Queensland, the Learning Innovations Branch and the Teaching Applications Team have resulted in the Learning Pathway being adapted to suit the University of Adelaide’s MyUni environment.

At the completion of the semester students were surveyed on their perceptions and use of the pathway and invited to participate in focus groups. Following this, learning analytics data were captured from the LMS servers and mined to analyse the student’s online learning behaviour. All research was conducted with approval from the Office of Research Ethics and Compliance unit (H-2015-233).

Initial modelling of the analytics data revealed rapid adoption by users, as the navigation tool provided one click access to weekly topics. The number of clicks that it took to access an item (e.g., PDF or lecture) was 1 in the pathway compared to an average of 4 from the standard side menu navigation pane. Analyses explored how use of the Learning Pathway was affected by day of the week relative to the lecture schedule and how student use changed throughout a semester, with the hypothesis that activity would increase as the semester progressed and students became familiar with the tool. It was also hypothesised that activity would be highest on the day before a lecture. Variance was also partitioned according to class size and discipline to further analyse online student behaviour and use of the Learning Pathway.

Analysis of the Likert scale survey data revealed three key results: (1) 95% of students felt that the Learning Pathway interface improved the online environment; (2) 95.5% of students felt that the Learning Pathway provided a more consistent layout and was easier to navigate, and (3) 95.5% of students indicated they preferred the Learning Pathway over the standard MyUni interface. Key trends emerged from the three focus groups, students felt the presentation of course material in the pathway helped keep them organised, saved them time and made it easier for them to find the relevant information and course material. In the context of tertiary education, analytics

captured from student interactions with the LMS provides a wealth of data that can be analysed and transformed into useful information (Pardo and Kloos, 2011), to inform the design of and changes to their online learning environment thereby improving the experience for the student, the instructor and ultimately, the institution as a whole. The authors will present further detail on a trial of the Learning Pathway module 1 in the online MyUni environment and how the results of qualitative surveys and focus groups combined with quantitative learning analytics helped to inform the design and structure of courses as the University of Adelaide transitioned to a new LMS, Canvas.

## **23. Long-term outcomes of explicit Research Skill Development**

### **John Willison**

Universities have traditionally been sites where the development of student research skill has been left implicit in the undergraduate years. With the increase in prevalence of Research Based Learning (RBL), there may be necessary a shift towards making research processes more explicit to students. The Research Skill Development (RSD) framework was devised in 2006 to articulate to academics, casual staff, professional staff and students the nature of the research enterprise and the thinking processes involved. The RSD makes explicit the otherwise implicit research processes.

This presentation reviews studies of implementation of the RSD in semester-length courses and across multiple courses of whole degree programs. Taken together, there is emerging evidence that explicit research skill development over multiple semesters, when well-adapted to discipline-specific contexts, makes a substantial difference to student learning and to teacher engagement. For students, there is a long-term appreciation of the benefit of discipline-specific research skill for future study, and especially in employment. For educators, there is an appreciation of the benefits of clear articulations for student learning, but also for their own disciplinary research agendas. Studies have also unearthed problems with explicit Research Skill Development, and suggest some ways to improve relevant teaching and learning processes.

## **24. Research-related formats at universities in Germany - Potential for the future of teaching and learning**

### **Teresa Stang**

Major scientific institutions in Germany, such as the Science Council and the Federal Ministry of Education and Research, recommend that universities should shift their teaching towards research-based learning. The reasons for this are numerous, since through research-based learning for example...:

1. ... students can gain a deeper knowledge of their subject;
2. ... a better understanding can be gained of the

- complexity of the (professional) world;
3. ... expertise can be developed in relation to the professional world and practice;
  4. ... connectivity to high-tech industry can be secured; and
  5. ... a mature citizenship can be created (critical thinking).

In order to exploit this global potential from research-based learning, it is important to deal in detail with the implementation and impact of the approach. To this end a large national project entitled “ForschenLernen” is in progress, in which all German universities, which are addressing research-based learning, are involved. The project is funded by the Federal Ministry of Education and Research. Empirical examination is being carried out into the anticipated effects of research-based learning and how this approach can be implemented in universities. This is based on a survey (Stang, Huber) on the systematisation of research-related courses (formats), which was conducted at 17 universities in Germany. Meaningful documents were identified by means of a document analysis. The subsequent classification and evaluation of the documents was carried out using a qualitative content analysis, which resulted in a typology of research-oriented formats. These are defined by characterising parameters such as course form or student and teacher activities.

A selection of the formats, which have been created, will be briefly introduced in the presentation and analysed for their potential to provide an insight into which forms of research-based learning are currently practiced in the higher education sector. There are, for example projects in which students work with a teacher on a research assignment, or students work on their own research questions within the specified scope of the seminar. Within the individual formats a wide variety of features, such as interdisciplinarity or collaboration with external partners, may be developed, thus enabling the initiation of steps into a global future. Specific examples from universities will also be introduced.

In the overall project, alongside the formats, the following shall be considered:

- What effects does research-based learning have on students' individual learning?
- What does skills development look like with reference to domain-specific research skills in the social sciences?
- To what extent are the cross-domain skills of scientific reasoning promoted among students?

It is apparent from previous project results that, for reasons other than those mentioned at the beginning, research-based learning unlocks still further future potential: either as a wide-scale mandatory offering or as an option in universities, both motivation when learning and core skills that are vital for students can be strengthened through research-based learning.

The overall conclusion is that issues of heterogeneity can be better managed due to, among other things, the social interchange, membership of a research team, consideration of interests and above all the the guaranteed autonomy. Ample evidence can be found in the literature to support the fact that research-based learning is suited to taking into account a variety of requirements by students: The approach offers openness for unequal conditions and “comes closest to the hitherto standard recommendations for managing heterogeneity, because it is the most likely way of being able to achieve an alignment (homogenisation), in particular of different knowledge and ability” (Reinmann 2015 p. 132). That is, where there is researchbased learning the frequently discussed heterogeneity of students does not suffer the disadvantages that it does with traditional teaching formats, which assume a roughly equal level of knowledge and progress for all students. As part of the interdisciplinary structure, different knowledge and abilities may well prove profitable (cf. Huber 2009, p. 26). Heterogeneity turns from a deficiency into a resource (see *ibid.* p. 9).

After many of the benefits of research-based learning have been addressed in their individual facets, this approach can also be considered on a larger scale: in summary it can be stated that the combination of research and teaching (in the shape of the proposed formats) is significant for the global future. It will be interesting to see what conclusions can be drawn at an international level from the national experience of research-based learning.

## **25. Engaging students in the global policy arena**

**Mary Kane, Hugo Dobson**

The launch of the Faculty of Social Sciences' Global Leadership Initiative (GLI) at the University of Sheffield in 2015 demonstrates a uniquely hands-on, exciting, and real-time environment for innovative learning and teaching combined with engaging undergraduate and postgraduate students in research with academic staff as co-creators.

The Global Leadership Initiative provides undergraduate and taught postgraduate students rare opportunities to work as fully accredited policy analysts at major global summits such as the G7 summit and Habitat III. This allows students to situate their studies within a wider global policy context and gain first-hand experience of leadership in action. Students have the opportunity to work with academic staff with allied research interests.

The GLI has three primary objectives. It: 1) provides students and staff with unique teaching opportunities to collaborate as partners, co-learn and increase their mutual skill-sets; 2) creates innovative training opportunities for students to produce high-quality policy analysis of the activities and declarations of global summits and disseminate this to stakeholders including

the general public; and 3) gives students and academics a unique opportunity to conduct real-time on-the-ground research so that they can build and expand their research networks and create impact through policy engagement.

This initiative provides staff and students within the Faculty of Social Sciences at the University of Sheffield with a unique opportunity to attend a range of global summits and work collaboratively. At the same time, a relationship has been established with the Global Policy journal to publish and disseminate their outputs. Global Policy is an interdisciplinary journal bringing together world class academics and leading practitioners to analyse both public and private solutions to global problems and issues.

In advance of all summits, academic staff mentor students to develop creative approaches to engagement with policy-makers, advocates and the media. This collaboration enhances student learning by developing expertise on a topic area, providing preparation about making the most of media briefings, and training on writing policy briefs, interview techniques, peer-reviewing and publishing. Thereafter, the nature of each summit shapes specific learning and teaching opportunities, with academic staff working with the student policy analysts to refine their developing policy briefs, fielding questions and engaging in cultural exchanges.

During summits students manage unfolding policy events, collaborate with one another and academic staff on the production of real-time policy blogs, conduct interviews, give media briefing, and produce and peer review focused policy briefs to a demanding schedule. This unbounded participatory environment offers experiences that enhance employability and transcend academia, helping to build self-confidence, teamwork and a foundational skill-set that cannot be replicated in the classroom.

The benefits of linking research and education are evident. The Global Leadership Initiative stands as an example of how students can provide credible international policy analysis in partnership with academics, looking at some of the major global challenges we face today. Both students and staff have been inspired to fulfil their potential through original scholarship and contributions to international policy debates reaching a wide and diverse audience.

By attending this session, participants will learn more about the underpinnings of the Global. By attending this session, participants will learn more about the underpinnings of the Global Leadership Initiative from a pedagogical and management perspective, the successes and challenges of responding to real-time debate on global issues with students as partners, and the potential for future research. It will also allow for a dialogue on the benefits of students as partners in research.

## **26. Partnerships for Technology-Enhanced Blended Learning: First impressions**

**Ruth Brown and David Baume**

Under the auspices of an Association of Commonwealth Universities (ACU) project for the Department for International Development (DfID), the presenters are working with academic colleagues from partner universities in four East African countries to develop a blended Staff and Educational Development Association Professional Development Framework (SEDA-PDF) award in course design and educational change. The award is being adapted, with local stakeholders, to be appropriate to local conditions. This process recognises the role of education development in leading and supporting change in higher education in a way that achieves local implementation of international standards.

Research-based approaches are both retrospective and prospective. Firstly, the process draws on outcomes from SEDA, JISC and HE Academy projects with which the presenters have engaged. There is also a strong focus on encouraging the initial participants to test and adapt these already tried-and-tested methods in their own settings, and to develop their own hands-on evidence base. The project thus also involves another form of blended learning – the blending of training with real and productive work by participants, as the work produced by participants for the award will include the development of blended learning modules for their own students. (The academic colleagues who engage in the programme design process will also be “students” on the first iteration of the new award.) In the next stage of the project, which will be considered only briefly in this presentation, the initial “student” group will support a new cohort of local academic colleagues towards the SEDA award. For this reason the award will focus on educational change as well as on programme design, thus animating the sometimes rather over-optimistic account of ‘cascade’ training and development.

## **27. Raising UGs’ awareness of the research culture of a maths department: learning about what research is and how researchers do it**

**Crisan Cosette**

Researchers have suggested that a lack of focus on the transition needs of the postgraduate students reflected an assumption that students are somehow already prepared for postgraduate study since ‘postgraduate-level study is simply “more of the same”, “taken to the next level” (O’Donnell et al, 2009, p. 27) or that they are already experts in the realm of higher education and learning, hence not even acknowledging the moving on to the next level of studying as being a transition issue (Tobbell et al, 2010). Furthermore, a brief review of non-subject-specific research about transitioning to postgraduate education suggested that in fact, students had a desire for more information about the course they were going to be studying and wanted to know what would be expected of them in terms of academic



requirement (e.g., Symons, 2001). Indeed, Hathaway et al (2002) found that those undergraduates involved in research were more likely to pursue graduate education and postgraduate research activity than students who did not participate in undergraduate research. As a further support for this argument, in their report for the Higher Education Academy, Healey and Jenkins (2009) argue that all undergraduates students in all higher education institutions should come as close as possible to the experience of academic staff in carrying out disciplinary research.

The project presented in this paper stems from conversations between postgraduates and academics aimed at finding out how to better support pursuit of and transition to postgraduate studies (Crisan et al, 2017). A number of strategies for engaging undergraduates, postgraduates (PGRs) and academics in a partnership intended to develop the undergraduates' subject-based research and enquiry skills, grounding their understanding about what research is and what researchers do from early on in their studies were put forward.

The UCL Connected Curriculum aims to ensure that all students are able to learn through participating in research and enquiry at all levels of their programme of study and such an example is a strategy promoted at university level, namely the 'Meet your researcher' publication of the UCL Centre for the Advancement of Learning. This is an adaptable induction activity designed to engage first year undergraduate students in learning through and about research during their first weeks at UCL. The project builds on this idea and extends it to all level undergraduates in the maths department at UCL, engaging thus undergraduates (UGs) and postgraduates (PGRs) in a partnership intended to develop UGs's understanding from early on in their studies about what research is and what researchers do. This project worked on two levels: at the postgraduate level, PGRs prepared a short presentation about their research to a specialist audience (maths UGs) but not yet advanced enough in their subject knowledge (at research level), hence needing to develop their synthesising and communicating about own research at the undergraduate level, while at undergraduate level UGs worked in small groups to produce some output of their choice (e.g. a biography, a poster, a video, etc) about their chosen research and his/her area of enquiry. Some of these views of the participants in this project will be presented, together with examples of the experiences and outputs produced by the UGs at the end of this project.

## **28. Academics conceptions of the links between teaching and research: Reflecting on benefits, barriers and practices to promote change**

**Ana Baptista**

### **On the importance of the links between teaching and research**

Teaching and research are two intertwined activities, which should be brought together and put into practice inside and/or outside Higher Education (HE) classrooms. The importance of engaging students in research-based opportunities has been extensively studied, and we find a strong convergence as to the types of students' gains reported by diverse studies (Brown & McCarteny, 1998; Hunter, Laursen & Seymour, 2007; Lopatto, 2009).

Healey (2005), for instance, stresses that linking teaching and research and involving undergraduates in research activities helps them to develop several competences in a holistic, integrated and in-depth manner. Consequently, research-based contexts allow the students to improve and/or enhance personal, interpersonal, scientific and academic, cognitive, and so many other competences of transferable nature, which will be extremely important for their future professional careers within and outside Academia.

Also, Brew (2010) mentions that the holistic development of competences helps the students to cope with the complexity and uncertainties generated by the advances of science, and with today's uncertainty (Barnett, 2000). Additionally, other studies report effects of research-based educational environments on retention, persistence, and promotion of science career pathways not only for regular students, but also for underrepresented groups (Nagda et al., 1998).

As it has been internationally noted, linking teaching and research and engaging students in research at undergraduate level also impacts on leading academics/supervisors' performance, particularly in terms of the enhancement of mentoring and teaching; the achievement of research, scholarly and creative outcomes; the integration of scholarship and teaching; and the increase of job satisfaction and personal development (Osborn & Karukstis, 2009).

Though this seems a very well researched area, there is still a strong need for more research and systematised thoughts and reflections on the benefits of research-based education for academics' research and teaching practices. Moreover, from the academics' perspective, it is central to analyse their conceptions on these links, so they are optimised.

### **Overview of the study, and objectives of the presentation**

In Portugal, there is an absence of CPD courses directed to HE teaching staff. Since they are not compulsory, they do not influence teachers' assessment nor their career

progression. As such, the need for intervention in this area is overwhelming, despite of mainly being proposed by institutional training services on a voluntary/underpaid basis.

Within this context, a CPD module was designed, aiming to address several issues on HE Pedagogy, particularly on innovative and active teaching and learning strategies. One of the themes repeatedly explored has been linking teaching and research, and the involvement of undergraduates in research activities outside and inside the classroom. Due to a lack of theoretical and empirical reflections on this theme, at least within the Portuguese HE context, the author (who was also the CPD trainer) decided to stimulate individual and group discussions – both orally and on discussion forums – based on teachers’ (pre/mis)conceptions and practices on the identified pedagogical approach.

Hence, with this proposal the author aims to (i) present a qualitative analysis of the benefits, potential difficulties and recurrent teaching practices reported by 80 academics from several academic domains, when exploring research-based teaching and learning; (ii) to analyse and discuss the implications of academics’ conceptions of the benefits and barriers of linking teaching and research on their disciplinary practices; and (iii) to reflect on the wider implications of their disciplinary practices on their conceptions of teaching and students’ learning.

Despite of this study’s context, the analysis and the discussion will speak to other HE contexts around the world because of the inter-relations with current discourses, and the transferability of pedagogical ideas and practices, benefits and barriers, as well as conceptions on teaching and learning.

## **29. Using research and reflection as synergistic activities in an expanding first year course**

**Sarah Symons**

The relationship between research and teaching is a topic of widespread discussion among instructors in higher education and is one of the thematic questions for this conference. However, undergraduates, particularly in their first term at university, often have very little notion of what academic research means, what their instructors research interests and motivations are, and what research brings to the process of learning. A first-year science course (one term, five hours per week, currently 350 students) at McMaster University has been designed to incorporate these ideas in order to enrich students’ perception of themselves as learners and university members, and to aid their development as successful consumers and producers of information. A pedagogical research project investigating this course has demonstrated some unexpected benefits and has the potential for developing into a useful methodology for ensuring long-term course objectives are met for both

students and instructors.

The course incorporates research in several distinct ways, with students as researchers, consumers of research, and research subjects. The students learn basic research techniques through mini-projects; they learn what the latest research says about human learning and effective study techniques and can then practice and reflect on their own habits; they listen to presentations describing how research is carried out in each department and hear latest results; and they find out a little about pedagogical research and participate as subjects in the research project described here. In each case, instructors wished students to identify for themselves the purpose and utility of the content and its relevance to their personal academic journey. One of the key aims for the course was for students to understand that studying or researching in science (or any field) requires engagement and insight, including making sensible decisions about long- and short-term course and career planning.

This presentation will describe one of the unforeseen outcomes of the pedagogical research project: it has formed a beneficial cycle of reflective practice for the students and the instructors in parallel processes. The course was designed with aims similar to many first-year, first-term transition courses, providing foundational information and skills. Course assessment includes a series of reflections, prompting the students to examine not just what they are doing at university, but why and how and what the relevance is. Reflections from the first offering of the course (2014) inspired the pedagogical research project which has now run during both the 2015 and 2016 offerings. The project was designed to address the impact of the course, including its focus on students’ relationship with research, on students’ academic behaviour outside the course itself. We hoped to see, in a way that standard course evaluations could not, what the course was achieving beyond grades and student retention.

The project uses the student reflections as data for qualitative analysis. The study has also influenced course content in return. For example, the research project requires students to be recruited via an informed consent process, which is now included as part of a research ethics component. The students’ awareness of pedagogy having been raised by the introduction of the project and by classes covering research on human learning, the depth and richness of their reflections is in turn enhanced, and students are confident that their opinion and experiences are being treated seriously, with concomitant improvement in their engagement, learning, and satisfaction. Ultimately, the results of analysing the research project data provide insight into students’ reception of the course and, in particular, their view of the utility of each part of the course in their other academic activities.

They also help the instructional team to review their own practices and course design decisions. Future course developments (include increasing course capacity from an original 175 students up to a potential 1600 students) will be implemented with the results of the study as evidence for effectiveness, utility, and clearly-articulated student needs in a diverse and changing student population. Even in a class of hundreds, quiet individual voices from all segments of our student body can be heard and acted upon through the medium of personal reflections willingly contributed.

The presentation will also outline a framework we are developing for adapting and implementing this type of multi-purpose pedagogical activity in other research-based scenarios. Our rationale is that a linkage between in-course student reflection and pedagogical research fulfils three widely-applicable aims: 1) assessment demonstrably aligned with curriculum and resource constraints; 2) deep and habit-forming student engagement with professional and personal development; and 3) rich, useful, and targeted course evaluation or pedagogical research material. We argue that the process therefore benefits all course stakeholders: students (including, in our course, former course students as mentors and TAs), instructors-as-teachers, instructors-as-researchers, and administrators.

### **30. Making research-based education more successful: Improving critical thinking and engagement through well-directed peer assessment**

**Pilar Garcia Souto and Adam Gibson**

Universities increasingly recognize the need to train students using research-based education, using their discipline knowledge within group practical activities and to develop their critical thinking and teamwork skills to prepare them for their careers after graduation. With that in mind, students carry out substantial research-based projects many of which are in groups. These research-based projects may take the form of short labs, longer projects within a module during term time, or intensive one or two-week long full-time projects. In these cases, students may work together in disciplinary or multidisciplinary teams. In addition, some MEng students have a group project in the 3rd or 4th year of their degree that traditionally accounts for an equivalent of 2 taught modules.

Despite the well-accepted educational benefits of getting students to work in research-based activities and in teams, some issues can detract from the student experience, i.e. (i) critical thinking skills are needed but difficult to obtain; and (ii) dissatisfaction with the assessment of group work. This paper presents work aimed at overcoming these two issues.

Acquiring critical thinking is challenging and requires practice. Academic staff should implement long-term

approaches to facilitate it. Introducing students to the critical analysis of someone else's work early on in their degree programme is an excellent way of developing critical skills. We have incorporated this via peer assessment activities (e.g. of a report, a set of calculations, etc.) that initiates students in reviewing and constructively criticizing peers' work. This stretches them because assessing a piece of work can be harder than completing the work itself, requiring a deeper understanding of the material and of alternative approaches. However, there are problems with traditional peer assessment which include (i) student disengagement leading to provide poor feedback to their peers, and (ii) students lacking confidence in their peers' marking skills, and therefore the mark obtained. We have developed and successfully run for the past 3 years a new method of peer assessment (360 degree peer assessment) that addresses these main two issues, providing a better experience for students, and a successful tool for academics to foster and support the students' critical thinking development.

In the simplest way of assessing group work, the project deliverable (e.g. a report, a prototype, a video) is assessed and all members of the team would receive the same mark regardless of their individual effort. This leads to various problems: (i) dysfunctional behaviour and uneven participation, with some students not contributing their share; and (ii) frustration of high-performing students who do not see their work as being recompensed. Often, the mark will include an individual component, but it is either based on a separate piece of work (not practical to mark neither encouraging students into the group spirit), or they are set by the tutor based on some criteria considering the attitude of the individual in the group with just partial information. Alternatively, various practitioners have started to include an element of individual peer assessed contribution (IPAC) to team work. With this approach, each student in the group receives a mark based both on the overall "group mark" but also on the individual's personal contribution towards the final product. This contribution is assessed directly by their peers, who are more aware of each team member's contribution, and encourages self-reflection. However, the IPAC factor needs to be carefully assessed and applied. Following some initial work on the field, Pilar Garcia-Souto set up the IPAC Consortium whose ultimate goal is to "Identify a method for peer assessment of individual contribution in group work, develop or obtain an appropriate tool to implement it, and disseminate these across UCL and beyond; showing how to make the practice successful and efficient." This consortium is currently formed by 40 members of staff from over 20 departments across UCL, and includes teaching staff in a range of fields (biomedical engineering, mechanical engineering, electrical engineering, physics, management, archaeology, architecture, culture, etc.), educational researchers (e.g. the Centre for Advanced Teaching and Learning, and the Institute of Education), and support staff (e.g. from the Digital Education and e-learning



environment department). In this paper we will talk of our achievements so far and make recommendations for practitioners.

In summary, this paper explores how a well-thought peer assessment method can aid students to develop critical thinking skills and allow academics to address group work assessment concerns, such that Research-based Education is more successful. Our approach is scalable and should appeal to anyone interested in incorporating or updating research-based education activities, regardless if you are designing a small activity within a module or a full programme of studies.

### **31. Research foundations in a global challenge initiative: L2 Achieve More: 10bn, University of Sheffield**

**Amanda Crawley Jackson**

Achieve More: 10bn is an optional interdisciplinary programme open to all (5000+) second-year undergraduate students at the University of Sheffield. Launched in 2015 and bringing together students from all faculties and disciplines, it comprises a 3-week online course hosted on the FutureLearn platform and an accompanying series of face-to-face talks, workshops and other events. In this paper, in our capacity as academic leads for the L2 Achieve More: 10bn initiative (AML2), we will focus on the ways in which research pertaining to a population of 10bn conducted by academic colleagues in Sheffield has underpinned the design and ethos of the programme, and why. We will begin by discussing our rationale for choosing 10bn (the predicted global population in 2055) as an overarching theme, showing how this wicked problem, which extends far beyond the boundaries of any one discipline or approach, enables us to encourage students to focus on the processes of research, but also on research as a relational practice, in which a multiplicity of voices need to be heard. Importantly, in AML2 students get to meet each other and discuss an issue which impacts on everyone, whether from a background in science, engineering, social sciences, medicine or the arts and humanities.

AML2 showcases examples of interdisciplinary research networks within the University of Sheffield, exposing students to 10bn-related research taking place in their own institution, but demonstrating also how different disciplines do and conceive of research differently. This, we suggest, encourages students to critically appraise their own disciplines - their methodologies, scope, priorities, concerns and assumptions - and develop their openness to the approaches, views and priorities of others. What, we ask students, do their subjects bring to our understanding of this research question and the world? And how might their discipline work usefully with others? This heterogeneity, we argue, can function as a driver of creative and non-normative thinking. In the 'safe' context of AML2, a non-credit bearing programme (although it does offer a series of accredited digital badges and is also

formally recorded in participating students' HEAR), we aim to inspire students to take creative research risks that they might otherwise avoid in credit-bearing modules. In order to complete the AML2 programme, students submit a piece of reflective writing that is peer-reviewed online. In this, students reflect together on the ways in which knowledge is constructed, contested, shared and disseminated in the research cycle. AML2, we go on to argue, not only exposes students to a diversity of research practices and experiences, thereby encouraging them to reflect critically on and develop their own, but has the potential to trigger further interdisciplinary learning beyond the course. A key aspect is to highlight 'exit points' and promote further development and reflection, whether this is through existing opportunities (such as interdisciplinary L3 modules, academic research seminars and PGT/PGR programmes), or by creating new ones. For example, we have secured HEFCE Catalyst funding to create a number of scholarships that enable small groups of AML2 students to work collaboratively with an academic or a broader research network during the summer.

We make the case in this paper, therefore, that as AML2 seeks to enhance understanding of different epistemologies and interrogate the permeability of borders between subjects, it is attentive to the wider priorities for the future of higher education, namely developing better relationships and networks, enabling and promoting impactful and creative research, and modernising pedagogy. In a world where, arguably, 'all the information is already out there', we aim to construct more meaningful relations between teaching and research.

We will finish our paper by discussing the broader benefits of a co-informs research. Furthermore, by bringing together academics from different disciplines and enabling them to work with students from outside their own departments and faculties, it enables the sharing of pedagogical good practice and promotes better teaching. Finally, we will present the 2016 AML2 magazine, written, produced and published by students, thereby showcasing AML2 as a space in which students can benefit from (but also create their own) opportunities to publish and disseminate their research, individually or in groups.

### **32. A Research-Based Approach to Enhancing the Student Experience: Staff and Students Working in Partnership**

**Nafisa Wagley & Julie Evans**

The 21st century has seen a rapidly transforming, global higher education (HE) environment, underlined by changes in HE policies. From the growing effects of internationalisation in HE and the need to support the international student experience (Altbach (2004; 2007; 2013) to a purposeful move towards mass higher education to support equality of opportunity and greater

access for marginalised groups (Trow (1973; 2007) Shavit and Blossfeld (1993)). From the challenges that these movements present, particularly in a post-Brexit environment, it is crucial for the UK's research-intensive universities (RIUs) to remain well-informed and ahead on topical issues such as the need to promote greater diversity and inclusion in HE. Underpinning this is an expectation for universities, particularly RIUs, to demonstrate commitment to providing fair access so that HE is more equitable and accessible for less advantaged groups and those exhibiting academic excellence (DfES, 2003). However, engaging, supporting and retaining students from diverse backgrounds is of equal significance to help eradicate inequalities amongst different student groups (Humphrey (1999); Carroll and Ryan (2005); David (ed. 2010); Murray and Klinger (2014) and Reay, Crozier and Clayton (2009; 2010)). Drawing on case study examples, this paper considers how such issues can be addressed through a Research-Based Education (RBE) approach.

Within these shifting dynamics of the HE landscape, University College London (UCL) offers staff and students the opportunity to work in partnership to enhance the student learning experience. ChangeMakers is a funding scheme offered by UCL to encourage greater staff-student collaborative projects, opening for grant applications on a bi-annual basis. In recent years, the UCL Faculty of Brain Sciences (FBS) has actively engaged its students to collectively exploit such funding opportunities and address some of the ensuing topical issues stemming from policy developments at a national level. The importance of empowering students and offering them greater choice, better value for money and quality teaching has been emphasised by policymakers in recent Government HE White Papers (BIS, 2011; 2016). Therefore, in congruence with this and using the ChangeMakers scheme, FBS has successfully gained funding to support the delivery and successful completion of a number of projects in collaboration with its student body.

Using a RBE approach, FBS has explored student perceptions on a variety of current issues, from undergraduate to postgraduate levels. Student focus groups have supported this adoption of a research-based, investigative model. The research projects conducted were managed and executed by students leads, not only enhancing their own experience and understanding of RBE, but also further strengthening the quality of the research findings and positive actions stemming from them. Such student-led, research-based investigations have included exploring:

- Information, advice and guidance processes on induction;
- Suitability of current curriculum offered across different levels and;
- Support for career/educational progression.

The findings and qualitative research gathered from these

investigations has led to analysis and evaluation, which supports enhancements to programme delivery and the development of internal strategies.

Case study examples of the types of projects initiated by FBS will be presented to share best practices in adopting a RBE approach to staff-student collaborations and partnership working. These will include:

- Exploring the BME (Black and Minority Ethnic) student experience around attainment and achievement issues;
- Supporting and enhancing different transition processes made by students e.g. transitions in level of studies or transitions from overseas to UK.

The session will end by considering what role RBE, through staff-student partnerships, might play in the future HE climate, as well as contemplating the scope for future projects.

### **33. Symposium. Citizen Science for Radical Change – a research-based learning module at UCL**

**Carl Gombrich and Kat Austen**

This symposium will look at the philosophy, preparation and implementation of UCL's 2nd year, interdisciplinary, research-based learning module: Citizen Science for Radical Change: Co-Design, Art and Community. This is an elective course embedded within UCL's innovative Arts and Sciences BASc degree [www.ucl.ac.uk/basc](http://www.ucl.ac.uk/basc).

The Citizen Science module introduces students to citizen science, DIY science and community co-design as means to garner and understand the meaning and value of multiple knowledges. The thematic focus of the course is food - a topic that touches everyone and has multiple meanings and modes by which we can understand it. The course has research-based learning at its core and is highly generative, with students both learning and creating throughout its 10-week duration.

The work is undertaken between UCL students on the BASC2096 elective and a community of students at Newham 6th Form College in East London. Students work in partnership to understand food from multiple scientific, humanistic and cultural dimensions. DIY chemistry is used to analyse nutrients in food. Protocols have been implemented to analyse supermarket, market and foraged food within the community of Newham. The foods chosen to be tested are decided by discussions between students and the wider community. The course starts with introductory lectures into the principles and philosophy of citizen science, an introduction to DIY chemical analysis techniques and their methods of development, critical and co-design methods, an introduction to multiple knowledges and the socio-politics of changing modes of producing knowledge. In the second part of the course, students will use practice-based methods to gain personal insights into these topics.

The majority of the assessment is the following: A short

(around 1 page) reflective report in each tutorial in weeks 3-8. These can be short written documents, diagrams and / or sketches. They comprise 50% of the mark. A final 6-page report that details design outcomes, drawing together all the threads from the course material and interactions with the community. This can incorporate written, diagrammatic and sketched elements alongside documentation from the process. This comprises 40% of the mark.

For the symposium, examples of student work produced for the course will be exhibited and reflections offered on the challenges and benefits of running such a research-based learning module. Specific challenges of interest include: philosophical challenges of teaching highly inter- or post-disciplinary courses; bureaucratic and legal issues universities face when partnering with external institutions, especially schools; and pedagogical challenges – both theoretical and practical, for example working across different university departments, using both make-spaces and laboratories.

#### **34. Symposium. Institutional policies to stimulate RB education in traditionally teaching-intensive environments**

**Irene Hermans, An Verburgh, Miriam Losse, Kris Thienpont, Bram Van Baarle, Anne Vanschoor, Ria Bollen, Didi Griffioen, Jean Tillie, Mick Healey**

Research-based education (RBE) is an important characteristic of higher education, in traditionally research-intensive as well as in teaching-intensive institutions worldwide (Karseth & Solbrekke, 2016). Although RBE is often loosely defined (Trowler & Wareham, 2008) it generally pertains to the development of research competencies, to the involvement of students in research(-like) activities and to the learning of content that is based on research. Authors differ in opinion whether a combination of these competencies is necessary in order to speak of RBE.

Despite the fact that research is becoming more prominent in traditionally teaching-intensive institutions, the development of RBE policies and the implementation into RBE practice, involves major challenges in these institutions (Griffioen & De Jong, 2015; Heggen, Karseth, & Kyvik, 2010). A first challenge is aligning RBE with the orientation of the programmes. In the Netherlands and in Flanders the traditionally teaching-intensive institutions offer programmes with a professional or vocational orientation. The development of professional competencies is the main aim of these programmes. Often, research competences are considered relevant as long as they are in line with the professional competencies. Increasingly, and in line with the general logic of the Bologna reform, research competences are seen as central in the competence profile of higher education graduates including those in professional degrees. A close connection between teaching and

research is perceived as essential to achieve these competences of students (Healey, 2015). However the precise meaning of research competencies within each specific vocational degree needs to be defined. The same need for professional relevance counts for involving students in research or in RBE: the activities need to be directly or indirectly relevant for the profession.

A second challenge is convincing the labour market of the value of research competencies and research activities of graduates of professional programmes. Again, at the EU level the argument towards the teaching-intensive institutes is clear in stressing research competencies as essential to the competency profile of professionals in knowledge societies. That insight is not yet universally permeated at the regional level though.

A third challenge concerns the human resource base required for a solid implementation of RBE in higher education. Staff members have a pivotal role and RBE hinges on their (self-)efficacy of guiding students in research activities. Lecturers were traditionally hired for their experience in the profession and their educational ambitions and not for doing research or helping students in developing research competencies (Griffioen & De Jong, 2015). Hence, setting research examples, as well as providing research supervision often causes a serious challenge.

Given these challenges, developing supporting policies is of crucial importance to enact RBE in traditionally teaching-intensive institutions. Organisational alignment with the professional needs of programmes helps to stimulate RBE (Jenkins, Healey, & Zetter, 2007). In this symposium four institutions describe institutional approaches to stimulate RBE.

The first case study by An Verburgh, Anne Vanschoor and Ria Bollen describe the process of developing an institution wide vision on intertwining research, education and practice. Anchoring RBE in the institutional mission statement is the prime condition to even start working on it. In the second case study Didi Griffioen and Jean Tillie report on the institutional programme at Amsterdam UAS, in which all 70 bachelor programs were assigned to reformulate their vision on research in the profession, and provide for curriculum change accordingly. Research competencies of lecturers and relevant HRM developments are the focus of the third case study by Kris Thienpont and Bram Van Baarle. This case focusses on the institutional policies in recruitment and professional development concerning staff research competencies. And finally, Miriam Losse discusses in the fourth case study the institutional support offered to programmes in order the help them to enact a research-based curriculum.

These cases offer valuable insights on the complexities of institutional change in general and of research-based education in particular. All four combined, the cases



provide for a more comprehensive insight on building up the RBE in teaching intensive HEI and the institutional policy changes this entails.

### **Individual Abstracts**

The development of an institution wide vision on intertwining research, education and practice

One of the strategic priorities of the University Colleges Leuven Limburg (UCLL) is the intertwining of research, education and practice. A major obstacle in the pursuit of this strategic priority was the lack of a shared vision, among different partner-institutions and actors. UCLL is the product of a recent merger three university colleges in Flanders. Each partner-institution had its own habits concerning the relation between the three actors: teaching, research and practice. Therefore a process of developing an institution wide shared vision was started in September 2016 and is still ongoing. In this presentation the process, its results and future plans will be discussed. Particular attention will be given on how the lack of a shared collective vision among different partner-institutions and actors was solved.

### **A Research-based Change Approach in the Further Implementation of Research into Undergraduate Education**

The current assignment of vocational programs in higher education is to educate future evidence-based professionals. Often is presumed that a substantial connection between research and teaching is needed to achieve this aim with students (Healey & Jenkins, 2015). As an effect in the Dutch institutes for higher professional education there is an increased attention for the connection between research and teaching as a carrier to develop these knowledge related competences. But what does it mean for an institute of higher vocational education to actively strategize towards integrating research and teaching in all bachelor and master programs for 45.000 students, while still standing in the tradition of being teaching-intensive? This paper presents the planning and analysis phases of a large scale institutional change in Amsterdam UAS, including a systematic analyses of vision, curricula, network development, and perceptions in students and lectures of what RBE contains.

### **Capacity building as a precondition for research based education**

Connecting teaching and research is a cornerstone of Artevelde University College's research and teaching policy since several years. Although the teaching-research nexus often rightly focusses on the involvement of students in research it is in fact a policy area relating to several other institutional policy domains. It requires a holistic institutional view on the nature of research, the educational model and all related policy areas. In this paper we will address the specific projects set up within Artevelde University College in order to enhance RBE capacity among the research and teaching staff, in terms

of selection and recruitment, staff involvement and training and HR-policy.

### **First Student and Tutor Evaluations of a new Perspective for Integrating Research in Curricula into Bachelor Programmes**

The assignment of Dutch higher professional education to deliver professionals with research abilities has catalysed a discussion about what research means in a professional context. Research skills tended to become an end in itself and curricula often missed the professional context of research as a means for decision making and acting in specific professional situations of for example nurses, engineers and business developers. The past three years Saxion has created an institution wide learning community to create new possibilities to contextualise research abilities and to integrate the training of these abilities in the curricula of her bachelor programmes. This paper presents the experiences of students and tutors of the first trial of a new approach in the final year project of one of her educational programmes. The evaluations are based on monitoring through group interviews and on a pretest-posttest-design in measuring the quality of final year projects.

### **35. Symposium: Designing a programme around research-based education**

**Adam Gibson, Jennifer Griffiths, Rebecca Yerworth and Pilar Garcia Souto**

The first students on a new biomedical engineering programme are about to graduate. This new programme was designed to take advantage of global trends in teaching, including students and staff collaborating on the co-creation of knowledge, the development of professional and employability skills, and the use of a wide range of flexible digital technologies, all in the context of research-based education (RBE). The programme provides an example of how such initiatives can inspire the development of brand new programmes or the update of existing ones, exploiting problem-solving, research, design, multidisciplinary and professional skills as cross-cutting themes which connect the curriculum.

Biomedical engineering is inherently a highly multidisciplinary subject, incorporating aspects of electronic and mechanical engineering, computer science, biology and physics as well as professional, practical and research skills. We exploit this breadth to provide a test case in how to design a general academic programme, showing how cross-disciplinary material can be built in.

In this symposium we will discuss designing a curriculum around RBE, modifying existing modules, developing cross-disciplinary exercises, and creating through-lines of enquiry-based activity. We will describe some of the most important aspects of RBE in the programme, outlining the benefits of RBE while also identifying some of the problems which may occur, and proposing solutions. Some of these problems are practical and easily solved,

but others highlight deeper conflicts and contradictions in curriculum development, and bring into focus some of the challenges facing modern higher education.

Two particular changes which resulted from our implementation of RBE are week-long, problem-solving, group practical sessions which we call scenarios, and the introduction of a variety of forms of assessment. Both these raised particular challenges and opportunities, which we will discuss. We have developed six scenarios, each of which is designed both to illustrate a particular part of the engineering design cycle and the academic curriculum, and to provide a real-world application of the professional skills which students are taught in parallel. Assessment is another common challenge of RBE. Whilst students invariably enjoy the challenge of open-ended problem-solving tasks, they are typically (and stereotypically) concerned about how their performance is graded. This sometimes means that students are unnecessarily conservative in their approaches and that traditional methods of assessment can detract from the quality of their learning. Moreover, assessment of group work is notoriously challenging and can be disheartening for students. We have found that assessing RBE requires a different, more creative approach than assessing traditional coursework, and we have used the programme to investigate and evaluate a range of different solutions to this problem, which we will describe.

We will outline our experiences of designing a RBE programme, the challenges and pitfalls, and the solutions we have found to group work and assessment in four short presentations, and then we will run a short workshop for attendees where they will be challenged to design a multidisciplinary scenario depending on their interests and expertise, with appropriate assessment. This part of the symposium will be facilitated by the four speakers and take advantage of some of the digital learning environments which we have found useful.

### **Paper 1 - Designing a new programme embedding research-based education and UCL's Connected Curriculum**

We will describe our new biomedical engineering programme, concentrating on the cross-cutting themes of problem-solving, research, design, multidisciplinary and professional skills, and explaining how these themes support the learning of the core syllabus. Timely institutional initiatives, such as UCL's Integrated Engineering Programme and the Connected Curriculum, gave us the freedom, support and encouragement to embed RBE throughout the degree. Engineering design is taught and developed in years 1 and 2, culminating in a group design project in year 3. Research-based problem solving is embedded into all four years of the degree. Multidisciplinary aspects are taught in each year, but brought together in week-long problem-solving "scenarios" and the group design project. Professional skills are taught in years 1 and 2, but developed and

assessed in years 2, 3 and 4. Tutorial groups include students from all years of the programme, enabling new and established students to learn each other and reflect on their educational journeys.

### **Paper 2 - Overcoming the pitfalls and challenges of research-based education**

We speak a great deal about the advantages of research-based education, but it has to be recognised that there are also some difficulties. Some of these are practical problems of resources and time, engagement of research-active academics and professionals, and institutional inertia. Other challenges, which illustrate more fundamental dichotomies within education, include the culture change for students who might previously have experienced fixed syllabii and well-defined, highly-structured assessments, initiating cross-cutting themes throughout a programme which is based around a modular structure, the tension between learning and assessment, and the reduction in time available for lecture-based teaching of the fundamentals of a discipline. We will also question the premise of RBE when applied to a subject such as engineering when most students will be employed in industry – is there a conflict between RBE delivered by traditional research academics and broader professional training?

### **Paper 3 - Interdisciplinary problem-solving scenarios**

A highpoint of our new degree programme, which is an integral part of UCL's Integrated Engineering Programme, is the use of week-long, problem-solving group-based scenarios. Our scenarios are designed to (1) each highlight a different part of the engineering design cycle; (2) illustrate the cross-disciplinary aspects of biomedical engineering; (3) introduce the students to open-ended, research-based problem solving; (4) provide training and experience of practical engineering skills; (5) give students experience of working in a team and to a hard deadline; (6) deliver real-world examples of issues which demonstrate the relevance of professional skills. We will describe how these multiple constraints were reconciled and how our scenarios now provide a holistic through-line of problem-solving, building in complexity and open-endedness. We will also describe the advantages and challenges of assessing professional skills through group work.

### **Paper 4 - Assessing open-ended group projects**

We have exploited a range of different assessment types in order to enhance the learning within our scenarios and other activities. These include traditional written reports and presentations, but also more unusual forms such as collaborative websites, interviews, poster presentations, through-project deliverables, a user guide for a device for a disabled client and a "dragons' den". We will explain how different assessment types can be used to build upon the students' learning in project work to give valuable and timely feedback as well as a summative mark. One of

the biggest challenges is to give robust individual marks and feedback during a group project while retaining the confidence of students and staff, and we will describe the approaches we have taken. We will also describe a scalable approach to peer assessment which we have developed and used.

### **36. Dimensions to Consider in Research-Based Higher Education**

**Gerda Visser-Wijnveen**

By introducing research into teaching, students become aware that knowledge is constructed and something they can contribute to. How research-based education is conceptualized differs. This paper discusses various dimensions that can be recognized in well-known and lesser-known models originating in Australia, the UK, Canada, The Netherlands, Belgium, and Germany. The intention is to support academics in distinguishing between research-based practices by identifying unique and shared dimensions, while also highlighting different interpretations.

Neumann (1992) identified three types of connections: tangible, intangible, and global. Tangible and intangible can be considered a dimension stressing either the introduction of research outcomes versus the research approach to knowledge. The global connection is described as the departmental (versus the individual) level.

Griffiths (2004) presented three dimensions: specific – diffuse, weakly embedded – strongly integrated, and unidirectional – two-way. Specific refers to introducing research itself into teaching, while diffuse refers to a general research orientation of a teacher-researcher. Research is considered weakly embedded when presented as information and strongly integrated when being incorporated in the learning process of students. Unidirectional relates to research being beneficial for teaching, while two-way also stresses the benefits of teaching for research.

Building on Griffiths (2004), Healey (2005) described three dimensions: emphasizes research content – emphasizes research processes and problems, students are treated as the audience – students are treated as participants, teaching is teacher-focused - teaching is student-focused. The last two are combined in his framework.

Starting from the approaches to teaching literature, Wuetherick and Turner (2006) organized four categories on a teacher focused/transmissive to student focused/conceptual change dimension: research outcome transmitted, research processes transmitted, students engage with outcomes or are provided issue to solve via process, and students as researchers. Next to the previously identified emphasis on research products or research process, Visser-Wijnveen (2013) divided the second dimension in knowledge acquisition, knowledge

replication, and knowledge production, distinguishing between research processes resulting in knowledge that is new to students (replication) or new to the discipline (production).

Verburgh (2013) did not consider research processes and research outcomes opposite ends of one dimension arguing that they both can be relevant at the same time. In research outcomes, she distinguished between relevant for students and functional for discipline. Research processes consist of six alternatives: four alternatives related to content given to students, and two in which students produce some content themselves. While no dimensions are indicated, three dimensions could be deduced: no mention of research background – students confronted with research background; explanation of: research background – research methods; and segments of research – full research cycle.

A recent contribution by Rueß, Gess, and Deicke (2016) presented a typology consisting of two dimensions with three categories each. The focus can be on research results, methods, or process; distinguishing between teaching about research methods versus using methods as a means in a research process. The students' activity level is divided in receptive learning, applied learning, and learning by research.

Comparing the various models, three dimensions are only represented in one model whereas six dimensions are represented in at least two models. The dimensions identified once are: departmental – individual (Neumann, 1992), unidirectional – two-way (Griffiths, 2004), and no research background – research background (Verburgh, 2013).

The first dimension relates to the question whether research itself or a research orientation is integrated. The most common dimension is emphasis on research outcomes or processes. However, in the interpretation, this dimension many times explicitly or implicitly encompasses two different aspects: teaching objective (disciplinary content [outcome] - research methods [process]) and teaching approach (learning about research [outcome] or learning through research [process]). In the case of learning through research, two other dimensions might be considered: the research process might be a part of or a whole research cycle; and the resulting outcomes of this process might be relevant for the student or contribute to the discipline as well.

### **37. Researcher Professional Development – involving students in designing their own learning**

**Sam Smidt, Nataša Perovic**

In this module, students were asked, in the first session of term, to participate in the planning and designing of their learning for the term. The planning was done using the ABC Curriculum Design workshop developed at UCL



and used in many UK and international institutions. The workshop was slightly modified for student use.

The reasons for doing this were twofold. Firstly to ensure that the content met the needs of first year research students – a module for professional development that doesn't meet the expressed needs of its participants is a singularly unrewarding experience for everyone. Secondly, and possibly more importantly, to recognise the students' own expertise in their own learning and give them responsibility and ownership of their own professional development.

The outcomes of the workshop were shared amongst the various groups of students involved and were referred to at various points during the term. The workshop required the students to think about the content and the mode of learning and about the balance of learning types and activities – so the presentation from the lecturer, group work, online work, peer feedback and 'visiting expert' was strongly influenced by the ways in which they envisaged engaging with each topic.

Most of the topics selected reflected the traditional content of postgraduate skills modules, including presentation skills, literature review, and an introduction to the Vitae Researcher Development Framework. The section on Research Integrity was non-negotiable and not included in the design workshop. However, the students were very keen to have a section on Teaching and, when offered the possibility of a section on 'Digital footprint' expressed a definite lack of enthusiasm, offering instead the suggestion of 'Using Social Media for impact'.

One topic that was chosen collectively by the group and that had not been anticipated by the lecturer was that of exploring research careers outside of academia. For this topic, a group of volunteers was given the task of planning and delivering the session in the form of a mini-conference with speakers from a range of industries and a range of academic roles.

The assessment tasks were not designed by the students due to shortage of time but this is something to be considered in future years. However, they were discussed and agreed by the group and contained a large degree of freedom to pick the parts of the course that were of most personal relevance for individual development.

In the feedback at the end of term, students expressed some initial scepticism about the design process but seemed overall very content with their experiences and the way in which the module broadly delivered what they had expected after the design session. At the time of writing this abstract the final assessments have not been submitted or marked but these will be discussed in the presentation.

All universities grapple with the challenge of making the so-called 'soft skills modules' interesting and relevant to research students. This case study demonstrates that, by directly involving students in the design of their learning and giving them responsibility for their own studies, engagement is enhanced, and there appears to be a greater degree of reflection on their own learning.

### **38. Strengthening sense of belonging: a 'students as partners' institution-wide project**

**Phil Levy**

The University of Adelaide's Strategic Plan (2013-23) sets a clear direction for an educational proposition that is grounded in the strong union of research and teaching, with research-based education through small-group discovery learning at its heart. Aligned to this Plan, and informed by evidence of the important role played by a strong sense of belonging in fostering student engagement and success (e.g., Thomas 2012), the University's Strategy for Learning, Teaching and Assessment (2016-18) established the goal of better understanding, and further strengthening, students' sense of connectedness to their academic community.

The University's Statement of Mutual Expectations formally recognises the University and its students as partners in creating a unique educational experience at Adelaide. Building on this, and inspired by recent developments across higher education that focus on working with students as partners in education and educational enhancement (as discussed by, among others, Healey, Flint and Harrington 2014), the University has established a partnership and co-creation project aimed at exploring and strengthening students' sense of belonging and community within the University, in particular at the level of academic programs and disciplines. This presentation will offer an overview of this project's strategic and scholarly rationale, its principles and approach, and its progress to date. Its first phase was supported through participation in the 2016 Australian Government Office for Learning and Teaching Transforming Practice Programme. The programme was a facilitated change management initiative on the theme of 'students as partners' and enabled staff and students within the project to learn with, and from, like-minded institutions in Australia. The structured programme has provided a platform to enable further contributions to the development of the 'students as partners' evidence-base across the sector in Australia and beyond.

The University of Adelaide's project goals were to develop and implement a 'students as partners' approach to: a) explore student experiences relating to sense of belonging and academic community; and, to b) identify and set in motion priority actions to help strengthen this aspect of the student experience. The project has been designed to develop an institutional understanding of co-creation and partnership, and to act as a catalyst for transformative practices that will enhance student

engagement and success at the University.

The first phase of the project entailed set-up of a small project team comprising two student members alongside a mix of academic and professional staff. Having established broad goals and principles for the work, the team decided that the project would first conduct a short institutional survey of undergraduates' sense of belonging to academic community (2016), and then in the project's second phase use the evidence generated to inform the launch of a program of student-led change projects (2017). The design of the online survey questionnaire was informed by student and staff focus group discussions and relevant evidence from the wider literature. More than 2000 students responded to the survey and 470 indicated that they would like to be contacted in future regarding opportunities to be part of these projects. The questionnaire asked undergraduates how strongly they felt part of their academic community in their studies at the University and which factors they felt contributed to feeling this more, or less, strongly. The rich dataset includes both quantitative and qualitative data, and reflects students' experiences of factors including small-group discovery learning, and connections between degree and future career. A summary of key findings will be provided in the presentation.

At the time of writing, the team plans to present the survey findings to students and staff at an interactive workshop-style event and to invite proposals for change projects which will be led by students with some central support provided. The team will be seeking imaginative, small-scale proposals with practical and measurable outcomes. An overview of the successful proposals will be presented at the conference.

The principles and values of partnership and co-creation are fundamental to the project and for further development of inclusive, high-quality and high-value research-based education at Adelaide. The presentation will comment from this perspective on implications for the future of global higher education.

### **39. Challenges and opportunities with audience-orientated assessment**

**Mira Vogel**

Dissemination is a crucial aspect of research, and therefore an inevitable part of a research-based education. Consequently students at UCL are increasingly asked to produce work directed at an audience (Connected Curriculum Dimension 5). This session reports on a UCL Connected Curriculum project exploring students' digital multimodal outputs at UCL. 'Multimodal' here refers to communication styles – register and voice, for example – in a range of media, where 'media' can be thought of as the work's fabric. Working in these new forms brings challenges for students. These may be related to balancing academic discourse with engaging notional audiences. Where (as is

often the case) adopting the new media or mode precedes conceptualising audience, the challenge may be to achieve aptitude with a given technology. Assessing the work brings new dilemmas for staff too, including distinguishing rhetorical from aesthetic, balancing recognition between effort and quality, and taking equitable approaches to a diversity of skills, technologies and interpretations (Anderson et al, 2006). There is also the question of whether the work can stand for itself, or whether written commentaries or reflective pieces are required (DePalma and Alexander, 2015) – considered from one angle, this is a disciplinary question, from another, a question of equal opportunities, and from yet another, a question of whether students can or should be expected to master communication in a given mode or medium. Assessing work created with new technologies – especially where no single technology is stipulated – brings new opportunities for students and staff to collaborate on generating assessment criteria which recognise emerging practices, and for peer assessment. These in turn can relieve staff of one of the barriers to multimodal assessment, namely the impossible burden of maintaining authority on all possibilities (Adsanatham, 2012).

To explore these matters this project has arranged dialogues between a tutor and at least one student to consider three main questions together:

- What kinds of digital outputs are students producing at UCL, and using which media?
- How are students supported to conceptualise their audiences?
- What approaches are taken to assessing multimodal work?

Dialogues are recorded, transcribed and inductively analysed to create a picture of current practice across UCL subject areas. This session will discuss the themes emerging from these staff-student dialogues, and the implications for practice. It will consider practicalities including how to hosting the work and make it publicly discoverable, and how consent for group work could be handled.

### **40. Zero Tolerance to Sexual Harassment: Active Bystander Workshops**

**Sam Nicholson**

The Zero Tolerance to Sexual Harassment project is an ongoing campaign-led project, which brings together a number of ongoing and new activities across the institution, with the intention of eliminating sexual harassment at UCL, and supporting survivors of sexual harassment and sexual violence. In summer 2015, UCLU launched the Zero Tolerance to Sexual Harassment Pilot Pledge for UCL Departments. In signing the pledge, 44 UCL departments made a commitment never to tolerate sexual harassment, to educate students and staff about sexual harassment, and to support students and staff who experience it.

## Rationale

The departmental Active Bystander training for students was developed to empower students, by improving their knowledge of what constitutes sexual harassment, the options they have to respond when they witness sexual harassment, and how to report incidences of harassment. The workshops informed people about bystander interventions and gave them a number of tools that they can use to select a suitable response when witnessing sexual harassment. The training requested that students take action, when safe and appropriate to; to help put an end to sexual harassment at UCL. The bystander interventions are based on recommendations from Cornell University research on bystander intervention. This research showed that when bystanders intervene in a case of sexual harassment, the harassment is more likely to stop, and the intervention had a positive effect on the emotional wellbeing of the target.

## Results

After the workshops in 2015/16, an evaluation form went out to participants to gather their feedback. Many of the participants could recall the tools used, and some had used the intervention methods in real life situations since the workshops. Frequently, trainers or the Women's Officer received disclosures from participants, prompted by the workshop's education. In 2016/17, in anticipation of further disclosures to trainers, guidance was given to the trainers before workshop delivery began to support them in receiving disclosures. UCLU hope to continue expansion of the Zero Tolerance to Sexual Harassment project, to engage more departments, and educate even more incoming students. The target for 2017/18 as set in the Zero Tolerance to Sexual Harassment project plan is to deliver Active Bystander workshops to 50% of incoming students.

### 41. Meet the Researcher: The use of interviews to connect First Year undergraduate students to research staff at UCL

**Julie Evans, Alex Standen and Alastair McClelland**

There is considerable international interest in the relationship between teaching and research in the higher education sector (for a review, see Malcolm, 2014) and in particular, the concept of strengthening the link between research and education as a way of enhancing the student experience and improving learning outcomes (e.g., Healey, 2005; Healey, Jordan, Pell & Short, 2010). An important concept underpinning our initiative is that of learning communities (Lave & Wenger 1991), and the relationship between such communities and a successful academic experience for students. In this paper we will outline the process of introducing a 'Meet the Researcher' scheme into two undergraduate programmes.

UCL offers an intensive research-embedded education that expects students not to just passively receive the wisdom of scholarly activity conducted by our academic

staff, but to be actively involved in their own research as part of our larger institutional research community. In the autumn of 2014, UCL launched the Connected Curriculum (CC) initiative which has the fundamental aim of fostering student learning through research and enquiry. There are six dimensions to the CC framework, the first being that "Students connect with researchers at UCL and have an opportunity to learn about the institution's research" (Fung and Carnell, 2016, p. 4). On both the BSc Psychology and BSc Psychology and Language Sciences programmes in the Faculty of Brain Sciences there is a clear 'research throughline' from Year 1 through to the project in Year 3 which is a piece of empirical research conducted by each student under the supervision of a member of staff. Research methods teaching and the opportunity to participate in empirical studies starts in Year 1, but students have not had the opportunity to engage with members of the research staff in the faculty. The aim of the 'meet the researcher' initiative was to give First Year students some exposure to the research community within the faculty in the first term of their degree programme by getting small groups of students to interview a researcher in the faculty.

Small groups of First Year students interviewed a member of the research staff in the Faculty of Brain Sciences and reported back on their experience and findings to their peers in a seminar group setting led by their personal tutor. The feedback from all parties was extremely positive and the third author has been actively promoting the 'Meet the Researcher' scheme across UCL. We will also present an example of the implementation of this initiative in an entirely different academic discipline i.e. Planning in the Bartlett: Faculty of the Built Environment.

### 42. Exploring the Impact of Research-Based Education on the Undergraduate Experience with a Focus on the Contribution of Work Placements to the Research Experience

**Marian Meehan, Katherine Howell**

University College Dublin (UCD) is a large research-intensive university in Ireland that has a commitment to student-focused, 'research-led' education as one of the key components of its Strategy 2015-2020. With an undergraduate cohort of over 16,000 students this research project, which was conducted by three UCD Fellows in Teaching and Academic from 2014-2016, aimed to examine UCD's undergraduate students' awareness of, and exposure to, research in their discipline/programme, and their perceptions of how studying at a research-intensive university in Ireland has impacted their learning. In particular, we were interested in addressing the following research questions:

- To what extent are undergraduate students aware of research conducted by staff in their chosen discipline/programme, and to explore how this awareness (if any) has developed?
- In what ways (if any) do undergraduate students



perceive that research has been linked to their learning and/or teaching experiences, in the curriculum and/or the wider university?

- What examples of good practice do undergraduate students identify and describe in terms of research-teaching linkages?
- In what ways (if any) do students perceive that studying at a research-intensive university has impacted on their skills and attitudes?
- In what ways (if any) does students' awareness and experiences of research, and their perceptions of the impact research has had on their learning, vary according to their stage of study and discipline and/or programme?

Our aim was to obtain a sample of undergraduate students' perspectives from across the university. We chose a focus group methodology and conducted seven focus groups with a total of 59 final year students, each consisting of undergraduates from a programme/discipline from across the six UCD colleges. Participants for focus groups were mainly recruited in lectures by administering a short survey to the target group of students at the end of class, with the focus group usually conducted immediately afterwards with lunch provided. The survey, which was based on that designed by Healey et al. (2010) contained questions on research awareness and experiences, and collected demographic data about the students. In total 353 final year students completed the survey. Surveys were also administered to three cohorts of first year students, and three focus groups with first year students – one each from Arts, Engineering and Science – were also conducted. In this presentation we will focus on the findings from the seven final year focus groups.

The seven focus group audios were transcribed and on listening to the audio-recordings and reading the transcripts several times, the authors coded one of the transcripts. A research assistant applied these codes to the transcript using NVivo, and independently coded a second transcript using the coding scheme. The authors and research assistant then met to examine the second coded transcript and the resulting discussion resulted in a refinement of the codes.

The remaining five final-year focus groups were coded in Nvivo by the research assistant using the coding scheme developed, and each transcript was then double-coded by a member of the team. The survey data was inputted to excel and descriptive statistics produced.

Our findings show that across the disciplines, students generally have a high awareness that UCD academics are engaged in research with this awareness developed through (i) discussions of research activity by lecturers, (ii) research experiences that are part of the programmes of study, and (iii) cues from their environment, for example through the visibility of research posters and research labs. In addition four major ways in which

undergraduates had some form of research experiences were identified: learning about others' research; learning to do research; learning in research mode; and, learning by doing research. Finally a large majority of students feel that acquiring research skills is important and useful, principally because it (i) informs their career choices, (ii) prepares them to pursue research degrees, (iii) prepares them for careers, and (iv) is necessary for professional accreditation.

While the above findings have local implications for UCD, in this presentation we will focus on additional findings that we believe have wider implications for the future of higher education. Five of the focus groups were conducted with students from disciplines/programmes where the completion of a capstone research project in the final (fourth) year of their undergraduate programme was mandatory. In addition, three of these discipline/programme also had a major work placement component, in the penultimate and/or final year. We will discuss the comparisons that students drew between the different types of research experiences that both of these opportunities offer and the perceived advantages of both.

### **43. Student Partnership in the Development of an Undergraduate Leadership Course**

**Teal McAteer and Vera Dodds**

This multidimensional study incorporates students as research partners throughout three levels of inquiry. The study focuses on the creation, implementation and examination of a fourth year undergraduate Leadership course. Following identification of a gap in the business program curriculum, an upper year Leadership capstone course was proposed. It was hypothesized that this course would be well received, but that there would be a need for modifications in the scaffolding of courses in previous years of the program in order to properly prepare students for this unique and challenging experience.

**Level 1:** The first phase of research in 2014, used small focus groups each comprised of five current undergraduate students from first year to fourth year of the business program. The total sample of 30 students was randomly selected from each year of study. With the vision of a capstone Leadership course in mind, the focus groups brought innovative ideas and presented areas of weakness in the current curriculum from a student perspective. The outcome of these focus groups was the implementation of a scaffolding plan within the business program curriculum, building management skills and knowledge in a more cohesive way from first year through third year, thus providing the necessary foundation for the fourth year Leadership course. Student partnerships developed during the focus group phase provided invaluable feedback and led to many of the incorporated curriculum design changes.

**Level 2:** The new Leadership course was launched in September 2015. The course focused on identifying and building Leadership capabilities through self-initiated learning, with a large emphasis on reflection. A small group of 20 students participated in the course, and while challenging, it was found to be a highly rewarding learning experience with significant opportunity for personal and professional growth. The second phase of the research examined the course required Leadership learning journals completed by each of the 20 students.

Students established their ideal leadership vision, and then critically assessed how to move from their current state to their desired leadership identity. Students were assessed using multiple leadership dimension scales and then asked to develop an action plan to adjust their thinking styles and associated behaviours in a way that better reflected their leadership identity. Students were given six weeks to attempt to make shifts in their desired thinking and resultant behaviors. They documented their journey in two learning journals, also known as TLEs, Transformative Learning Experience #1 and #2. Learning journals were qualitatively coded in order to discover themes and to understand if students were able to create and implement realistic action plans using this self-initiated method. This stage of research assessed the effectiveness of transformational development through self-initiated learning and reflection. Under the supervision of the course instructor, a student partner from a non-business program was engaged to complete all coding of the TLE learning journals. Once again, partnering with a student was invaluable as this allowed for more objective coding and brought a student's perspective to the interpretation of the data set.

**Level 3:** The final phase of the research provided broader implications and more meaningful understanding of the course impact. In December 2016, the same student partner contacted the 20 participants in the Leadership course who had since graduated. They were asked to complete a survey regarding their experiences after completion of the Leadership course. The anonymous survey, gave the respondents freedom to be open and honest about their thoughts and feelings relevant to the course content and its impact. Questions focused on whether students continue to use the skills they learned in the course and to what extent the course had a strong impact on their leadership identity.

Respondents were also asked to provide recommendations for future improvements in course content and structure. Conducting the survey one year after graduation, provided an understanding of the long-term impacts of the Leadership course. The longitudinal data collection using a follow-up survey brought the research full circle and allowed for an understanding of how the course could be improved for future cohorts. This final research phase involving the 20 new student partners, once again brought valuable insights on further use of self initiated

leadership and reflection-style teaching and learning in higher education. In the complex and global corporate world of today, leaders cannot only possess technical skills. They must also learn and develop thinking styles and associated behaviors that enable effective leadership. Through self-initiated learning and reflection, we hope to foster some of these individualized personal and professional skills in today's new graduates. The major impacts of this research are not only the understanding of the effectiveness of student initiated learning, but also the acknowledgment that student partnerships in pedagogical research are of significant importance in the design and development of curriculum in higher education.

#### **44. Connected, hybrid, disruptive, haunted: perspectives on the digital curriculum**

**Helen Beetham**

In developing a connected curriculum for the C21st, digital practices and networks have a particular role to play. This paper examines how the connections or border crossings between research and teaching play out in digital spaces, looking at four ways they can be theorised, and drawing on examples from a number of research-intensive global universities.

1. Digital forms of learning and teaching are often gathered together under the rubric 'the connected classroom'. This sees learners connecting in a purposeful way with resources, and with people relevant to their learning (peers, experts, mentors, tutors, assessors and audiences), beyond the physical and psycho-social space of the classroom. Some educational theorists have suggested that this 'connectivity' or 'connectivism' (Siemens 2005) constitutes a radically new way of learning and constructing knowledge. This paper argues that it is not a property of networks to connect forms and practices of knowledge, but of concerted work by scholars and students within networked spaces. The connected classroom becomes then an extended arena of knowledge work, rather than simply a node in a network of knowledge flows.

2. The idea of connectivity is not often extended to the curriculum itself. But if finding information on the internet is 'research', and if research data and publications can be found as readily as educational content in that process, then digital practices in the curriculum can become hybrid forms of scholarship, with properties of 'learning' and 'research' at once (Weller 2011). Hybrid forms are not of course confined to digital spaces, but features of digital spaces that promote hybridity include the open availability of high value knowledge to relatively novice learners, and the tendency for knowledge construction, communication, and re-construction to become conflated in rapid cycles (the 'constant beta' state of knowledge outputs). These present challenges to our received academic practices and pathways of student development.

3. When connectivity becomes ubiquitous and pervasive, when connections do not simply complement or amplify the curriculum but challenge and even negate it, and when the rapid cycling of knowledge undermines the structures and processes through which knowledge has previously been legitimated, the situation is less comfortable for classroom practitioners. Boundaries that classrooms keep in place are abolished in the open spaces of the internet. So the different roles of teachers, researchers and learners may be contested, and the authority of curriculum knowledge may be challenged. Some of these ‘disruptions’ (Christensen 2008) can be turned to learning advantage, particularly if teachers are working in a radical or critical tradition of pedagogy. Others risk the entire enterprise of the university (Selwyn 2016). This paper offers examples of digital disruption from both perspectives.

4. Finally, Bayne (2010) has described digital knowledge practices as ‘uncanny’: ‘defamiliaris[ing] teaching, asking us to question and consider anew established academic practices and conventions’. This ‘haunting’ of the curriculum by its digital other is seen by Bayne as a largely positive, revitalising encounter. But in today’s climate of disdain for evidence and expertise, the ‘other’ knowledges of the internet seem increasingly dark: trolling and hate speech, deliberate distortion and confusion, echo chambers, fake news. And as digital technology penetrates our institutions and practices ever more deeply, its own shadow side – the production of knowledge as data, the drive for standardisation and surveillance, the capture and commercialisation of attention – break out into the curriculum too. A truly connected curriculum must give students resources to thrive in this environment, and must give its own knowledge practices some hope for survival.

#### **45. Symposium: From researched to researcher: a student-led exploratory study into BME student experiences**

**Steve Dixon-Smith and Adeola Elugbadebo-Solomons**

The workshop responds to the conference theme ‘How can research-based education allow universities to better address inequalities, including of race, gender, and indigenous people?’ It also invites participants to consider the broader application of a response to the question ‘how can research be strengthened by greater student involvement?’ The session will detail the motivations, methods and findings of an exploratory study into BME student experiences at the University for the Creative Arts. The research responds to the BME attainment gap observed in UK Higher Education (Woodfield, 2015), and specifically within Art and Design. Attempting to get beyond the and behind the statistical analysis, the study was driven by the belief that ‘[e]ffectively widening participation depends on explicitly addressing the experiences, practices and meanings of the students themselves’ (Burke, 2002:2 in Finnegan, 2009:136).

In order to address these issues, the study applied ‘students as partners’ principles as , employing and training student co-researchers, who conducted focus groups, contributed their own experiences, and identified patterns in the data at the inductive stage of data coding. The research generated rich audio data which was embedded directly into the institutional report in audio format to minimize the interpretive role of the lead researcher (Miles & Huberman, 1994), giving immediacy and authenticity to the student voices presented. These voices, the findings drawn from them, and the resulting institutional responses will be presented by the lead researcher and student co-researcher and opened up for discussion.

Participants will also be invited to consider some of the contradictions and complexities involved in research of this kind. These involve: the struggle to acknowledge racial misrecognition as a structural injustice, rather than a free-standing cultural harm; responding to the situation without contributing to group stereotypes that emphasize particularity at the expense of singularity and ascribing fixed rather than fluid identities to students from minority ethnic backgrounds; ensuring that we are not employing notions of diversity/inclusivity that position students who constitute a global majority groups as outsiders in UK universities; and ensuring that attempts to address the causes of attainment differences are not drawn into focusing on specific sets of (student or staff) actors, while giving due consideration to the fact that differential outcomes arise from complex interplay of explanatory factors across a range of levels of influence. Participants will be invited to consider how they might respond, in their own contexts, to the broad conclusion of the study that ‘the critical interrogation of the sociocultural specificity of taken-for-granted normalised practices, knowledges, histories and perspectives would present opportunities to develop more inclusive practices that can address difficulties faced by ... students’. This will be achieved through engagement with more specific sub-conclusions which draw on instances of student experience highlighted by the study.

As well as adopting a ‘students as partners’ approach, the study proposes a range of recommendations that align to the 2015 HEFCE-commissioned report *Causes of differences in student outcomes*, and as such proposes a key role for ‘students as change agents’. The workshop focuses on the importance of this role as part of institutional responses that inform the future of Higher Education, and provides an example of how student engagement in the exploratory stages of research can facilitate this.



## 46. Meaningful learning across disciplines: innovation and transformation in a pan-Humanities module

**Helen Brookman**

This paper will share reflections on designing and teaching an interdisciplinary research-based module in medieval studies. In 2016, the Faculty of Arts and Humanities at King's College London launched a series of interdisciplinary 'Opportunity modules', which are designed to be taken as electives by students from departments across the Faculty. They all take distinctively innovative approaches to teaching and assessment and are of particular appeal to students on the multidisciplinary Liberal Arts programme. One of these modules, 'Arthurian Transformations', seeks to make the Arthurian world and the ways in which it has been constantly and imaginatively rewritten and remediated in the modern era accessible and meaningful to students from a wide range of Humanities subject backgrounds, from Film to Philosophy, who arrive at the module with varying levels of prior knowledge of literary and cultural studies and of the languages and literatures of the Middle Ages.

'Arthurian Transformations' blends independent research-based activity and e-learning with more traditional delivery methods. The Arthurian tradition provides much rich and accessible modern material for students to explore and investigate independently alongside their learning in the medieval sources. In the first half of term, students attend lectures and seminars arranged around three themes ('Grail', 'Guinevere', and 'Death'). These correspond to the content of the last three books of Malory's *Morte D'Arthur*, extracts of which are set for seminar reading alongside modern literary texts and visual arts, such as Julia Margaret Cameron's striking photographic illustrations to Tennyson's *Idylls of the King* (late 1860s) and Kazuo Ishiguro's atmospheric novel, *The Buried Giant* (2015). Between seminars, guided research tasks enable students to develop skills in independent research, using a series of databases and resources provided on the Moodle page. Students post the results of their work-in-progress to a research journal, using the e-portfolio software Mahara, and receive weekly tutor feedback on their findings, ideas, and writing, thus defining and developing their own material, topics, and approaches for an individual research essay. In the second half of term, we begin to work together in project workshops, as students conduct research individually and collaboratively to find, analyse, and communicate information about and interpretation of modern Arthuriana to a public audience. The final output will be a group-curated Mahara 'digital exhibition', with collective and individual components. Using written content, found media, and original created media, it will display and analyse sections of Malory's text alongside a curated collection of modern artefacts under a shared title and theme, to form a coherent online exhibition. Thus, students will seek to explore, understand, and communicate their understanding of how and why

Arthurian literature and legend has proved so culturally productive and enduring.

The module is being taught for the first time in Semester 2, 2017 and I will use module evaluations and submitted assessment material to reflect on the opportunities and challenges it has presented to me and the students. One particular challenge in designing the module has been to enable students from multiple disciplines with limited prior knowledge to gain the required skills to read and understand Malory's Middle English prose. Building on the module's own conceptual theme of 'transformation', I will consider how transformative this learning experience was for this diverse group of learners. What new perspectives and skills will they take back to their programmes? Will the experience differ for single-honours, combined honours, and Liberal Arts students? This pedagogic research forms part of my collaborative work with medievalist colleagues at King's and elsewhere on creative and critical non-specialist encounters with early English. Although I am presenting a specific case study, I will highlight a number of broader themes that will have relevance across and beyond the Arts and Humanities. As well as the lessons learned about e-portfolios and group assessment, I will reflect on an increasingly common challenge: how to enable undergraduates to engage meaningfully and critically with challenging and specialist material beyond their primary discipline.

## 47. Student Powered Research. Experiences from the Cities Aquatic Resources Project(CARP)

**Caroline Garaway**

This paper explores lessons learned from the Cities Aquatic Resources project (CARP), an initiative, now in its third year designed to give real research and fieldwork experience to UCL Anthropology students whilst at the same time producing data with the potential for real societal benefit. Specifically, the paper highlights the opportunities and tensions created when an academic involves students in the academic's own research project.

As part of an undergraduate course looking at fisheries, food systems, urbanisation and environmental sustainability, students join an ongoing research project investigating the Thames shellfish commodity chain. The Thames Estuary has supported a culturally and economically important cockle and oyster industry for hundreds of years. Be it cockles, whelks and winkles eaten in London's east-end or raw oysters straight from their shells in the upmarket West, these shellfish and their stories provide a perfect case study for students to explore the issues addressed in the course and to better understand the challenges faced by those trying to affect sustainable change. The students, on the other hand, provide me with a real opportunity to increase the scope of my research, to critically discuss it, and to take it in novel and interesting directions. Starting in 2014 with these potential synergies in mind, the project has now

gone through three iterations and produced a significant body of work.

Each student on the course chooses an area of the commodity chain that they'd like to focus on and then identifies who or what they would like to investigate. For some this has required interviewing key actors in the chain, for others it has involved archival research or policy analysis and for others still the development of consumer surveys, or the analysis of text (such as menus and newspapers). Collectively, the journey has taken them all over London, to the home counties of Kent, Essex and Buckinghamshire, and further afield to Portsmouth, Hastings, and Weymouth. They have gone to oyster bars and pubs, markets and fishmongers, to government headquarters, national archives, ports and harbours. They have spoken to fishers, oystermen, wholesalers, retailers, regulators, policy makers, monitors and consumers. Individually the projects provide an interesting perspective on different parts of the chain. Taken collectively, and by getting 'inside' all along the chain, they provide incredibly rich anthropological insight into this highly complex commodity chain.

This research project forms part of the students' summative assessment, and has become increasingly important (now at 80%) as a result of the observed level of student engagement with the project and the impressive quality of work produced. The work is written up in two different ways to increase impact and further develop research skills. Firstly, students provide a research field diary explicitly designed to inform the students coming after them about what they did, about what worked and what didn't and where they think the research could be taken next. In this way students build on the experiences of those from previous years, adding to rather than repeating the research of others. The second output is an outward-facing blog reporting their findings as a public interest story, which is then published and, where possible, made publicly available on the CARP website. As well as improving their skills in writing for a non-academic audience, these blogs are currently the principal means through which the project and its results are disseminated to the wider Thames Estuary community.

This paper discusses the successes and challenges of this ongoing project and how it is evolving to address them. As a means of increasing student engagement in real world issues at the same time as improving research skills and module learning outcomes, this paper presents evidence to suggest this project has been extremely effective. It also shows that work of real academic value can and is being produced. At the same time, it describes the risks inherent in letting student-researchers onto one's field-site and the difficulties encountered in ensuring the quality of data produced by inexperienced researchers with wide-ranging ability, not to mention the logistical problems that come with carrying out 30 individual research projects simultaneously. For the students, being

involved in 'real' research is one of the key attractions of the course and asking them to invest energy in real world problems brings with it a responsibility, not always easy to uphold, to ensure that their engagement results in valued insight. Research-based education undoubtedly has real pedagogical value. It also has the potential to strengthen academic research if proper attention is paid to the student-researcher relationship and time is invested in its development.

#### **48. Engaging Students in Researching the Role Culture Plays in Learning in International Classrooms**

**Jim Berger**

Teaching, while often carried out in a structured environment, is flush with cultural components that impact effectiveness with adult learners. Likewise, a difference in cultures between the instructor and students can cause a strain in the learning process. Learners may expect the instructor to have certain views on time, respect, knowledge, or learning. When these expectations are not met, students can become frustrated and disengage from the learning process. While there have been many studies on teaching techniques and fewer on classroom culture, little research has been done examining how culture can impact learning in a higher education classroom environment. Therefore, the purpose of this session will be to examine the research regarding various cultural processes and explore how students might be involved in studying its impact on learning within higher education classrooms. The following section will examine approaches to learning, knowledge, authority/respect, and time, and how they differ among various cultural groups.

Research has shown that members of various cultures have different learning approaches that are culturally shaped. An instrument often used to examine learning approaches is the Study Process Questionnaire (SPQ; Biggs, 1978), which focuses on surface learning, deep learning, and strategic learning. Using the SPQ, Volet, Renshaw, and Tietzel (1994) conducted a study and found that Asians scored higher on surface strategy but lower on deep strategy. Zhang (2000) used the SPQ to examine the learning preferences of students from Hong Kong, mainland China, and the United States and found differences in the motives and strategies among the three groups. Such differences indicate that different cultures have different preferences for learning approaches.

Different cultures view knowledge in different ways. Knowledge, different from personal learning approaches, is viewed as types of information. Schommer (1990) examined literature in personal epistemology and developed the Epistemological Beliefs Questionnaire (EBQ) with four factors: Certain Knowledge, Simple Knowledge, Quick Learning, and Fixed Ability. Rizk, Jaber, Halwany, & Boujaoude (2012) compared Muslim and Christian groups and found differences along the

dimensions with the Muslim group reported as more sophisticated. Karabenick and Moosa (2005), when comparing Omani and U.S. students, found U.S. students responded that the more certain the knowledge, the more they felt that knowledge was based on empirical evidence and the more trusted the authorities.

Among the many choices instructors have to make when entering the classroom is whether to approach their students as an authoritarian or as their equal. In Western classrooms, instructors or teachers are often seen as an authority, “sage on the stage”, or an expert but closer to students’ equals. In non-Western cultures, views of instructors vary with cultures. In some Latin American cultures, they are seen as co-learners and are regarded as equals (Merriam, 2007). As such, authority and respect occur differently in the classroom. Within a Western classroom, students are expected to ask questions and provide comments/feedback to the discussions during class. In Asian cultures, where the instructor is revered, students sit quietly to avoid interrupting the teacher and wasting other students’ time. If questions need to be asked, they are done so after class or in the instructor’s office

Time is a concept that differs among various cultures and its view impacts the higher education classroom. Various cultures diverge regarding how time is perceived and how an individual uses this perception to establish their goals. In monochronic cultures (Hall, 2003), time is a quantity that can be measured, borrowed, taken, and saved, while in polychronic cultures, time is more ethereal, more fluid. Thus, in polychronic cultures, deadlines for students are less meaningful than for students from monochronic cultures. An assignment due at a specific time would be less likely to be submitted on time by a student from a polychronic culture than from a monochronic student. The cultural values of polychronic societies are focused more on personal relationships and the interactions between people than the precision of time and deadline. Thus, deadlines are seen as approximate and a “deadline” may be met within minutes or several hours of scheduled time.

### **Connection to International Perspectives on Research Based Education**

The variety of cultures represented in an ever-increasing international classroom will make it difficult to ensure that learning takes place when using a mono-culture approach. The presenter of this session will explore the research on cultural values within higher education classrooms and suggest approaches for engaging students in participating in the development and conduction of research on how those cultural values impact learning at the college and university levels. A research project is in process to develop an instrument to assess the presence of various cultural values in higher education classrooms.

## **49. Students as partners in developing a research-based education**

### **Jenny Marie**

A research-based education may contain elements of the curriculum in which students act as partners in subject-based research. By this, I mean that students are not just working with staff on a research agenda set by staff, but that students are working with staff to define the research questions and that they are working together to investigate, analyse and present the research (Cook-Sather et al., 2014). I argue that the best way to work towards such an outcome is through student/staff partnership; as this develops the norms of partnership working, provides experience for staff of undertaking research in partnership with students and ensures that the educational opportunities created best meet student needs.

Partnership work can be challenging for both students and staff. Carey (2013) discusses how students can act out conceptions of students as consumers; and staff can find partnership threatening (Cook-Sather, 2014). This applies as much to working in partnership for subject-based research as to being partners for research into teaching and learning (Brew, 2006). For partnerships to be successful they have to be conducted in line with partnership values (HEA, 2014) and these are best developed through reflective partnership practice. Thus work to develop a research-based education through partnership helps to develop these values in practice.

There are many benefits to both students and staff in undertaking such projects documented in the literature, including increased motivation and awareness of how learning occurs (Cook-Sather et al., 2014). However, there is less evidence of the advantages for the enhancement work occurring (though see Brooman et al., 2015). There are examples of such projects developing research-based education with medium-term impact at UCL. For example, one project from 2014-15 led to the piloting of clinical problem-based scenarios in classrooms, with a resulting increase in student engagement. A member of staff at UCL wrote that UCL ChangeMakers, which supports student/staff partnership work on educational enhancement projects, is “an excellent tool to facilitate research-based learning across the university.”

This paper will discuss the experiences of staff and students who have worked together on projects designed to forward research-based education at UCL under the UCL ChangeMakers programme. This will be explored through case studies: with students from the projects presenting their experiences of working in partnership towards a research-based education. The projects are occurring at both undergraduate and postgraduate levels, with enhancements being made to both taught and research provision. The students will discuss both the benefits of taking forward research-based education in this way and the challenges of doing so. Some of the



challenges experienced at UCL are more practical than those in the literature, such as no-one having the capacity to follow up and ensure that the project makes a lasting impact. Benefits include the development of a sense of community. This is important for developing a sense of belonging that increases attainment and for professional socialisation. The experiences of the projects will be brought together to make conclusions about what makes for a successful partnership project developing research-based education and how to meet the challenges that they can pose.

## **50. Evidence and Enquiry in Psychology**

**Daniel Richardson, Stephanie Lazzaro, Jorina von Zimmermann, Alistair McClelland, Anna Hughes, Jo Evershed and Nick Hodges**

Our goal was to bring the process of scientific research into the centre of our undergraduate psychology programme from the outset. In introductory lectures we used a new software tool to collect and analyse students' behavioural data in real time. In laboratory sessions, students learnt research methods through conducting their own experiments in an innovative online platform.

The standard route in undergraduate teaching is to review the basic concepts and methods of different fields of psychology in turn. This puts the students at arms-length from the two most important aspects of any science: asking questions and seeking evidence.

In our presentation, we will discuss the problems of connecting research and education across a more modular curriculum, where students from different programmes might have different skills, lectures and timetables. But with innovations in course structure, content and technology, we have engaged 180 students in the cycle of evidence and enquiry in a manner that could be extended across the social sciences.

### **Enquiry**

One of the innovations in our curriculum was that it was structured around simple, real-world questions, derived from students' curiosity about how people think and behave. Each week, we posed a question and then cut across traditional disciplines looking for answers.

For example, to answer the question 'Do we all see the same blue?', we presented textual evidence from Homeric Greek describing the ocean as the colour of wine, moved on to the biology of mammalian and arthropod retina, to developmental psychology and experiments in infant word learning, to end by discussing linguistic and cross cultural effects upon cognition.

In lectures, they handled Egyptian artefacts and sheep brains, saw their head of department have his brain stimulated, witnessed a staged robbery and tested their eye witness memory, watched a live magic show, and figured out how the trick was done using important

psychological concepts.

(for a short overview see <http://eyethink.org/1107>)

### **Evidence**

Students were placed at both ends of the microscope, as subjects and scientists, participating in demonstrations and real experiments mid-lecture, reflecting upon their own data, generating their own hypotheses and designing their own experiments in laboratory sessions.

In lectures, we used a system called The Hive, developed by us to study collective behaviour in crowds via their mobile devices (<http://eyethink.org/thehive>). We adapted this tool to allow us to perform large scale experiments on students in the middle of the lecture, with their behaviour data sent to R scripts for immediate, online analyses.

In laboratory sessions, we employed a new system called Gorilla (<http://gorilla.sc/> developed by JE and NH in collaboration with UCL). It is an online tool that allows anyone to create full psychology experiments with little or no expertise, as easily as they might create a survey with a tool like SurveyMonkey.

For example, during the first term students first ran a prepacked experiment (an Implicit Association Test) that had been discussed in lectures. Then in small seminar groups they had a critical discussion of how to interpret results, and posed their own hypotheses.

The next week students created stimuli and adapted the IAT task to test their own ideas. They investigated hypotheses ranging from social stereotypes related to downs' syndrome to implicit attitudes towards people of different faiths. Running the experiment online via their social networks, the class was able to collect data from over 1500 participants. Students presented their work in a poster session modelled on a real conference. Some of their findings are being written up for dissemination in scientific journals and conferences, so that students will make a genuine contribution to the field.

### **Conclusion**

We argue that our experience attempting connecting the curriculum in psychology could be expanded across social science education and research. We have learnt some lessons in how research in learning can be scaffolded, balancing the demands of scientific rigour of our discipline with the creativity and curiosity of the students. Moreover, experiencing this cycle of enquiry and evidence, from lectures to labs sessions gave students the psychological literacy to form and test hypotheses, to be critical of experimental design and reported findings, and to integrate knowledge across the diverse disciplines of our field. Led by their own ideas, the students transitioned from studying the history of their science to being 'real scientists' a few weeks into their degree.





Wednesday 28 2017





## **51. Symposium: Research-based Education and Global Challenges: Reflections on Five Years of the UCL Global Citizenship Programme**

**Tim Beasley-Murray, Priscila Carvalho, Nikhilesh Sinha, Shivani Singh, Hannah Sender, Hugh Starkey, Eszter Tarsoly, Oli Pinch, Hannah Posner and Taz Rasul**

The symposium introduction will give a brief overview of the UCL Global Citizenship Programme and the way that it has developed research-based education as a means of addressing global challenges.

### **Session 1**

Conceptualising Global Citizenship through research-based scenario-based learning

In this session we will be exploring interdisciplinary teaching methods and scenario based learning drawing on on-going research at UCL. This session explores how students can understand and engage with complex real-world situations at a deeper level through simulations. This approach is suited to looking at issues in a local as well as a global scale and developing an understanding of the most pressing problems facing our planet.

### **Session 2**

Engaging the wider community in research-based learning

This panel shows the potential of connecting teaching programmes with participatory research approaches. It explores different methods for collaborative engagement with citizens, including through employment of local citizens as ‘navigators’, challenge-setting by local organisations, engaging with communities’ languages and cultural practices, and immersion in migrant communities. We will explore the way that research outputs can be the outcome of collaboration between students and members of the communities they are researching - for example, through creating documentary film portraits, photography, and addressing local challenges with creative solutions.

### **Session 3**

Transforming Research into Practice – how non-academic services can bridge the gap between curriculum and career

Students as researchers gain valuable subject-based skills on their degrees but are often unsure of how to transform these qualities into something an employer would value. Hence they can lack confidence and understanding about the real world and the impact that they can have. Non-academic services can be the bridge that helps students cross the divide between the curriculum and their chosen career. Leaders of three of the GCP Strands (Employability, Volunteering and Social Start-up) will present a brief overview of their strands and demonstrate how these strands encourage students

to draw on their experience of research by engaging in practice (placements, meeting employers, starting their own venture, making new connections, etc.). In so doing, students learn to put their research-skills to use and hence enhance their employability.

### **Panel Discussion**

Research-based Education, Global Challenges and a Connected Curriculum

This panel-discussion will explore further the relationship between research-based education and global challenges and the way that the UCL Global Citizenship Programme articulates this relationship. It will also consider how the programme relates to UCL’s goals in the Connected Curriculum. This session will make the most of the fact that the conference is being held at UCL and will involve students who have recently taken part on the Programme and members of community organisations who have worked with the Programme, as well as members of academic and non-academic staff at various levels.

## **52. Symposium: Object-Based Learning (OBL) approaches to foster a research-based, inclusive and student centred curriculum**

**Fiona Salmon, Catherine Kevin, Thomas Kador, Helen Chatterjee, Tabitha Tuckett, Elizabeth Lawes. Heather Gaunt and Shanton Chang**

### **Paper 1. The transformative potential of object-based learning for higher education and beyond Thomas Kador & Helen Chatterjee (University College London, UK)**

During the 19th and early 20th centuries many university programmes made use of teaching collections and object handling in daily teaching. Since the second half of the 20th century this practice has declined across the western world and university collections have been largely marginalised from teaching. However, this is changing again and several university programmes are beginning to ‘dust down’ their collections and explore how the contents of academic museums could benefit their student’s learning experience. This presentation will highlight the growing international network of OBL practitioners, provide examples of best practice and present results of recent research into the benefits of giving students the opportunity to work with collections. Drawing on our substantial experience at UCL, of using collections for structured research-based learning activities, we will conclude by discussing the transformative impact that OBL could have right across higher education.

### **Paper 2: Indigenous art in higher education: a decolonising strategy?**

**Fiona Salmon and Catherine Kevin (Flinders University, Australia)**

Higher education faces ongoing challenges in bringing Indigenous perspectives to teaching and learning. In

Australia this is evident in calls for students to better understand contemporary issues confronting Aboriginal and Torres Strait Islander people, and for Aboriginal and Torres Strait Islander knowledges, experiences and understandings to be valued in academic teaching. A recent Flinders University study brought Aboriginal art from the University's Art Museum to the core of an Australian History subject, with the aim of explicitly addressing these concerns. Non-indigenous students overwhelmingly reported that this strategy increased their engagement with Indigenous themes in history and fostered nuanced understandings of Indigenous experiences of contemporary Australia. Drawing on these findings, this paper explores the value of Indigenous art as a pedagogical tool, its potential application across different disciplines and the possibilities it offers non-Indigenous academic teachers for preparing students to engage empathically with Indigenous issues that remain unresolved in settler-colonial contexts.

### **Paper 3: Object-based learning for libraries: rare and artists' books at UCL**

**Tabitha Tuckett and Liz Lawes (University College London, UK)**

University library staff working with rare books and manuscripts are no strangers to teaching and learning with physical objects, whether termed 'object-based learning' across disciplines and nationalities, or 'studying original sources', which represents core to research enquiry for many subjects in Higher Education internationally. In this paper we will argue that OBL methods are increasingly important for libraries because of a decline in students' skills to interpret the physical aspects of text-bearing collections. This appears to correspond with prevalent attitudes to digital text as 'content' that discount the impact of the visual and physical medium on understanding words and their context. UCL's Slade Small Press Project, and projects with early printed books and the UCL Dante Collection, illustrate ways of improving object literacy in Higher Education for textual objects, so that the next generation of graduates can understand, rather than merely read, the words on the page.

### **Paper 4: Enriching perspectives and metacognition through the humanities, for tertiary technical graduate students**

**Heather Gaunt & Shanton Chang (University of Melbourne, Australia)**

Higher education in professional areas such as Information Technology (IT) or Engineering is often criticised for not preparing graduates adequately for their respective industries. Usually, these criticisms focus on a lack of soft (or transferable) skills like communication, presentation, and collaboration. Responding to this need, international postgraduate IT students at the University of Melbourne develop soft skills through workshops in drama/movement, and enquiry-based exploration of Australian indigenous and non-indigenous art. Students

are both culturally and disciplinarily 'out of their comfort zones', in situations that demand metacognitive alertness. Positive outcomes over three successive cohorts include increased confidence in presentation, ability to engage intellectually and emotionally with ambiguous material, and increased knowledge of local culture, all of which have direct applicability to career success. This paper explores this example of cross-disciplinary enquiry-based learning in depth, and overviews related applications of the pedagogy across other curricula, including science, geography, population and allied health.

## **53. Symposium: (Re)Orienting research based education towards a Responsible Research and Innovation perspective**

**Symposium Chair: Catherine O'Mahony, PI in EnRRICH project, University College Cork**

The challenges facing us in society exert their influence at a global level and are characterised as being complex in nature, uncertain and ambiguous in terms of problem articulation and solution, enmeshed with many other problems, and bristling with potential for conflict. There is an emergent trend in the policy arena to encourage research and innovation practices that responsibly address these grand challenges (e.g. European Commission, 2012), however Higher Education remains in its business as usual path of commodification of knowledge and learning focussed on the well-being of the economy (Tassone et al, submitted). We ask how Higher Education might equip students to be and to become responsible actors, researchers and innovators in a complex world and to meet societal challenges. A key step in this is in reorienting research based education (RBE) efforts to address societal challenges, to engage key societal actors in the research process, and to employ pedagogical approaches that support the cultivation of (new) ways of knowing, being and doing.

Drawing on the learning from three European funded projects focussed on Responsible Research and Innovation (RRI), this symposium will share key tools, practices and a heuristic for curriculum design to support the development of a more socially responsive and responsible orientation in the enactment of research and learning and in support of RBE approaches in Higher Education. It will invite participation and discussion on whether the concept of responsible research and innovation and the tools developed by these projects are of use in the context of research based education, and learning will be brought back into the various consortia and used.

### **RRI Tools project**

**Presenter: Melanie Smallman, University College London**

The basic principles of RRI will be introduced through the RRI tools project. RRI Tools identified actions and support needed for RRI, and produced an extensive Toolkit to assist anyone looking to bring responsibility into

their research and innovation processes.

### **Enhancing Responsible Research and Innovation through Curricula in Higher Education (EnRRICH) project**

**Presenter: Valentina Tassone, Wageningen University**

The EnRRICH project proposes three curriculum design principles and accompanying competence framework to enable the transition towards a more socially responsive and responsible ethos in Higher Education. With a focus on equipping students as future responsible researchers and innovators, the project looks at the supportive conditions for research based education that encourage an RRI orientation. Examples of higher education curricula practices will be shared to provide insights on the concrete application of the design principles and competence proposed. Participants will be invited to reflect on the relevance and applicability of the design principles and competence framework in their courses.

### **Higher Education Institutions & Responsible Research and Innovation (HEIRRI) project**

**Presenter: Núria Saladié, Pompeu Fabra University**

The aim of the HEIRRI project is to promote the integration of RRI within the formal and informal education of future scientists, engineers, and other professionals involved in the research, development, and innovation process. Based on the conducted RRI stock-taking inventory containing results of a thorough state-of-the-art review and an extensive scan of projects, initiatives and experiences around the world, a set of RRI training programs (for different educational levels, i.e., BA, MA, PhD, summer schools, MOOC) has been designed. HEIRRI are currently in the process of developing training materials and these will be shared with the audience to gather feedback.

## **54. Student experience in research in developing world within teaching-intensive public Universities**

**Adriano Uaciquete**

Research is available, documenting students' research experiences in research oriented universities (Jenkins, Healey & Zetter, 2007). This is far less the case when it comes to teaching intensive universities. The related literature can also be criticized since it does not adopt a multi-actor perspective. Only recently, also students have been involved in the discussion (Visser-Wijnveen, van der Rijst & van Driel, 2015). Moreover, the topic is under-researched in the context of African universities. The present quantitative study was set up in Mozambique; a developing country with hardly national and institutional mechanisms/strategies pushing research practices in Higher Education. Students from 8 undergraduate courses representing social sciences, education and humanities programmes at two public universities in Mozambique were involved. Both

universities, Universidade Eduardo Mondlane (UEM) and Universidade Pedagógica (UP) are teaching intensive universities. The key research question was to determine what the level of the student research experience is in these teaching-intensive universities and whether differences can be observed between programmes and universities. A Portuguese version of the Research Integration Scale was developed to measure four latent variables: reflection about research, participation in research, awareness of current research, and motivation to do research. Scale items are presented to respondents who indicate on a 5-point Likert scale to what extent they are involved in the activities (1 very rarely to 5 very frequently). The back-translation method was used to develop the Portuguese version (Behling & Law, 2000).

The revised scale reflects high overall reliability ( $\alpha=.92$ ) and acceptable to high reliability in all four subscales. Applying confirmatory factor analysis (CFA), the structural validity of the scale and subscales could be confirmed with good goodness-of-fit indexes (CMIN=55.685, Df=29,  $p=.002$ ; CMIN/Df=1.92; GFI=.960; AGFI=.924; CFI=.982; TLI=.972; RMR=.046; RMSEA=.059). High covariance was observed between the four subscales, confirming the integrated nature of student's research experiences. The questionnaire was administered to 261 undergraduate students (51.7 % from UEM) from 6 Faculties, each comprising of 8 departments. Analysis of the subscale scores indicates that students' research experience is average: Reflection = 3.3/5; Participation = 3.24/5; Current Research; Motivation = 3.44/5. Since, no concrete benchmarks are available to judge the adequacy of actual research experiences, this study put forward a critical benchmark of 80%, building on established Mastery Learning literature (Zimmerman & Dibenedetto, 2008).

This high benchmark is based on the rationale that a sufficient level of research integration experience is critical towards developing new skills, trying to understand future research work, improving competence levels, or developing a sense of mastery based on self-referenced standards. The results of one sample t-tests, comparing above averages with the critical benchmark of 4,2/5 shows the average scores are consistently below par; though with small effect sizes ( $** = p < .01$ ): Reflection  $t = -9.8**$ ; Participation  $t = -10.0**$ ; Current Research  $t = -18.4**$ ; Motivation  $t = -7.7**$ ). The student values seem also to differ between universities and courses; but mostly in relation to Motivation and Reflection, and not in Current Research and Participation. A discussion of the results centres on differences in culture, competences and traditions in teaching intensive universities. The results also put forward an instructional design agenda for these institutions to move to Research-Based Education (RBE) in the context of Teaching and Research Nexus (TRN). The results can be used as benchmarks to direct strategic discussions in universities and specific courses/programs.



The limitations of the present study inspire new research involving larger samples, other programs and teachers as key actors next to students.

## 55. How do students learn through research?

**Katrin Rubel**

Academic education should enable students to achieve the optimum qualifications for their professional career. Given the increasing pace at which professional requirements are changing and the constant growth of complex societal problems, focusing exclusively on acquiring technical knowledge no longer seems adequate. Instead, what is required are skills that enable the individuals to have an open mind when facing questions and problems that can be methodically substantiated and processed following analysis in a systematic and interdisciplinary manner. The skills required for an analytical, methodical and systematic approach can be developed through the acquisition of cognitive, motivational and social research skills. According to the didactic discussion of research-based learning, academic skills can best be learned through independent academic work (Ludwig, 2014). For example, students should not find out about research methods merely by reading methodological manuals, but also by working independently on research questions. The student research process is supported by the teaching staff in a way that ensures, for example, that critical consideration of the choice and application of methods is possible to stimulating a learning approach to the research requirements. This didactic teaching approach also supports the learning process by enabling the students to contribute and follow up their own questions and learning interests.

Against the background of the learning theory that only the learners themselves can control their learning process, and third parties such as teachers are only capable of providing external stimulation and support (Holzkamp, 1993), the question is posed as to how do students structure their learning process in the teaching/learning-settings of research-based teaching. How do they succeed in appropriating the teaching subject as their learning matter and how do they experience the acquisition of professional skills?

These are the questions I explore in the BMBF-funded joint project “ForschenLernen”, a research project in support of the nationwide higher education development programme “Qualitätspakt Lehre“, of the BMBF. My aim is to reconstruct typical learning strategies and describe how research-based teaching can support or impede the learning process for students.

The chosen methodology of grounded theory (Strauss & Corbin, 1995) offers optimum openness for explorative investigation, using the inductive-deductive approach in the circular research process. I acquired my data through problem-centred interviews (Witzel 2000) with students from different universities and various Masters’

and Bachelor’ courses in the social sciences in the period from 2015 to 2016. The current interim results of my investigations show the relevance of an academic learning culture that is characterised by a questioning attitude as opposed to a scholastic learning culture dominated by rote learning. Only an academic learning approach seems to enable students to link studying with the development and processing of their own questions. Apart from the content-related and methodological requirements, collaboration in student research groups represents a key learning challenge. In heterogeneous working groups the focus is on the shared process of constructive mutual coordination. This is why the students have to open up to one another, acknowledge their diversity and exploit their specific skills for the joint research project. On the question of the outcome of a research project, the students are aware failure is always possible and they deal with this in a variety of ways. The task for teachers as mentors is to enable the students to learn from the process as they deal with situations of possible failure. Then, from the perspective of the learning process, it is possible to prevent failure and instead to create awareness-expanding stimuli. This glimpse of my research results shows that my presentation can enrich the discussion of research-based teaching, in particular its potentials.

Research-based teaching can only be successfully conceived if the learners’ perspectives are also considered. To this end, it is helpful to understand how students structure their learning process. Otherwise, there is the risk that teachers and students will pull in different directions. The aim should be to guide students into academic learning culture in a way that ensures that they search answers to their questions in order to grasp the complexity of each case. Insofar as the students’ own learning and working processes are continuously considered in the teaching/learning-settings of research-based teaching, research situations of irritation, uncertainty and frustration can be dealt with in a manner of learning. In this way, the students are enabled to develop learning and working strategies that also guarantee a research-based approach to complex problems in their specialisations later on. They can apply the methodological skills and specialist knowledge they acquired in their practical research work to develop solutions to problems.

## 56. The Secondary to University Transition: Skill awareness and its impacts on research-based education.

**Chad Harvey**

The motivation for this study, its design and analysis are part of a collaborative, pedagogical research study that has involved undergraduate students as active collaborators. It is an international study collecting student participant data from a university in Canada and a university in the UK. The results have international relevance and aim to facilitate student engagement and success in undergraduate, research-base education. The

transition from secondary school to university requires students adapt to many new experiences. This transition occurs with a level of difficulty for most students. There is a growing body of academic research identifying the importance of the secondary school to university transition, and its perceived ease or difficulty, on overall undergraduate student success. As aware instructors in higher education, it is of the utmost importance that we are aware of our students' perceptions regarding how well they think they are prepared for the academic rigours of university.

As evidenced by the rise in research-based education, higher education is transitioning to an era where facilitating students' academic skills are becoming as important as delivering content. With this transition, students' perceptions of their skill preparation is that much more important. First year undergraduates are aware of and expect an increased level of independence yet, tend to be less aware of an increased emphasis on skills versus content consumption, particularly in the light of increased academic load and decreased contact time with instructors. In research-based education the gap in skills may be that much more significant.

In an attempt to make curricula better targeted to facilitate first year student skills we need to be aware of which disciplines, assessment styles and academic skills students feel least prepared for upon entrance into university. With this information, we can better design our pedagogies to facilitate student proficiency in areas of perceived skill deficiency, which will lead to greater content understanding, greater engagement in content application (research) and enhance their overall first year student experience. Extension of this enhanced awareness could be used to facilitate better communication between university instructors and secondary school teachers to increase our overall awareness of student skill deficiencies and establish clearer criteria by which suitable students are defined.

We evaluate and compare the results from an online survey of first year undergraduate students enrolled in introductory science courses at McMaster University, Canada and the University of Leicester, UK. With this study, we sought to identify student perception for their preparedness in six different scientific disciplines, test taking skills and question styles, time management and writing and communication skills. With comparison between disciplines as well as more categorized types of skill, we can begin to clarify specific academic skill areas where today's students have general proficiencies and deficiencies upon transitioning to university. Further, with the inherent differences in secondary school logistics and university programme structures (e.g. general first year programmes in Canada v. direct entry courses in the UK) between Canada and the UK, more international comparisons can be communicated.

Preliminary results indicate perceived lack of preparedness in general written test answers and time balance, which is not surprising, but more pertinent students perceive a lack of preparedness in more research-oriented skills such as research statement generation, group collaboration and editing. Curiously, students perceived their preparedness for more physical based sciences greater than more biological sciences, countering an often-perceived trend.

## 57. Helping Researchers to become Effective Research-Based educators

### Beth Beckmann

Since the Boyer Commission on Educating Undergraduates in the Research University (1998) reported the failure of universities to develop an adequately research-literate citizenry, there has been much discussion about research-led education (e.g. Healey, 2005; Healey & Jenkins, 2009; Brew, 2012). The need for science undergraduates especially to have evidence-based, authentic and research-led teaching is still urgent (Bradforth, 2015; Waldrop, 2015). Yet without effective professional development in relation to teaching skills and pedagogical principles, many researchers involved in teaching at a research-intensive university still think that research-based education means telling students about cutting-edge research. At the Australian National University (ANU), research-based education is a feature of all courses, with every course required to identify its research-led activities as part of approval and review processes. Engaging staff in professional development about the breadth and depth of research-based education, using concepts such as Healey's Framework and the Research Skill Development Framework, has been a feature of academic development at ANU for some years. This paper will describe three diverse case studies—in first, second and third year undergraduate courses in biological sciences—where research-based activities have successfully been used to involve students in research. These case studies—alongside examples from other disciplines—will be used to identify some key features of working with academics to involve students effectively in research.

The first case study presents a first year human biology course which introduced inquiry-based learning through involvement in the Science and Maths Network of Australian University Educators (Beckman, Ferru and Beckmann, 2013). The second case-study introduced a highly interactive learning protocol in plant science lectures alongside a semester-long research project that required students to identify the genetics of a plant's mutations. These students became active researchers and many have become successful in producing a new generation of plant science researchers (Beckmann et al., 2015). The third case-study involves a third-year course that involved students in 'consultancy-style' field work for community groups that could otherwise not afford access to scientific advice about issues such as acid sulfate soils

or water management (Beavis and Beckmann, 2012). This course has recently added a new research dimension for its students, focused on researching the diversity of stakeholder perspectives in international water ethics.

After a brief description of the approaches and strategies of each case study, and illustrations of the measurable and diverse outcomes of success for both students and staff in all three, the paper will analyse the staff development strategies involved in achieving these successes. The underpinning development strategies included distributed leadership, capability building, cognitive partnership models, and iterative design-based research. There was a focus on confidence-building, and impacts on teaching self-efficacy, as all the researchers involved in this course heightened their engagement and understanding as educators, and have taken this knowledge into curriculum development.

### **58. Conceiving and delivering more integrated models of research based education: the role of the big research question**

**Maree O'Keefe**

Universities hold a long established and unique role in society, shaping the future through education and research. It is often the case though, that within universities, education and research are conducted within two distinct streams. While sensible from an operational and resourcing perspective, two worlds can exist, that of the learners and teachers, and that of the researchers. This duality has the potential to limit the future potential of universities to be a 'force for good' and have impact on contemporary global challenges.

In a rapidly changing world there is a pressing need to bring research and education together in a more aligned and connected fashion: to leverage synergies and expertise, to expand our understandings of the purpose of both education and research, and to create more integrated models of research based education.

In this presentation the challenges associated with conceiving and delivering more integrated models of research-based education will be examined through the lens of activity theory and expansive learning. Activity theory considers the various activities people engage in to achieve a particular purpose, the 'tools' that are used and the factors that act as facilitators of change. Together these comprise an activity system.

Within any activity system, unchallenged, unresolved tensions and barriers to change work to maintain the status quo. From the perspective of activity theory though it is exactly these tensions that can give energy to processes that propose and test new solutions. When the case for change becomes compelling new models are conceived and tested.

Frequently cited challenges or contradictions that

arise in attempting to bring research and education together include the relative inexperience of the student as researcher, the imperatives of grant writing and publication, time poor researchers and the need to develop research capabilities in students within the already crowded curriculum.

Two case studies will be discussed to illustrate how activity theory can provide a useful framework for planning and managing change.

The first case study will briefly describe an intervention to improve the management of student learning in a complex health service environment that illustrates the value of activity theory in understanding the key features of successful organisational change.

In a complex work setting such as a university, numerous activity systems coexist. Within this complexity, stable entities with meaning in more than one activity system are recognised as boundary objects. In the second case study the role of the research question as a boundary object will be explored.

To achieve a more integrated research-based education for students, learning outcomes should have direct relevance to contemporary real world challenges. The associated learning activities would then more clearly encompass development of research literacy and capabilities to enable the framing of new research questions with meaning and impact.

Researchers can assist in identifying global challenges and engaging in joint activities with students to develop big ideas and solutions to current wicked problems. In this way big research questions can function as boundary objects, having meaning in both research and educational contexts. Working through big questions can simultaneously develop student research skills, strengthen university research endeavours through greater connectedness to current major challenges, engage researchers in educational activities closely aligned to their skills and experiences, and enable students to becoming effective change agents.

### **59. Salient practices of UG research mentors – implications for the future of RB learning in Higher Education**

**Helen Walkington, E. Ackley, E. Hall, J. Shanahan and K. Stewart**

Ragins and Kram (2007) have described how mentoring has been reconceptualised from 'constellations of relationships' to 'developmental networks' (p.659). This re-thinking highlights an important aspect of the sustainability of mentoring undergraduate researchers in the future, the intentionality of mentoring as developmental, over and above the more instrumental aims to go through the process of completing a research project and disseminate the findings as a research



product. Ten salient mentor practices in the literature (Shanahan, et al., 2015) involve: planning to meet the diverse needs of students; setting clear and high expectations; scaffolding engagement with research methods and processes to build ownership, professional development and dissemination capabilities; developing a research community and providing emotional support; providing time for one to one mentoring; and creating opportunities for students to learn mentoring skills. Interviews with 32 award winning mentors in the US, Canada, UK and Australia reveal that these mentors believe UGR mentoring in the future will develop online mentoring e.g. through software platforms such as skype, for engagement in increasingly interdisciplinary research and the development of new collaborations through co-mentoring, via international networks and cross disciplinary teams, reflecting wider research trends. The importance of understanding effective mentoring practice will also be more significant, especially given that UGR is currently being used as an equality enhancing programme to address participation from under-represented groups, a practice likely to continue. With academic research needing to demonstrate ‘impact’ in communities more authentic ‘real world’ projects are likely to form the basis of student research too. Sowing the seeds for extra-curricular research activities will require much earlier curriculum embedding to prepare students. Some award winning mentors foresee a highly competitive future where published research at undergraduate level becomes a requirement for graduate school entry.

While one-to-one mentoring by a faculty member is associated with the highest impact for students (Kuh, 2008), the reality is that many students gain research experience under the mentorship of post-docs, graduate students, and more experienced undergraduate peers (e.g. Dolan & Johnson, 2009; Edgecomb et al., 2010; Edwards et al., 2011; Sloane, 2010). The use of this ‘peer / near peer’ mentoring approach can spread the benefits of immersive mentored research across a greater number of students and develop a student – led pedagogy. In order to maximise the number of students accessing this particular HIEP in the future, involving students seems to be part of a sustainable approach. The role of the peer mentor has evolved in some well-established university schemes from trying to replicate the role of a faculty mentor to one of a facilitator of scholarly thinking Sloane (2010). Walkington et al, (2016) highlighted the importance of student-led pedagogies in the development of transformational learning through Foucauldian ‘reciprocal elucidation’ in research dissemination. Managing the involvement of students in expanding research based education and democratising opportunities for mentored undergraduate research may become salient practices in the future.

## 60. Shaping H.E. through student-staff partnership in research, curriculum design, and pedagogic consultancy

**Beth Marquis, Emily Power and Melanie Yin**

Student-staff partnership in teaching and learning—including in research-based education—has recently been positioned as one of the fundamental issues shaping higher education in the 21st Century (Healey, Flint, & Harrington, 2014; 2016). Typically understood as a process wherein faculty and students collaborate actively on pedagogically-relevant activities ranging from curriculum design to pedagogical or disciplinary research, partnership has been heralded as providing a transformative agenda for higher education, laying the groundwork for radical revision that might make universities more democratic and equitable, while simultaneously enhancing learning and contributing to broader social goods (Cook-Sather, Bovill, & Felten, 2014; Cook-Sather & Felten, 2017; Matthews, Cook-Sather, & Healey, 2017). Amongst other things, for example, partnership has been understood to contribute to destabilizing the prevalent metaphor of students as consumers of their education, instead positioning staff and students as co-inquirers and co-producers with mutual (though not identical) responsibilities (Healey, Bovill, & Jenkins, 2015; McCulloch, 2009; Neary, 2014). Partnership opportunities have also been found to enhance learning and motivation for both faculty and students (Little et al., 2011; Mihans, Felten, & Long, 2008), to enrich the work being undertaken by virtue of bringing multiple perspectives to the table (McKinney et al., 2010), and to contribute to productive shifts in identity—including augmenting students’ sense of belonging to and recognition within scholarly communities and contexts (Cook-Sather & Alter, 2011; Cook-Sather & Luz, 2015; Moore-Cherry et al., 2016). In light of such benefits, student-faculty partnership certainly constitutes a ‘big idea’ with the potential to positively transform higher education for the future.

In spite of these potential benefits, however, scholars have also noted the challenges that can attach to student-staff partnership, not least of which are the uncertainties involved in navigating unfamiliar roles and inhospitable institutional cultures and the potential for resistance to arise (Bovill et al., 2016; Delpish et al., 2010; Marquis, Black, & Healey, 2017). Rather than idealize partnership, such work suggests, we need to acknowledge clearly the factors that militate against it (Levy, Little, & Whelan, 2011), and to engage actively in critical examination of the extent to which such initiatives meet their radical, transformative potential in practice (Allin, 2014; Kandiko Howson & Weller, 2016).

This presentation will present preliminary findings from research aiming to take up this imperative. In particular, we will share insights from an ongoing qualitative research project—designed and conducted by a faculty member and two students working in partnership—that

investigates the ways in which student-staff partnerships in research, curriculum design, and pedagogic consultancy might contribute to educational change. We draw on data collected from faculty, students, and educational developers participating in three streams of a student partnership program at a Canadian university: one stream focusing on partnership in designing/re-designing individual courses, one on partnership in the context of program-wide curriculum review and quality enhancement processes, and one on co-inquiry in pedagogical research. Each of these streams was supported by the central teaching and learning institute – both financially and via contributions from academic developers.

In order to assess the ways in which participants experience the process of partnering and the extent to which it affects their approaches to teaching, learning, research, and educational development, we conducted focus groups with these individuals at various points throughout their time working in the program, and invited them to complete responses to brief reflective prompts approximately once a month between these focus group sessions. We will present preliminary findings from this work, considering the data through the lens provided by the notion of partnership as a threshold concept (Cook-Sather, 2014; Cook-Sather & Luz, 2015; Marquis et al., 2016), and thus assessing the extent to which participants experience change that might be seen as difficult and uncertain but ultimately transformative. As an increasing number of institutions take up student-staff partnerships, data on how we can effectively design partnership programs to work around challenges and bring out programs' full potential for improving education, research, and personal transformation is becoming more relevant. Given these foci, the session will align tightly with the conference sub-themes of 'engaging students in research' and 'students as partners in curriculum change', while simultaneously exemplifying the process of student-staff research partnership via its team of co-authors.

## **61. Students as future-makers: using educational design thinking as a driver in students' design of and enquiry into higher education futures**

**Rikke Toft Nørgård, Clive Young and Nataša Perović**

The Innovating Pedagogy 2016 (Sharples et al, 2016) identifies 10 major trends that will shape education in the coming years. Amongst these are 'productive failure,' 'teachback,' 'design thinking,' 'learning from the crowd,' and 'learning from the future.' These trends emerge from the fact that higher education's organization, positioning in the world and inner life is rapidly changing in ways that transform the very mandate of the university and the roles of students and staff (UCL, 2016; CHEF, 2017). This calls for innovative pedagogies (Sharples et al, 2016), new conceptualizations of the university and its staff and

students (Peters & Besley, 2013; Besley & Peters, 2013; Barnett, 2012) as well as revitalizations of virtuous and academic citizenship (Nixon, 2008; Macfarlane, 2007), and students as partners in and participatory designers of the futures of higher education (Leat & Reid, 2012; Bland & Atweh, 2007; Fielding, 2001). Taken together, this point towards encouraging and engaging not just staff, but also students to reconceptualise higher education for the future through:

- interweaving practices of research and education (students as researchers),
- engaging with curricula and society (students as academic partners and citizens), and
- collaborating with fellow students, academic staff and partners beyond the campus (students in participatory academic collectives).

What we have elsewhere described as practices of 'academic citizenship' (Nørgård & Bengtson, 2016), 'opened education' (Nørgård & Paaskesen, 2016), and 'participatory academic communities' (Aaen & Nørgård, 2015). Here, these practices are brought together under the notion of educational design thinking, as a way of practicing design thinking (Nelson & Stolterman, 2012; Yelavich & Adams, 2014; Conole, 2013) at the university in proactive, critical-creative and constructionist ways of future-making. The paper demonstrates how design thinking can be utilised in workshops with students and staff to focus on the values and visions inherent in these reconceptualisations that enable new higher education futures. The workshops are developed and tried out in collaboration between UCL's ABC Workshop (Digital Education Team) and Aarhus University's Value-based Vision driven Educational Design Thinking Workshop (Center for Teaching Development & Digital media and Center for Higher Education Futures). The aim is to support staff and students in becoming their own future-makers and enable them to forge connections along the abovementioned dimensions – both as academic researchers, curricula designers, and collaborators beyond the campus. As such, educational design thinking invites students to become critical and constructive proponents of academic and public work and think around emerging issues within their disciplines, universities and education at large. Through the method of educational design thinking students work with the values, visions, activities and outcomes to design and carry out institutional change, curriculum design, learning processes and research practices. Educational design thinking envisions the university and the people within it as in the business of future-making as they work together to create lasting change and new futures. At the core of design thinking lies the realization that futures are not inevitable, they are made (Nelson & Stolterman, 2012)

Through fusing the abovementioned workshops from UCL and Aarhus University, the paper presents educational design thinking as a methodology to explore and experiment with higher education futures and

critically discuss which futures are good futures in relation to institutions, curricula, learning and research and how these dimensions are interweaved in students at the university to create higher education futures. Through a Design Based Research approach to education (Anderson & Shattuck, 2012; Cobb et al, 2003; Barab & Squire, 2004), the paper presents the workshop kit, structure, and process as well as central outcomes and insights coming out from the staff and students' work in the Value Workshop, Vision Workshop and ABC Workshop. More specifically:

- Future Institution Workshop: 1000 students, teachers and leaders involved in educational design thinking through the Vision Workshop and Value Workshop to create shared view on their institution
- Curriculum Design Workshop: Approximately 50 students from Aarhus University and UCL partake in the ABC Curriculum Workshop to design (parts of) their own curriculum and learning process
- Design-Based Research Workshop: More than 150 students from the MA courses ICT-Based Educational Design, Webcommunication, Entrepreneurship, and Game.Play.Design: ReThink have through the Value Workshop and Vision Workshop conceptualised design-based research projects that have real impact beyond the campus, as conference presentations, peer-reviewed research articles, academic poster exhibitions, business products or designs for societal change.

The workshops are running during 2016-2017 and continuously evaluated, reflected on, and iteratively redesigned to better achieve the purpose of supporting staff and students in becoming future-makers in their research practice, learning processes, curricula design, society engagements and academic citizenship. Drawing on processes, products and evaluations coming out of the workshops the paper will explore the potentials and possibilities of inviting students to become future-makers by reflecting on the following questions:

- How do we engage and work with the futures nested within students when they come to the university?
- How do we work together with students to create new higher education futures and engaged academic citizenship when they are at the university?
- And how do we give them the capacity to steer their own future as citizens in society in academic ways beyond the campus?

## **62. Bridging Disciplines - Research Based Education in Undergraduate Biophysics**

### **Daven Armoogum**

This presentation reports on an exciting student-staff collaborative project that embodies the principles of a connected curriculum via research-based education in Practical Physics. In this project, a team of third year students was tasked with designing a new Biophysics experiment for the second year undergraduate teaching laboratories in the department of Physics and Astronomy at UCL. The theme of the project was “Bridging

Disciplines – Biophysics in the Teaching Laboratory”. The UK funding council EPSRC describes Biophysics as “an important area of multidisciplinary research to the UK with a vital role in economic and societal developments”. However, in their International Review of Physics in 2005, the EPSRC panel observed that, “the majority of internationally viable biophysics research is not conducted in physics departments” and expressed concern that this would “limit the exposure of UK physics students to one of the fastest growing cross-disciplinary environments in modern physics.” Indeed, in the UCL Physics department, there is a dedicated Biophysics research group, and a Molecular Biophysics module is offered to MSci undergraduates. However, students had no practical exposure in this area due to the lack of Biophysics experiments in the undergraduate teaching labs. As the importance of interdisciplinary science grows, so the need for undergraduate exposure to these research fields becomes increasingly relevant. By creating a new experiment based on Biophysics, not only could the student team create connections across disciplines but would also enable future cohorts to do so. After conducting a thorough feasibility study and in consultation with teaching and research staff from the Biophysics Group, the student team chose to design an experiment based upon Brownian Motion of microspheres in solution. Thus, future student cohorts would gain a practical insight to stochastic processes so important to biophysical phenomena, at a level that complemented their existing lecture studies in Thermodynamics.

With team funding from UCL Changemakers, and equipment support from the Physics & Astronomy department, the project outcomes were met successfully. Not only did the student team design the experiment, but they also built a prototype and wrote supporting pedagogical documentation.

In December 2016, the experiment went “live” in the teaching laboratories, and was successfully conducted by second year undergraduates. Indeed, this experiment now forms part of the practical physics curriculum. In other words, future cohorts of undergraduates studying Physics, Medical Physics or Natural Sciences degrees at UCL now have the opportunity to benefit from an experiment designed and built by students for students.

Looking forward, perhaps the most defining aspect of this project is the manner in which it empowers and engages students with research. For the team of students involved in the project, this enabled them to become agents of change in the curriculum, whilst developing transferable expertise to take into their professional lives. For example, the research skills gained would be wholly applicable in postgraduate study, and indeed, at least half of the student team are either applying for, or are already enrolled upon, a postgraduate course.



In summary, this project has enabled students to enhance the learning experience for themselves and many cohorts to come, creating a tangible and enduring legacy that demonstrates the principles of research-based education.

### **63. Research-based Interdisciplinary Education: a course design process for balancing content and skills**

**Carolyn Eyles**

Science today is exploring complex interdisciplinary problems using powerful techniques that are changing and developing rapidly, yet scientists themselves are also under pressure to be able to explain their work in the most understandable and approachable of ways in order to communicate with diverse audiences. How can we prepare our students for a work environment that is challenging in so many different and unpredictable ways?

This is one of the questions that was faced eight years ago by the design team of the Honours Integrated Science Program, a four-year undergraduate degree with a focus on learning to research. Our course design process, which has underpinned the development of every aspect of the Program, has been refined and condensed since then, resulting in a method that is now being used for course design beyond the Program at McMaster. In parallel, we have also been evaluating the impact of our design choices via a longitudinal pedagogical study of the Program.

We first present the principles behind our design process, which we call “Research-based Interdisciplinary Education” (RIE), showing in particular how information literacy and communication skills are fundamental components of learning in this environment. RIE is based on a sequence of alignments that span from learning activity (class, course, module, program) objectives through to evaluation of efficacy. RIE prompts the relationships between the alignment areas to be fully addressed in the design process, and helps an instructional team to identify positive reinforcement feedback loops that can be exploited to deepen student learning and engagement while conserving instructional resources. In RIE, teaching and learning are not perceived as linear processes, but as the mutual construction of a complex network of activities joining learning and assessment, content and techniques, and reflection and communication into an integrated, efficient, research-based learning environment. As a result, acquisition of skills such as information literacy is fully integrated into a broad-ranging science curriculum.

RIE requires at least one type of evaluation to be part of the core pedagogical structure of each new activity. For an overview of our whole Program, we chose to perform a longitudinal study to gain a fuller and longer-term picture of students’ learning over and above that provided by grades, destination statistics, and standard course evaluations. We chose a broad question (are we preparing

our students well?) and have surveyed our student body annually for the past six years to investigate their attitudes. We also surveyed a comparative student body outside our Program. In the study, we focus on students’ responses to the pedagogical methods used, their insight into the value of skills acquired, and their perception of whether they feel adequately prepared for their next academic steps. We will illustrate the outcomes of our processes and design decisions as elucidated by the study.

Information and research skills are important across the full range of academic subjects, and we conclude by suggesting how our curriculum design process can provide a framework for planning many different types of courses and programs that need an integrated, flexible, rich, and efficient approach to balanced skills and content learning.

### **64. Using Problem-Based Learning to Teach Undergraduates in Medical Physics by Actively Engaging Students in Creating Research Proposals**

**Konstantin Lozhkin, Adam Gibson and Gary Royle**

#### **Purpose**

Problem-based learning (PBL) in small groups of students has been used as research-based education (RBE) for undergraduate teaching in medical physics. The goal is for students to actively engage in research methods and enquiry as an integral part of their studies, to integrate knowledge from different disciplines, to enhance students’ motivation and to teach professional skills. This paper discusses the wider implication of research-based PBL for higher education, some risks and benefits of PBL for students and tutors, as well as assessment methods for PBL.

#### **Method**

In problem-based learning, a small group of students decide for themselves what they need to study after discussing in depth some trigger material, such as a written real-life problem [1]. After a period of extensive self-study, they meet periodically to share, compare and relate what they found to the original problem. Finally each PBL group produces a portfolio, which is assessed by the tutors who also take into consideration the individual contributions of each student to the final group’s result.

#### **Results**

Problem-based learning in small groups of 5 to 6 was introduced into a medical physics course “Treatment with Ionizing Radiation” for 3rd and 4th year undergraduate students. The course is offered during one semester, with the first half of the course consisting of traditional lectures to cover the background physics and radiobiology, while the second half is an intense research-based PBL project. Class sizes for the course are typically 30 -35, and we have now offered this PBL course 8 times, teaching about 250 students. Each PBL group is given a different

engaging problem to study during a 4 week period at the end of the semester. The trigger material for each group, that we offer now, is a letter from an imaginary Head of Medical Physics Department asking to provide a Science Case for a research grant application to an imaginary Research Council to compare two methods of treatment of cancer a of specific organ with ionizing radiation: a novel research method and a traditionally used method of radiotherapy. Each of the 5 – 6 PBL groups consists of a mixture of students from different disciplines including medicine, medical physics, engineering and natural sciences, who together bring substantial prior knowledge of medicine and physics needed for the given task, which is important for the PBL method. PBL tutorials are given to students twice a week to facilitate the problem-based learning process, with no ready answers given to students by the tutors. Each PBL group finally presents a portfolio of collective work (a 2000 - 2500 word Science Case for a research grant application), supported by references to scientific publications, radiation dose calculations and estimation of the costs of the proposed research.

The assessment of the PBL project is done by a portfolio of collective work (60% of the mark) and by a 300 -500 word individual student's report reflecting on his/her contribution to the collective work (40% of the mark). Students of each group also fill peer-assessment forms which are used to justify the mark when in doubt. For authentication of assessment, each group makes a 15-minute oral presentation with the aid of slides to all other PBL groups about the studied problem and their research proposal.

## Conclusion

It has been gratifying to see that research-based PBL leads to improved learning, and that students are satisfied with the PBL process and enjoy it, as their reports show. Conflicts within PBL groups are very rare (only one minor conflict in 8 years is worth noting). Most of the students are very committed to the PBL, some volunteering to take more tasks and responsibility, as they acquire a fundamentally correct grasp of what research is about and how research proposals are prepared. The students benefit from the final presentations of their research proposals, which they do very professionally. As is always the case with PBL assessment [1], PBL portfolios and individual student's contributions are difficult to mark objectively.

On the whole, teaching students using research-based PBL is an excellent way of introducing them to the research methods of science.

## 65. What can students and staff learn from engaging in dialogue about research?

**Nicholas Grindle**

*Please check the App for this abstract.*

## 66. “Post truth,” “alternative facts,” and the importance of research education: students as partners in curriculum design in an American Literature course.

**Joy McEntee, Stephen Abram, Jake Brown, Tamika Glouftsis, Georgia Hick and Sean Nunan**

One of the global challenges we face today is that we live “post-truth,” seen nowhere more clearly than in the Presidential campaign of Donald Trump. The President now tweets, and without particular care. How can we equip students to operate in such a world? Research education may be one of the ways. Engagement with research develops powers of critical thinking, builds independence of thought, and moves students away from a culture of simply accepting what they are told by complex, immersive and increasingly social media. This is one of the opportunities currently offered by research education.

But at the same time research-intensive universities face problems. One of them is the changing nature of twenty-first century employment. As Dawn Bennett et al point out, there is often a perceived tension between research-focussed education and education for employability, between learning disciplinary content and learning transferable skills. Yet key skills the World Economic Forum report *The Future of Jobs* identifies as critical to future employment – complex problem solving, critical thinking, judgement and decision making, and cognitive flexibility – are all hallmarks of research education. However, communicating the worldly usefulness of research intensive education into the context of modern employability still presents a challenge.

This tension is felt acutely in the Liberal Arts, and this paper reports on the development of a course that seeks to address these issues. It outlines how research-based education was incorporated in the development of an undergraduate course on American Literature within a Bachelor of Arts in a research-intensive university.

Independent and collaborative student research activity underpinned the course development process. Five students were employed as researchers and consultants in late 2016. The team represented a cross-section of disciplinary approaches, incorporating historical, educational, and literary perspectives, as well as perspectives informed by popular culture and the technologies of social media. The students met with the course coordinator in 6 x 2 hour workshops, and additionally conducted 8 hours of independent research. This approach was informed by Mick Healey's work on students as partners in the development of curriculum. These students provided their perspectives on learning outcomes and course content, as well as teaching methodologies and practices that they had previously found effective throughout their studies. They also had input into assessment approaches, researched teaching methods, suggested novel student-centred evaluation

mechanisms for the course. The student collaborators functioned in a flexible and iterative manner, exemplifying the dynamic, democratic, and creative process of research and course development. Overall, this process offered a more robust and rigorous way of incorporating student feedback than was offered by other measures, such as surveys of student satisfaction. Finally, the student collaborators co-wrote this paper.

So what informed the design of the course itself? The student partners were keen that students who enrolled in the course should become active in their own research education. Steps were taken to ensure that they would have the opportunity to actively contribute to the curriculum, creating a genuine academic dialogue in which students would be valued contributors. Special emphasis was placed on the need for meaningful, stimulating assessment tasks, particularly those that connect to the wider community and employability. Another factor making the course relevant to students' real world concerns was the linking of course content to contemporary issues. The first week, for example, engages with debates about the American discourse of nation in the wake of recent developments in the Presidency. In summary, this paper describes a course development process involving collaboration with students. The process, and the paper, address several key concerns in research education now, including articulating the worldly use-value of research both in terms of helping students to navigate the increasingly complex media world, and the fluid world of contemporary and future employment.

## **67. Understanding and Teaching Different Types of Legal Research – Differentiation and Balance**

### **Graham Ferris**

“And in general it is a sign of the man who knows and of the man who does not know, that the former can teach, and therefore we think art more truly knowledge than experience is; for artists can teach, and men of mere experience cannot.” Aristotle, *Metaphysics* 981b 5-10 (tr W D Ross)

“Teaching necessarily begins with a teacher's understanding of what is to be learned and how it is to be taught.” Lee S Shulman, ‘Knowledge and Teaching: Foundations of the new reform’ in *Teaching as Community Property* (Jossey-Bass 2004) 92

The focus of this paper is academic legal education (LLB, LLM, and PhD), although it is likely it illustrates issues that arise in other disciplines (e.g. Griffiths).

The argument is that in law at least research is not a unitary activity but several types of activities (Hutchinson and Duncan). Because understanding of what is taught is fundamental to design and delivery of teaching, articulation of the commonalities of, and differences between, research practices is a necessary preliminary to creating good research based education in University (Aristotle; Shulman).

Research is not a single type of activity in law. There is research for professional purposes, and research for academic purposes. Although one can identify distinct paradigms there is no obvious way to distinguish qualitatively the activities that comprise the two types of research.

Professional research is motivated by client need, so it is driven by a teleological imperative, one starts with a desirable conclusion and works from that point upon justification within the constraints of legal practices. At its most basic it may be checking that a client activity can be carried out without risk of criminal sanction. At its most sophisticated it may be construction of an argument founded in the legitimate functions of an area of law that leads to a specific interpretation or even rejection of legal sources.

Academic research is motivated by teaching needs and pursuit of understanding and reformist purposes. As such it is far less teleological, or non-teleological, and not constructed from a conclusion to a justification but is more open ended. At its most simple it is driven by a descriptive aim (although description without interpretation swiftly becomes impossible). At its most sophisticated it might involve synthesis or analysis informed by other legal systems, social science, or the humanities (Doherty and Leighton; Hoecke; Watkins). An example of a hybrid is research in pursuit of law reform purposes which has characteristics typical of both professional and academic research.

Professional research may be incorporated into the curriculum via clinical education for real clients or mooting. Policy clinics might involve students in law reform focussed research. Academic research may be modelled through research training and practice by embedding a keystone dissertation in the curriculum.

One specific problem for law is how to approach the relationships and balance between these different types of research. Our meta-discourse is underdeveloped, and there is little explicit consensus within the discipline on the relationships between these different types of research. All three encompass central practices or understandings – such as the importance of the status of sources as primary legal sources and commentary, the recognition of the authority hierarchies of the legal system, the existence of some functional independence of legal institutions, and the centrality of close reasoning based upon the actual words used in legal sources. However, the differences are fundamental yet subtle (so difficult to make real for neophyte researchers). The teleological nature of professional research is opposed to the inquiry led foundation of academic research. The importance and appropriateness of evaluative frame taken from non-law sources is very different. The appropriate form of expression is different.



Therefore, it is argued that recognition of these different types of research is a necessary stage in incorporating them within legal curricula, and that failure to distinguish them will lead to confusion of educational intent in design, and in student attempts to assimilate and understand the curriculum content in practice.

## **68. Designing a framework for campus-wide development of inquiry skills**

### **Corinne Lavery**

In a world of ubiquitous data and fake news, the ability to pose critical questions, to examine issues using reliable information, and to reflect on our own confirmation biases, has never been more important.

Queen's University in Kingston, Ontario, Canada is creating a strategic framework to bring a holistic approach to inquiry and research (terms we use interchangeably) across the undergraduate curriculum. Although the institution offers some extra-curricular undergraduate research opportunities, we wanted to build inquiry skills throughout every academic program so all students graduate with these foundational abilities. Following the pioneering work of McMaster University (Justice et al., 2009), we began a multi-phase process with a vision of embedding inquiry across the curriculum.

An environmental scan of research-intensive courses across disciplines revealed the many interpretations of inquiry: capstone/design, problem-based learning, external experiential learning (e.g. fieldwork), internal experiential learning (e.g. labs, tutorials), research-driven projects (answering questions), practicum/exchange, self-directed learning, and case-based learning. We thus conclude that inquiry takes many forms and is described differently across the disciplines at Queen's University.

In completing the environmental scan, we forged a definition of undergraduate inquiry that incorporates many of the central ideas of inquiry that are articulated across academic departments. We therefore describe inquiry as a dynamic, iterative, and developmental process whereby students engage in asking and researching questions of interest as they build and strengthen inquiry skills and work towards disseminating their work.

While inquiry appears in parts of all program curricula, it has not been necessarily and intentionally developed nor explicitly named or mapped. Students may not realize the value of developing these skills or be able to name them and faculty may not consider how they are being developed over a four-year degree. Consequently, our second step towards a holistic approach to inquiry was to explore the student perspective.

A survey and follow-up focus groups of our undergraduates revealed other needed supports for a programmatic inquiry framework. Of the 437

students who completed the questionnaire 36.8% had experienced inquiry assignments (n=161/437). Of those with this experience, 76.4% had it in a required course (n=120/161) while 9.6% (n=3/157) had experienced it as an undergraduate thesis and 1.9% (n=3/157) had completed a summer research fellowship.

Students who completed inquiry-based assignments reported they were valuable in supporting future projects and research (90%; n=122/136) and also valuable for their own selfdevelopment (88%; n=120/136). 302 students reported that they had not had inquiry-related experiences with the most frequent reason being that no research assignments were part of their coursework (63.6%; n=192/302).

Students who experienced inquiry-based assignments reported that they helped them to develop a wide range of research, writing, and presentation skills. The research skills included developing research questions, identifying sources, collecting and analysing information, and evaluating and organizing sources. The writing skills included communication, editing, and citation skills to preparing a research proposal, reviewing the literature, and planning an essay. However, students expressed the desire for more support to develop these skills, and very few have had the opportunity to do so except within their course work.

Given this student perspective and Queen's goal that all students have opportunities to develop research and inquiry skills, a Working Group consisting of educators, librarians, students, and staff engaged in inquiry, was tasked with developing an institutional framework for inquiry.

The Working Group is in the process of describing a framework of desired outcomes and the action strategies necessary to achieve them within the Queen's context using a Theory of Change model (Laing & Todd, 2015). We will: -Define inquiry in a way that includes all disciplines within the Queen's context -Map inquiry initiatives already existing within programs and clarify inquiry pathways for students on departmental and career websites -Create clusters of online generic research skill courses available to all undergraduates -Identify mechanisms for assessing desired learning outcomes for Queen's undergraduate programs, within a researcher skill development framework such as that of Willison & O'Regan (2015) -Expand the annual Inquiry@Queen's Undergraduate Research Conference now in its 11th year.

In addition, we will develop and enhance support services for educators, students, and departments including: an educational development series on inquiry-based learning for educators; workshops for Teaching Assistants as inquiry and research skill mentors; creating instructor resources on inquiry in the classroom; and other student resources on inquiry and research skills as needed.

## **69. Community impact through capstone undergraduate research: Ingenuity at Adelaide**

**Bernadette Foley, Louise O'Reilly and Benjamin Cazzolato**

Accredited professional level engineering undergraduate programs in Australia are structured as embedded honours degrees and are a pathway to research and further learning. These programs have staged research experiences with the highlight being a capstone research project. The projects afford students, and their supervisors, with the benefits of real world research based education. The projects can also present as an opportunity to engage with local and global communities through showcase events and related activities. This discussion uses a case study from the University of Adelaide to highlight these engagement opportunities, their impact, and their implications.

Showcase events for engineering projects can be seen across the world, ranging from small scale discipline events to multidisciplinary public events. The University of Adelaide's event started in the mid-1990s with MechExpo, a discipline based event for Mechanical Engineering with approximately 40 projects and 100 students. This has now been transformed into Ingenuity, a multidisciplinary initiative which culminates into a one and half day event with up to 280 projects, 700 student exhibitors and over 5,000 visitors.

The initiative is a celebration showcase of academic achievement, and a demonstration of critical professional attributes. It provides an opportunity for students to further develop their communication skills, and network with Industry. However, it is the identified positive community impacts which have provided the strategic direction for the initiative. These impacts relate to the development of sustainable partnerships, increasing awareness of Science, Technology, Engineering and Mathematics (STEM) career pathways, and demonstrating the influence undergraduate research can have on global challenges.

Ingenuity partners with industry, schools and the government. Representatives from these partnerships are members of a reference group, providing feedback and direction. Industry partnerships range from industry inspired research projects, to industry sponsored research, to assessment/judging of research, and finally, sponsorship of Ingenuity. Many partnerships are now ongoing and have integrated the partners into the University community.

School partnerships have seen both metropolitan and regional teachers actively embrace the opportunity to increase the awareness STEM amongst their students. These partnerships have also resulted in the development of activities and teaching resources for use in the classroom. The 2016 event saw 2,300 high school and 1,000 primary school minds interacting with research

based STEM.

Government partnerships continue to grow with purposeful links to key objectives in the Australian National Science and Innovation Agenda, addressing both state and national priorities. These partnerships see State ministers and advisors attending the event to experience first-hand the outcomes of the showcased research. In 2016 this led to the initiative being discussed in State parliament. Local Government partnerships have also enabled the event to be inclusive and accessible to underrepresented low SES and indigenous school students, with specific programs developed in these areas.

Demonstrating the influence of undergraduate research on local and global challenges has been a long-term goal for Ingenuity. It has seen the emphasis and format of the event change from a discipline based showcase of discrete research outcomes to a more sustainable initiative which is multidiscipline and theme based. This has enabled visitors to focus on the outcomes while appreciating the diverse and complex disciplinary inputs required to address themes such as energy and smart systems. Ingenuity now encompasses all engineering disciplines offered plus computer science and mathematical sciences. The event includes all student projects undertaken in a given year and therefore a spectrum of projects and levels of success can be seen. This has created an environment which demonstrates the genuine, achievable and diverse nature of undergraduate research. Consideration is being given to including additional disciplines to create a yearly program to further show the depth and breadth of the possibilities that studying STEM presents.

The initiative has become a sustainable engagement opportunity. It includes smaller scale outreach and events with key partners, a digital library of videos, stories and activities, social media and a phone APP. The digital engagement enables community interaction in the lead up to the event as well as during the event. A direction of the initiative is to increase the digital resources and activity, to broaden its accessibility.

Ingenuity has demonstrated the reach and influence undergraduate research can have when opportunities are provided for engagement with wider communities. The culmination of research skill development and student learning is central. However, the addition of authentic and reciprocal partnerships has enabled a significant marketing opportunity to become a community initiative. Ingenuity is valued by students, the University, Industry, Government, Schools and the general community.

## **70. Uncovering evidence of research and enquiry in undergraduate programmes**

**Catherine O'Mahony and Aonghus Sugrue**

Efforts to integrate research, teaching and learning are shown to most impactful when focussed on the engagement of students in authentic enquiry (Kuh, 2008),

also known as research based learning. This paper details an approach taken to uncover evidence of research-oriented and research-based teaching in undergraduate programmes at a research-intensive University. The purpose of this review is twofold. The first is to gather data that will form a baseline against which to measure the success of institutional wide efforts to engage students in research-based learning throughout their undergraduate studies, to articulate relevant KPIs, and to create an automated approach to gather this evidence. The second is to spark discussion amongst staff about research-based learning, disciplinary approaches to and definitions of research and enquiry, and the scaffolds required to embed research in the undergraduate curriculum.

The initial desk based review led to the development of a key word search which was manually applied in a review of programme learning outcomes and automatically applied in a review of module learning outcomes. The findings from this review will be shared along with considerations on the limitations of this approach, suggested solutions on how to mitigate against these and proposed next steps for the project.

## **71. Research Integrity & Governance (RIG): The evolution of a new module**

**Adam Liston, Susan Kerrison, Tarek Yousry and Caroline Selai**

The MSc in Advanced Neuroimaging (MSc ANI) was launched at the UCL Institute of Neurology in 2008. Teaching staff and students are from a range of disciplines, reflecting those found in Research Groups with a Clinical Neuroimaging focus – these include clinicians, radiographers, neuroscientists and natural scientists.

A Distance Learning version of the MSc ANI was launched in January 2015. This can be completed over a period of up to five years and its flexibility helps recruitment from practicing clinicians, who can afford only limited annual study leave, and from international students. The latter group may not wish to take a whole year abroad but might find attractive the opportunity this mode offers to spend one to three months based in London attached to a research group here while carrying out part of their 60-credit Neuroimaging Research Project.

Our most recent development is to offer an MRes route (MRes ANI) on which three students are currently enrolled. This involves the completion of an extended Neuroimaging Research Project (worth 120 credits), and four 15-credit taught modules, two subject-specific (chosen from the six offered on the MSc ANI) and two addressing Research Methods.

Only one Research Methods module already existed at the UCL Institute of Neurology, with a focus on Critical

Appraisal training and transferable skills. We were required to develop a further Research Methods module to complete the programme and decided to incorporate several pre-existing strands of compulsory training for UCL researchers to create one entitled “Research Integrity and Governance”. With the involvement of other departments and divisions there is an appetite in the Faculty to offer this in future as a standard module integrated into all relevant postgraduate degrees.

It contains training on 1) Good Research Practice; 2) Research Ethics; 3) Patient Consent & Safety; 4) The Human Tissue Act; 5) The Mental Capacity Act; 6) Reproducibility & Standardisation and 7) Information Governance.

Our delivery methods include the use of some online resources, lectures and some highly interactive face-to-face sessions discussing various relevant legislation and research scenarios. Students are asked to produce some short written reflections on these and to make presentations demonstrating their awareness and understanding of the implications of research integrity and governance for their chosen Research Project.

Our three current students are from the UK, EU and Canada. They have already asked about how our teaching on legislation will translate to their future research practice outside the UK. It doesn't necessarily seem practical to study and compare legislation from different parts of the world but we would encourage students to explore this if they intend to practice abroad. Later in the module we will at least discuss ‘Reproducibility and Standardisation in Neuroimaging Research’ clearly an international notion. We will ask students to compare one paper pre- and one paper post-‘standardisation’. We would also like to open up some of our sessions to our MSc students and to other, more senior UCL neuroimaging researchers, so that they also can highlight current issues and trends and share their experiences, in the UK and abroad, alongside our MRes ANI students. We are confident that our students will enjoy and benefit from the module and are also very much looking forward to the feedback we receive from our first cohort about its strengths and weaknesses.

## **72. Addressing the challenges of research-based education in one-year graduate Masters programmes**

**Jennifer Griffiths**

Much work has been carried out to embed research-based education into undergraduate teaching. Many undergraduate programmes now have through-lines of research, dialogue, reflection and skills development across the entire programme, and the typical 3-4 year length of programmes allows adequate time for student reflection, project-based learning, and for students to build relationships within departments and their cohorts. Within the UK Russell Group, it is also the case that the



majority of undergraduate students are at a similar point in their life-experience and have values and expectations shaped by the UK education system. By contrast, one-year Masters programmes are often taken as either a full year of intensive study or two years of part-time study alongside a busy career. It is more difficult for students to find the time to build relationships or reflect upon their educational journey. The short timeline also makes it more challenging to introduce through-lines within a programme, and the need for an 'individual' research project can reduce the emphasis on more workplace-oriented group work. Masters student cohorts may be more diverse than undergraduate cohorts, with a broader range of academic training and life-experience. This means that it is more challenging to implement research-based and workplace-based education within these programmes, but there are also unique opportunities afforded by the intensive, immersive nature of programmes and the diverse cohort. Learning can be quickly put into practice, and the opportunity for genuine peer-to-peer dialogue and co-learning between university academics and a cohort with workplace experience can be valuable in the evolution of Masters programmes and beyond.

This paper will discuss current models of research-based education at postgraduate Masters level. I will show examples of practice, and consider whether they have been a success by examining the students' engagement, satisfaction, and self-awareness of their strengths, their community and the wider-world implications of their work. Have they progressed from being passive learners to becoming authentic researchers in their own right?

This work will inform models of pedagogy, curricula and engagement techniques for Masters programmes that will enable students to gain the knowledge and skills that they need for their futures, and to become active partners in their own learning both during their time at university and into their careers.

### **73. Teaching and Learning in Libraries – a snapshot in time and a look forward**

**John MacLachlan, Jodi Reeves Eyre and Christa Williford**

Through examination of the essays of past and current Council for Libraries and Information Resources (CLIR) postdoctoral fellows, due to be published in September 2017, this paper will explore questions and initiatives related to Scholarship of Teaching and Learning in academic libraries. The essays are compiled through the use of a Collaborative Writing Group (CWG) methodology where library professionals, faculty members and students with varied backgrounds are brought together to tackle a specific topic of interest. This collection of essays is being compiled as a follow up to the successful volume 'The Process of Discovery: The CLIR Postdoctoral Fellowship Program and the Future of the Academy.' A brief discussion of the process necessary to

bring together the writing team will act as a preamble to the more topical discussion.

Throughout the process of compiling the essays common themes begin to emerge such as: Are antiquated definitions/concepts of what libraries are supposed to be creating roadblocks; and Are we at the point where it is time to radically rethink budgeting and resources for libraries? These themes, among others, will be explored through examples and questions raised within the six essays, representing 24 authors, that make up the body of the report:

1) Library Space: An exploration of both how library space has changed throughout time and how it may evolve moving forward. What are the key questions that need to be asked? Have the needs to undergraduate students changed drastically?

2) Librarians as Teachers: Why, in a general sense, are faculty not more involved in the librarian/faculty partnership necessary to successfully teach Information Literacy? What are some of the roadblocks that inhibit this collaboration and how should it look moving forward?

3) Libraries and Digital Humanities: The definition of Digital Humanities can be difficult enough but add in the complication of how it is used and defined at varying institutions and it can get even more complicated. How can understanding the different approaches, challenges and solutions to teaching digital humanities assist libraries to effectively prepare for changes in teaching practices?

4) Geospatial Spatial in Libraries: By compiling points of view from numerous uses of geospatial data at McMaster University, including faculty, staff and students, a picture of the value of geospatial information at an institutional level while acknowledging the numerous challenges involved with housing it centrally.

5) Special Collections: How are special collections used by a University? Through a look at detailed case studies the future of special collections is questioned as a pedagogical resource.

6) All the new 'Shiny Things': In a time when libraries are putting more and more resources towards things such as 3D printing the question of 'What are we getting out of it?' is an important one. Are students just making 3D cartoon characters because it is fun to do or are there real pedagogical linkages? Wouldn't it be fun to have plans on how to make an axe with proportions linked to a specific time-period with a 3D printer?

The broad range of essay topics generates an interesting conversation when pulling together common themes and deductions. This paper will emphasis those themes while bringing the audience through the process of how they were obtained.

## 74. How to Teach Interdisciplinary Knowledge Translation in a Health Faculty

**Alison Kitson, Richard Wiechula, David P. Wilson, Gill Harvey, Rebekah O'Shea, Alan Brooks**

### Introduction

Translation Science Research focuses on improving the timely adoption of evidence based practice for community benefit. Project objectives were to evaluate the effectiveness of the Small Group Discovery Experience (a distinct approach to researcher-led tutorials within the University of Adelaide) to teach the basic principles of translational research and to explore strategies to improve knowledge translation.

### Approach

A pre-class video (evidence around effective hand washing) set in a real world context was used to explain the context and challenges of implementing recognised best clinical practice. Students (invited from medicine, dentistry, psychology, public health and nursing programs) completed a knowledge evaluation quiz before and after viewing the pre-class video. During the first face-to-face session clarification was provided for any misconceptions that were identified from the online quiz. During the face-to-face session groups of students were given an authentic problem and a rubric that defined a set of questions to guide them in generating a strategy to improve a translational outcome. Groups made use of a spokesperson to share group outcome with the class. In the final session, with the help of a second defined rubric, small groups were tasked with refining their strategy and solution to the problem. Students were examined to evaluate both knowledge gained and the ability to apply this knowledge.

### Outcomes

The pre-learning quiz identified students had a limited understanding of what translational science was or its goals. Post learning evaluation indicated vast improvements in knowledge with strong evidence of retention and some ability to apply the knowledge to new challenges. SELT (Student Evaluation of Learning and Teaching) evaluation identified strong levels of student engagement and the use of defined rubrics encouraged effective interdisciplinary group dynamics.

### Conclusions

Using video narrative, learning checkpoints and well-structured rubrics to guide a group solution to an authentic problem was an effective learning mode, providing students with real world engagement and job ready plus skills. This pilot is being scaled up to include more KT topics.

## 75. Critical Global Education

**Maureen Ellis**

This paper is based on an Unconditional Pass PhD at UCL-IOE (2013) and the Routledge publication of 'The Critical Global Educator: Global Citizenship Education as Sustainable Development'. Treating research as intrinsic to the natural human search for meaning, it argues that current global conflict can only be addressed if the semiotic trinity or semantic triangle (Peirce, 1955) at the heart of a Classical education is no longer simply offered to the elite (Bernstein, 1996), but treated as the right of every citizen in any professed democracy. Aristotelian phronesis, moral education, civic participation, political engagement, are essential to (w) holistic education. Global citizenship, learning for life, life-long learning are no mere slogans, but logos, symbolic exchange which is vital to sustainable development. A Jungian (1933) mandala presents critical theory, socio-, psycho-, neuro- and cognitive linguistic justification.

Higher Education bears significant responsibility for theorising passion, for 'en-theos-iastic' global education which expands critical ethnography to sociology and theological anthropology. Critical global educators appreciate that 'Language is not a neutral medium... it is... overpopulated with the intentions of others. Expropriating it, forcing it to submit to one's own intentions and accents, is a difficult and complicated process' (Bakhtin, 1991: 294).

Advocating an Applied Linguistic, depth hermeneutic the paper will argue that education embodies individual/collective, centrifugal/centripetal, educere/educare dialectical materialism, enabling geosemiotic voice and vocation across disciplines, regions and cultures. Halliday's (2009) Systemic Functional Linguistics, itself sustained by Wittgenstein's (1953) disciplinary 'grammars' and 'vocabularies' and his assertion that, 'The limits of my language mean the limits of my world' (1922/2010: 5.6) anchor Critical Realism's systemic ontology, relativist epistemology and moral judgemental axiology.

'The scope and range of the negative impacts of university-educated people on the natural systems that sustain Earth are unprecedented,' (Corcoran and Wals, 2004:3). Reading the wor(l)d beyond the word means identifying genre, determining sub-genre and hybridity, deliberating critical criteria. Recognising the multiple modes which obscure global 'commonwealth', cognitive behaviourists distinguish material, sensorial, spatio-temporal and symbolic modes i.e. humanity's multiple ways of being, having and doing. Like a blind man's probes (Polanyi, 1966), evolutionary psychologists scrutinise material, sensorial, spatio-temporal and symbolic evidence (Toulmin, 1969) across diverse Discourses. Political literacy is the process of moving from the literal to the literary within and across diverse systems of knowledge. Explicit discussion of values and shared assumptions which frequently underly taken-for-granted

presuppositions generate detailed discrimination within each domain.

No longer considered mere literary flourish but as intrinsic cognitive device, ideology linking word to image, token to vehicle, metaphors address imagination, reflecting and revealing habitus (Bourdieu, 1998). Cognitive metaphor theory reveals metaphoric, metaphysical, non-literal, figurative representation as crucial to language and thought. To be literal is not the same as being literate. A novice to the digital world will assume a 'mouse' is a furry rodent until made aware of its metaphoric use, able to metaphorically claim, 'I see your meaning; I follow you'. Scientists who accept 'string' theory, Maxwell's Demon, waves and fields; economists predicting 'rising' and 'falling' prices in a common 'market'; medics advising on the 'battle' against cancer may yet need convincing of metareality and the value of researching metaphors within their disciplines!

Reading life itself as metaphoric narrative, self-critical ecolinguists (Bowers, 2011) challenge 'root metaphors' of individualism, anthropocentrism, unflinching convictions of economic progress. Metaphoric modelling scrutinises semantic adequacy, appropriacy, revealing afresh the cancer of urbanisation, the asphyxiation of debt burden, the blood poisoning of chemical pollution and the lunacy of consumerism (Jackson, 2008). Subalterns inserting idiolect and dialect into public and disciplinary Discourses (Foucault, 1972), challenging languages in action, refresh schema, perspective and world view. Recent controversy over a 'flood of migrants' raised public awareness of the power of metaphor; fresh metaphors (Semino, 2008) allow for new ways of addressing global pain. Research which analyses 'class' conver(t)sations, appreciates daily transformations, and values metaphoric conversions promises powerful tools for social justice, diversity, human rights, and sustainable development.

Engeström's (1987) Cultural Historical Activity Theory (CHAT) provides educators with a framework for self- and negotiated evaluation as critical global educators. Surveys, focus groups and semi-structured interviews involved over 500 teachers, teacher educators, International NGO administrators and academics from Britain and overseas. Interview data traced personal transformative learning through professional transaction to political transformation which addressed the political economy and cultural politics of their disciplines. Findings demonstrated Critical Discourse theory, analysis and application which incorporated transdisciplinary methodology and practical methods, integrity which merges formal, non-formal and informal learning at every (st)age in life. Disciples introduced to the big picture, to sustainable development goals and heteroglossic discourses of powerful international organisations, used educational technology to relate curriculum beyond campus to community. Multimedia, multimodal research, project work, simulations, case-study and Service learning

fed political literacy. Community products and funding aligned to explicit impact measurement fostered public engagement with research and research engagement with society. Critical global education successfully enlarged consciousness beyond the economy to ecology, conscience and consilience (Wilson, 1998).

## **76. A Connected Curriculum for Higher Education: the case for a Showcase Portfolio**

### **Dilly Fung**

Is it time for the higher education sector globally to take a more 'joined up' approach to its mission? Can institutions make much richer connections between research, student education and public engagement? Drawing on the classic Humboldtian notion of the unity of research and teaching, this paper introduces the Connected Curriculum initiative (Fung 2017), which sets out to develop better synergies between research, education, public engagement and contribution to the world. It then draws on a number of case studies of practice around the world to examine one curriculum feature that has the potential to empower students to make holistic connections: the curated, programme-wide Showcase Portfolio (Fung 2017; Clarke and Boud 2017) The Connected Curriculum approach, adopted by University College London as part of its Education Strategy 2016-2021 (UCL 2016a, UCL 2016b), is underpinned by the tenets of philosophical hermeneutics: that through dialogue and a willingness to be open to the perspectives of others, human beings in all their diversity can come into better shared understandings (Gadamer 2004; Fairfield 2012). It aims to move away from the customary split in practice between a university's research and its student education, in which researchers produced new knowledge and students received it, to a much more integrated ecology of activity.

The Connected Curriculum promotes research-based education; that is, the value of engaging students actively in research and critical enquiry at all levels of the curriculum. The focus is on prompting students to question their prior assumptions and, in ways that suit their disciplinary contexts, to find and examine new evidence. Drawing on dialogue with tutors and with peer review, students are prompted to formulate questions that question what we think we know: Can this knowledge be relied upon? Where are the edges of knowledge? In Brew's words, this leads to the defining of 'a new kind of higher education in which students, academics and others who work in universities progressively work towards the development of inclusive scholarly knowledge-building communities of practice' (Brew 2006, 180). It also challenges the tenets and practices of a 'post-truth' society, in which knowledge claims are so often made without supporting evidence, without logical argument and without critical analysis.

Within this context, I present in this paper the case for introducing a curated, Showcase Portfolio to



taught degree programmes, both undergraduate and postgraduate. A programme-wide Showcase Portfolio, which includes work produced by students that is directed to specific 'real world' audiences, challenges students to:

- review their work, as they select and perhaps edit for presentation
- revisit and learn from feedback on their work, including feedback from peers and external audiences/partners
- develop a holistic, analytic picture of the ground covered on the programme, including insights gained through active research and enquiry
- develop a stronger sense overall of the discipline(s) and themes studied and the ways in which they relate to one another
- articulate explicitly the perspectives and skills underpinning the range of work presented. (Fung 2017)

A key part of summative student assessment, and contributing significantly to their degree award, this method of assessment has many educational and practical advantages. There are also challenges: these will be explored through discussion with conference delegates, together with their possible solutions. We will conclude with a final, values-based question: can the introduction of a Showcase Portfolio, in the context of a more joined-up and research-based curriculum, both engage students more fully in their studies and empower them to contribute more fully to the world?

## **77. Research-oriented approach to design and effective training for student coaches**

**Marion Lehner**

Two of the most important 21st century learning skills are critical and creative thinking (Binkley et al., 2012). To systematically support the development of these skills in the study programmes at universities and to implement critical as well as creative thinking skills in the individual student learning processes seem therefore to be essential elements for the faculty development of the future.

At ETH Zurich, we developed a concept for the training of student coaches who we regard as our direct connection to the student body and also as our multipliers for spreading the importance of developing these skills further. For training the student coaches and tutors who are the ones to develop these 21st century skills in their future teaching practice, the faculty development unit at the ETH has mandates from the different departments. Training concepts are usually developed and conducted collaboratively with the teacher in charge for the course. Especially teaching in the Department of Environmental System Sciences (D-USYS) is interdisciplinary by nature as a variety of disciplines need to be combined to solve environmental problems. Critical and creative thinking is therefore an essential need for students in their study programmes and needs to be developed (Wals & Jickling, 2002).

In order to come up with a tutor training concept which

serves the needs of student coaches at the D-USYS, we conducted two focus groups – one group consisted of tutors with experience in teaching exercise groups, and one group consisted of novice student coaches who have never taught at all. We confronted them in the focus groups with their future tasks to support students to learn how to discuss topics, to encourage them to think deeper, tutors need to moderate and facilitate learning processes and should help students to develop self-regulated learning skills (Pellegrino & Hilton, 2012). The focus groups were of great importance to design the training concept as results show a strong need of the student coaches to simulate critical coaching situations as facilitating learning processes are unfamiliar to most of them compared to providing content and structure information.

## **78. Research conceptions and research-based teaching approaches: Disclosure of a presumed relationship in higher education**

**Wendy Schouteden, An Verburgh and Jan Elen**  
**Theoretical framework**

A close relationship between research and teaching is considered to be a defining characteristic of higher education (Trowler & Wareham, 2008). Since research and teaching are two important activities within the same institution and faculty are very often involved in both, the question about the relationship between the two is recurrent (Barnett, 2005).

The contemporary debate on the relationship between research and teaching is influenced by a strong movement in higher education to increase the research experience of students (Healey, Jenkins, & Lea, 2014). The focus on research-based teaching is also visible in the literature. Qualitative studies concerning the research-teaching relationship pertain to: (1) different ways in which students are confronted with research into their teaching (e.g., Zimbardi & Myatt, 2014) or (2) teachers' research conceptions (e.g., Hu, van der Rijst, van Veen, & Verloop, 2014). This focus on teachers' research conceptions is based on the idea that conceptions determine behavior (Pajares, 1992) and more specifically that research conceptions determine teachers' research-based teaching practices (Brew, 2003). However empirical support for this plausible idea is missing (Schouteden, Verburgh, & Elen, 2016).

This study investigates the relationship between teachers' research conceptions and their research-based teaching approaches in higher education. To shed a new light on this relationship and reveal why empirical support is currently missing, the study explicitly considers the teaching context, by including a new variable into this relationship ("contextualised research conceptions") and by including program type. Whereas general research conceptions refer to teachers' conceptions about research, teachers' contextualised research conceptions pertain to teachers' conceptions about integrating research in their

own teaching.

A conceptual model on the presumed relationship, at the level of the individual teacher, reflects three expectations: (a) a close relationship between general and contextualised research conceptions of teachers is not expected, (b) the relationship between contextualised research conceptions and research-based teaching approaches is closer than the relationship between general research conceptions and research-based teaching approaches, (c) program type affects the relationship between research conceptions and research-based teaching approaches.

## Methods

### Participants

The study entails case-studies of 24 teachers. Teachers came from professional and academic bachelor programs. All programs were selected from the same disciplinary area: soft-applied sciences (Biglan, 1973). Moreover, all teachers were responsible for a similar course “Marketing”.

### Data collection

Different techniques for data collection are combined: questionnaire, semi-structured interviews and document analysis.

The questionnaire contained questions on teachers’ (1) teaching and research experiences, (2) teaching conceptions and (3) perceived professional identity.

Teachers were interviewed twice. The first interview focused on: (1) teachers’ general research conceptions, (2) their plans for integrating research into teaching (teachers’ contextualised research conceptions), (3) teachers’ teaching and research experiences and (4) the Marketing course, regarding: goals, assessment and course documents. In the second interview teachers were asked to describe and explain in detail their real and ideal teaching approaches. The interview had an open structure, allowing respondents to give a narrative account of their teaching approaches.

For document analysis two types of documents were collected: ECTS syllabus and study materials accompanying the discussed Marketing course.

### Analysis

Data were analysed using within-case and cross-case-analyses (Miles & Huberman, 1994). A first analysis focused on generating more inclusive categories in the data (generating types of general research conceptions, types of contextualised research conceptions and types of research-based teaching approaches). Then these types of variables were compared pairwise. These pairwise comparisons were made for the dataset as a whole and for each type of program.

## Results

The first expectation, namely the absence of a close relationship between general and contextualised research conceptions of teachers, gets support from the data. Teachers with similar general research conceptions do not necessarily have similar contextualised research conceptions.

The second expectation, i.e. the relationship between teachers’ contextualised research conceptions and their research-based teaching approaches is closer than the relationship between teachers’ general research conceptions and their research-based teaching approaches, gets support for academic programs but not for professional programs. In academic programs there is a very close, even one-to-one, relationship between teachers’ contextualised research conceptions and their research-based teaching approaches. In professional programs, however, a clear relationship between teachers’ contextualised research conceptions and their research-based teaching approaches is missing. It is found that research-based teaching approaches of teachers in a specific professional program are nearly identical irrespective of teachers holding different research conceptions.

These findings confirm the third expectation. The relationship between teachers’ research conceptions and their research-based teaching approaches seems, as expected, to be mediated by program type.

The study highlights that by considering context it is possible to disclose the presumed relationship between research conceptions and research-based teaching approaches.

## 79. Improve students’ learning about research by activating thesis writing students in class

### Hanne Nexø Jensen

Ideally, students should get an introduction to research and research like process from day one at the university. However, writing a bachelor and master thesis become essential since many research process elements should be trained and activated. In the paper, I describe and discuss different examples of activities that can take place within class in order to achieve the aim of improving students research processes competences. Moreover, the wider implications for the future of these activities are included.

An important activity is feedback on written drafts in smaller groups of 3-7 students each. This is similar to a researcher presenting a paper at a conference where other participants comment. Accordingly, all elements in a research process are addressed in class. For example, students get an introduction to tools that can make their research question more exact; they interview co-students in order to improve the quality of their interview questions. Approaching deadline they should write down their conclusion etc. They come up with a written draft,

discuss the draft with peers and they leave class with another piece of text to be continued (Jensen, 2015).

The same process in lab-based situations would include students making tests where they support and help each other in the lab. Later they present the preliminary results and get feedback from a larger group of co-students and researchers and then they can redirect their lab-research in the final phase. This is an example from the Zero Waste department at the Technical University in Denmark. The students contribute to research with a huge amount of test results and some come up with new ways of using wasted materials (Ottosen et al., 2014).

Furthermore, all activities should be of relevance for each of the participants as well as the activities should contribute to progress in the students' research- and writing processes. This approach is within a social constructivist and cultural perspective on teaching and learning such as for example Dysthe et.al. (2006) and Lave & Wenger (1991) describe it.

Activating students in class and making the elements of a research process visible, result in more students handing in on time and write thesis of a higher quality. This comes about, by letting them work with the elements of a "research process" step by step along writing drafts for their thesis and exchanging feedback in a group (Akister, Williams, & Maynard, 2009; Baker, Cluett, Ireland, Reading, & Rourke, 2014; Nordentoft, Thomsen, & Wichmann-Hansen, 2013). Furthermore, they contribute with new knowledge to the research community. I.e. finite resources are used more effectively. However, what we need to know more about is how we can overcome the barriers at all levels such as the teachers and supervisors resistance to recognize this format as a research based activity that could be connected with their own research.

## **80. Embedding research into the undergraduate curriculum: Why is this so difficult in the sciences at research-intensive institutions?**

**Rachel Milner**

In this presentation, I will outline the work done on development of a research-intensive undergraduate curriculum in the Department of Biochemistry at the University of Alberta, a large, research-intensive university in Canada. Our context, of course, makes our work 'local practice.' However, during our long, ongoing project we have struggled with several issues that have implications for all research-intensive institutions of higher education, particularly in science programs.

It is natural to suppose that embedding research in undergraduate science programs would be simple, because science is equated so readily with research. Despite this, undergraduate science programming in many institutions remains almost entirely didactic, except for 'capstone projects' and extensive undergraduate laboratory exercises which accompany didactic courses

and which are intended mostly as illustrative exercises. The focus in this presentation will be an exploration of the barriers and obstacles we have experienced at the University of Alberta in setting up our research-intensive program and the barriers we continue to face in ensuring that our program endures and is successful. The presentation will focus on some important implications for our institution, implications shared by all research-intensive institutions of higher education hoping to develop successful research-intensive undergraduate programs in the sciences.

As Boyer argued in *Reinventing Undergraduate Education: A Blueprint for America's Research Universities* (1998) "undergraduates at research universities too often have been shortchanged and a new model of undergraduate education is needed." In 2017, in many places a new model is still needed, even in the sciences.

## **81. Evolution of Inquiry Based Learning at Southampton Business School Co-Design group** **Stefanos Marangos, Mark Gatenby, Stefan Cantore, Tom Rowledge, Tom Davidson and Zak Rakrouki**

Inquiry-based learning (IBL) has been seen as a way in which a more student-centred approach can create and expand the connections between teaching and research. The approach is becoming increasingly recognised in many fields, as inquiry and research experiences have the power to shape and develop students' scientific capabilities, as well as wider transferable skills (Edelson et al, 1999; Healey, 2005; Levy and Petrulis, 2012; Spronken-Smith and Walker, 2010). Our poster will focus on the implementation of IBL as an embedded learning philosophy within undergraduate curriculum which leads to the development of a co-design cluster at the University of Southampton Business School. We will demonstrate how IBL has been implemented over a three year period through a process of staff-student partnership.

In particular, we will give attention to the long-term viability of IBL practices by illustrating the cyclical, processual nature of design and implementation (Klob, 1984; Lewin, 1946). By doing so, we explore the role of partnership working in shaping the reflective process around the implementation of these learning methods, as well as the significant impact they can have for higher education institutions in the future.

## **82. Innovation-driven educational changes: Are they research-based?**

**Ian Johnson**

Teaching innovations are generally undertaken in the context of action research to improve the student experience and are usually evaluated by student satisfaction. Whether they improve learning outcomes is often unclear, yet they are often employed to do just that. This To investigate the relationship between



student feedback and learning outcomes, four different anatomy teaching innovations delivered by the author and collaborators between 2010 and 2015 have been compared.

In response to student feedback, learning interventions involving new technology were delivered between 2010 and 2015 after obtaining local human research ethics approval. These were: (1) an interactive, in-house, clinically-relevant on-line anatomy tool for 195 year 3 medical students (2) use of an online 'Prezi' presentation to integrate cranial nerve structure and function for 50 year 3 Health Science students, either (a) as a bolt-on to the existing course (b) as a tool that was integrated into the course (3) a change in anatomy delivery for 136-148 year 1-3 medical students to include elements of the flipped classroom, and (4) use of ultrasound simulators to assist with learning cross sectional anatomy for 59 year 1 medical students. Learning outcomes were compared with previous year's marks (studies 1-3), or before- and after- the deployment of the educational intervention in a single learning session (study 4). Student feedback was obtained near the end of the course.

The response rate for interventions 1, 2a, 2b, 3 and 4 was 40%, 89%, 23% 47-60% and 72%, respectively. Student feedback was very good for all 4 interventions, as evidenced by unanimously positive free comments and focus group comments for (1) and 76-91% broad agreement on usefulness for (2-4). However, none of the interventions had a significant effect on mean learning outcomes, except for (4) where the mean marks for year 3 students decreased from 80% to 63%.

At face value, the present learning interventions appear to have improved student satisfaction but not learning outcomes, at least the learning outcomes measured. A number of factors have been associated with increased student satisfaction with courses. These include, career preparation and course offerings, as well as the teacher's concern for students. It is likely that students will recognise the time and effort involved in innovation in teaching and see this as evidence of concern for students, which could explain the general finding in the literature that innovation in teaching is well-received by students. It has been reported that students' learning style, course design and teaching approaches all affect learning effectiveness. The effect of teaching innovation on learning effectiveness is reported rarely, perhaps because innovation is mainly introduced in the context of action research, and general course structures and existing evaluations may be insufficient to adequately assess it. These factors have affected the present studies. For example the present study designs do not address the possibility of differences in the timescales for detecting changes in student opinion and detecting changes in learning outcomes. Intervention 3 is therefore running for a second year. There may also have been mismatches between the traditional assessment strategies employed

and the more modern approaches used for teaching delivery, resulting in a disruption of constructive alignment. Changing the assessment to better match the delivery of teaching is possible for formative assessments such as intervention 4, but impossible to do retrospectively for the summative assessments of the remaining three. Changing the assessment to better match the modified content and delivery, however, potentially invalidates before- and after-comparisons.

The present review of teaching innovations in anatomy highlights a major problem with experimental design when innovations are evaluated as part of action research. These include the presence of several uncontrollable variables and failure to take into account changes in constructive alignment as a result of the innovation. This may drive teaching innovators to use student satisfaction as a proxy for learning outcomes, but in the absence of a clear relationship between these two measures, this approach is invalid. Overall, it calls into question whether innovation-driven educational changes in general are in fact research-based.

### 83. Managing research-based education

#### Filippo Nereo

Much of the literature on research-based education (RBE) and cognate areas (see, for example, Healey 2005; Healey & Jenkins 2009) has looked at particular exemplars of practice in an effort to share practice and encourage curriculum development (HEA 2016; Fung 2016; Hill & Walkington 2016; Lightfoot & Piotukh 2015; Rand 2016; Sangster et al. 2016).

This paper however begins by looking at the environmental and policy context of research-based education (RBE) in the United Kingdom, notably efforts to enhance teaching through the implementation of the new Teaching Excellence Framework (BIS 2016) and recommendations to revise the Research Excellence Framework to encourage 'educational impact' (Stern 2016).

The paper then explores specific management aspects of RBE at a large research-intensive university in the United Kingdom. It looks at disciplinary interpretations of that initiative amongst academic staff, what (disciplinary, conceptual, operational, financial, managerial, communication) barriers exist, and how RBE is governed and communicated. The paper concludes with a number of principles that can guide and enhance RBE at similar institutions.

Methodologically, the research is underpinned by a dozen face-to-face interviews with academic staff and students. Interviews were recorded in most cases, the data transcribed, then analysed thematically. Additionally, scholarly publications and grey literature were interrogated.

#### **84. A participatory approach to designing an academic social network as a connected digital learning environment**

**Eileen Kennedy**

Digital education is embedded in UCL's approach to the Connected Curriculum. This paper will present our progress towards creating a digital learning environment to help staff and students connect with each other, and engage in research-based education. Contemporary learning landscape of higher education requires a loosening of the boundaries of the conventional classroom, enabling learning to blend in with other aspects of life to create "a networked digital and physical landscape of connectivity in which users are increasingly empowered to select programs of learning activities across spaces, buildings, and the wider city" (Nordquist and Laing 2015, p. 339). Yet, existing technologies are unsuited to deliver this vision of learning. While the Virtual Learning Environment (VLE) has become near ubiquitous within Higher Education, implementations of VLEs have proved disappointing (Brown, 2010). Software is not neutral and such systems impose values on the way teaching and learning takes place within them: "Classrooms, as one scholar puts it, are instances of built pedagogy, and the LMS, in a similar way, imposes a pedagogical model" (Brown, Dehoney, and Millichap 2015, p. 3). This model emphasises teacher-led communication, restricting students' permission to create content and collaboration. Instead, UCL has envisaged a truly connected digital learning environment in the form of an academic social network that will design in collaboration from the outset. Students will not be restricted to modules or year groups, and be able to organise intra- and inter-institutional collaborations and create local and global learning communities.

This is, however, a risky project – with many other social networking sites available, students and staff may decline to engage. To mitigate this, we have taken a participatory approach to designing the network and ways of embedding in within the culture of UCL. We have engaged UCL students throughout the project, including working with 3rd year undergraduate Marketing Communications students who undertook research on student needs for an academic social network for their coursework. Students have also been part of the project board and contributed to decision-making. Engaging with students has helped us to refine our vision of what is required and provided creative insights into how such a network could be successful. We will show how student participation has shaped our approach to implementing an academic social network for UCL.

#### **85. Research Led Teaching in a Stroke MSc Course: Connecting the Curriculum**

**Sumanjit Gill, Robert Simister, Richard Perry, Caroline Selai, David Werring and Dilly Fung**

Forging the link between research and teaching in higher education is increasingly recognised as necessary to

enhance teaching delivery in university and to build academic communities of practice<sup>1</sup>. UCL has developed a framework of excellence to facilitate this, the UCL connected curriculum<sup>2</sup>. We have developed an M Level Stroke Course aligned to these principles. Students from a wide variety of disciplines engage in a broad range of activities, including observation of clinical care and research recruitment in a stroke unit environment, writing for a patient's stroke newsletter, participating in service improvement and attending workshops on consenting dysphasic patients for trials. They are required to produce both written and oral outputs and critically evaluate the ways in which research is implemented in the workplace through reflective practice. A global context is given through exercises which ask them to consider how what they have learnt can be implemented in the developing world, which has increasing stroke and disability burden. In this way students learn how to connect academic teaching to the workplace whilst developing their professional identity locally within a multidisciplinary environment and to consider their role in an international arena.

#### **86. A conceptual model of how research can influence student development**

**Martin G. Erikson, Anita Eriksson, Erland Johnson, Agnes Nagy and Tobias Richards**

Educational activities can be supported by research in various ways, discussed in terms such as 'research-based' or 'research-informed' education. There is an extensive literature on this field, with various points of departure, but surprisingly little attention has been given to how students can benefit when research supports educational activities. Here, we argue that a student-centred approach is called for, with the aim to show the actual benefits of such activities in terms of how they can help fulfil educational goals. The purpose of this paper is to present a conceptual model which can help teachers in higher education identify and evaluate how research can influence the students' development. Our model is intended as a tool providing structured understanding of potential forms of research influence, in relation to the purposes of a particular educational program. Based on a review on literature on research-based education and the 'teaching-research nexus', literature on student learning and transition, and our own research and teaching experience, we suggest the model presented in Figure 1.

In our conceptual model, we separate three sources by which research can influence students. The first source is the scientific theories and research results with their implications, identified as relevant for a particular educational program (an implication can for example be a scientific debate emanating from conflicting findings). The second source is the methodologies, research methods and practices as accepted and adopted in the fields of research relevant for the curriculum. This include anything from the accepted ways of collecting data to publication patterns which influence how primary research results

can be made available to students. The third source is the degree of scholarly expertise of the teachers, including direct experience to share with the students but also being a moderating force, where the teachers' individual knowledge influences curriculum and syllabus, either directly or through collegial procedures. Further, this third source includes the teachers' internalized disciplinary values and traditions, concerning for example academic quality.

When it comes to how the students are influenced, we suggest three distinct but interrelated areas of student development where it can be important to distinguish influence. The first is the development of the students' specific and generic knowledge. The second is the development of the students' specific and generic skills, and the third is the development of the students' academic identity, being part of a more general student identity. In relation to academic identity, research influence might be linked with student transition, and with goals of higher education such as life-long learning. The three areas of student development will also influence each other, for example by the role of academic identity as a factor behind student motivation. By explicitly repeating the three sources of influence for each of the three areas of student development, complex relationships can be made explicit in an analysis of a particular course or educational program.

We suggest that the model is general enough to handle variations in how research can be connected to education, which is important for two reasons. First, the connection between research and education can be influenced by a broad array of disciplinary standards, including assumptions about 'proper research' and what purposes the educational program are expected to serve – in many cases including a call for a balance between vocational and disciplinary competence. Second, there can be both disciplinary and institutional limitations on educational practices, for example when it comes to the possibilities for having students involved in their teachers' research. Such problems can also call for more detailed analysis in specific situations: While we suggest that the present level of detail ought to be sufficient for most situations, it should be pointed out that the model easily can be expanded so that each element can be made much more detailed.

Through the student-centred approach, we argue that we enter an underexplored area of studies of research-based or research-informed education, linking up with the student-centred approaches of for example the Bologna Project. While the conceptual model is not yet evaluated through actual empirical analysis, we suggest that our model can help teachers in higher education consider which aspects of research the students at a particular educational program will benefit from and how they will benefit. Adopted in such a way, the conceptual model can also help provide general arguments for why it can be of

vital importance to make educational activities research-based.

## **87. 'Research-Ability' as Curriculum Goals in Vocational Bachelor Programmes**

**Cia Kesselaar, Marianne Kok and Didi Griffioen**

With professional practice becoming increasingly knowledge-based, complex, and accountable to society (e.g. American Nursing Association, 2010; Payne, 2014), universities of applied sciences are searching for educational methods to better learn high-order skills, such as critical thinking, reasoning, or handling complex knowledge.

In the current 'supercomplex' world, having a substantial level of high-order and generic skills is important to all professional practice (Barnett, 2000). The quality of the answers vocational professionals provide to current day professional problems rely on these type of skills developed. With the answers defining the quality of the work of professionals, learning high-order skills is essential for the quality of professional work in the current societies of Western European countries (Brew, 2007).

So far the question remains as to what particular goals are aimed for in higher vocational educational programmes. Many educational programmes strive to better connect research and teaching (or implement research into teaching) (Griffioen, Boerma, Engelbert, & Van der Linden, 2013). However, there is no broad perspective or knowledge on the actual choices made, especially in the built up from the first to last year of bachelor curricula. One recent empirical study considered the learning-goals of single educational courses in Belgian higher education (Verburgh, Schouteden, & Elen, 2012), but did not consider the curriculum perspective. The curriculum perspective has been considered in more conceptual models, such as the Research Skill Development Framework (Willison & O'Regan, 2007), which considers five cumulative levels of research competence. Or the Research Development Model (Evans, 2012), which considers the researcher development through the development of attitude, behaviour and intellect.

The current study considers the development of so called 'research-ability' in curricula for future professionals from the context of Dutch Universities of Applied Sciences, which train future professionals into becoming 'research-able professionals'. 'Researchability' is defined as 'the competence to systematic answer questions that lead to knowledge relevant for the professional field'. Research-ability is considered to consist of three related competences: research disposition, the application of existing knowledge from research and practice, and research ability (Expertgroep Protocol, 2014). Previous research has shown how the connection of research and education differs between disciplines (Neumann, 1992; Noser, Manakyan, & Tanner, 1996). The focus is on the learning-goals of individual modules, the cumulation



throughout the curricula, and disciplinary differences.

## Method

### Research Questions

What are the learning-goals related to ‘research-ability’ in vocational bachelor programmes? What are disciplinary differences in learning-goals?

### Sample

The written curricula of all modules of 70 bachelor programmes of 7 faculties of the Amsterdam University of Applied Sciences (AUAS) were included. Written curricula mostly include the learning-goals achieved, their underpinning, as well as the order and didactical methods applied (Glatthorn, Bosschee, Whitehead, & Bosschee, 2016).

### Analysis

The written study guides are analysed applying the taxonomy and method by Verburgh et al. (2012). The taxonomy consists of six research-related goals, which were grounded developed. The six research-related goals are:

1. Acquiring knowledge from results of research;
2. Gaining insight into methodological and theoretical underpinnings of research;
3. Development of particular practical research skills;
4. Development of the competence to become a researcher;
5. Development of a critical attitude towards information, knowledge and knowledge construction;
6. Development of a curiosity towards evolutions in the discipline.

In the first phase the existing taxonomy will be evaluated against the definition of ‘research-ability’ as aforementioned, and adapted when needed. In the second phase a small selection of study guide texts will be half-open coded with the coding structure of Verburgh et al. (2012). When new research-related goals are found, the taxonomy will be adjusted accordingly (Charmaz, 2006). In the third phase the finalized taxonomy will be applied to all study guide texts. The coding structure in all phases consist of 0: no indication of presence, 1: some indication of presence, and 2: clear indication of presence of research-related goal. After coding, and to answer the research questions, the codes per educational programme (question 1), the codes per study year (question 2), and the codes per discipline (question 3) will be added. The weight of each individual module in relation to the weight of the full 4 year programme will be accounted for. All results will be visualized into spider webs consisting of six axes, one for each research goal.

### Preliminary Results

All programmes of the AUAS pay attention to the development of research ability. Interdisciplinary

differences are more prominent compared to intradisciplinary differences and in some disciplines the intradisciplinary differences are more prominent than in others. Curiosity (learninggoal 6) is not present maybe because it is difficult to draw measurable learning objectives concerning Curiosity. This empirical insight will infuse the debate on what to aim for concerning ‘researchability’ in future professionals. Furthermore, this qualitative study will yield results which can be later on quantified in order to test against measures as student satisfaction, study success, and thesis grades.

## 88. Recreating experiences: participatory qualitative research to develop student learning and experience

### Nicole Brown

Recently, there has been a heightened interest in teaching, scholarship and research-based education within Higher Education as well as an increased emphasis on student voice and the student as consumer. In this context I am conducting research in collaboration with my students about their perceptions of teaching placements.

Within qualitative research developments relate to narrative and creative methods for data collection and analysis in order to get more detailed insights into experiences of research participants (for example Bagnoli, 2009; Bartlett, 2015; Guell and Ogilvie, 2015). In many of these approaches the researcher’s role is still one of power and authority.

In my research project students are true partners within the research process rather than research participants or objects. The data collection method is based on students’ deep reflections on their experiences, which they express with the help of representations, artefacts and metaphors, thus by re-creating their experiences. This approach is based on the notion that human life and language are closely connected with metaphors and as humans we cannot escape the metaphorical (Lakoff and Johnson, 1980). Once students have expressed their experiences using metaphors they take an active role in the meaning-making process by taking responsibility for the interpretation and analysis of the metaphors. Thereby, due to this qualitative and participatory nature of the project students develop their research literacy and actively practise research skills long before being required to carry out their own, independent projects. Also, the outcome of the research is used to develop and improve students’ learning and experiences.

In my presentation I will provide a short overview of the setting of the research project before demonstrating how reflective processes can be deepened with the help of artefacts and metaphors. I will show how students get involved in investigating and experimenting with metaphors and artefacts. Students use Lego© and other toys to express their learning experiences in an abstract, metaphorical way. Having produced their representations

students are then asked to consider the processes of reflection and meaning-making by comparing traditional reflective models with the reflections using artefacts and metaphors.

My discussion will elicit benefits as well as potential pitfalls relating to the use of metaphors and artefacts regarding researching experiences. I will refer to the advantages and challenges of close research collaboration between staff and students by linking to my own experiences to the research with my students.

## **89. Inquiry, structure and purpose: how co-design has the power to transform higher education**

### **Mark Gatenby**

The polarisation of ‘research’ and ‘teaching’ in universities has been under increasing challenge from scholars who want to place research-based education (RBE), or inquiry-based learning (IBL), at the centre of higher education (HE) (e.g. Fung, 2015; Healey and Jenkins, 2009; Brew, 2003). RBE and IBL together offer a radical alternative to teaching and learning methods which rely on ‘teacher-centred’ curriculum design, where power is concentrated with the teacher-as-expert. Meanwhile, the ‘traditional’ model of university teaching has also been under pressure in HE systems where students are being recast as ‘customers’ who can make choices about their education service provider. This reverses the power relationship and creates a ‘student-centred’ education, but it also carries the danger of turning learning into a privatised commodity – seen somehow to exist externally from students who consume education, and then rate it using customer satisfaction surveys. The effect of this has been a creeping ‘credentialism’ in higher education with students trading course marks and league table positions over a deeper concern for learning and development (Gatenby, 2015).

RBE is neither student- nor teacher-centred, but is organised around the process of conducting disciplinary research – including asking questions, exploring bodies of literature, conducting empirical investigation, and developing theory. In this way, RBE can be described as inquiry-centred or knowledge-centred, with echoes of the ‘Humboldtian model’ which emerged in the early nineteenth century (Elton, 2008). However, over the course of the twentieth century disciplinary research became increasingly narrow and specialised to the extent that research and teaching came to be seen as polar opposites. Today academic disciplines stand fragmented and isolated, leading to calls for more ‘inter-disciplinary’ research or even a ‘post-disciplinary’ stance – which starts from a holistic rather than a reductionist map of knowledge (Goodall and Oswald, 2014; Gatenby, 2016).

The focus of this paper is how universities can implement an IBL approach within highly complex and conflicted higher education systems. We will draw on experience

from a UK research-intensive university which has undertaken a number of experiments in IBL within the context of undergraduate business school curriculum. We will argue that a promising – perhaps essential – path to reshaping undergraduate learning through IBL is to transform the governance and organization of education through staff-student partnerships; what we call ‘co-design’. This will be argued with consideration to the ‘structure’ and ‘purpose’ of undergraduate learning.

To explore the notion of ‘structure’ we need to draw on the organizational literature. More specifically, we need to consider how learning environments are created through organizational structures – which include role distinctions and identities (e.g. tutor, student, marker and examiner), hierarchical arrangements/power dynamics (e.g. teaching assistant, course leader and administrator), and performance measurement (e.g. learning outcomes, assessment criteria and satisfaction ratings). These institutional arrangements coalesce to create an environment which defines ‘what’ is to be learnt, as well as ‘how’ it is to be learnt.

The organization of learning environments is an under-developed area in the higher education literature but we can find relevance in debates about the nature of ‘professional bureaucracy’ (e.g. Currie and Procter, 2005). These considerations then inform pedagogical questions about the level of structure in course design. For example, within an IBL paradigm, Spronken-Smith and Walker (2010) ask whether undergraduates should start their undergraduate study in a ‘structured’ mode of inquiry – closer to teacher-centred lectures and seminars – and then move gradually towards an ‘open’ inquiry approach; or whether they should start in an ‘open’ discovery mode.

As a method of creating a learning environment, co-design fundamentally challenges considerations of professional bureaucracy and is more closely aligned with principles of cooperative governance (Winn, 2015). It is neither staff- nor student-centred, but relies on more fluid power dynamics (e.g. Davidson et al., 2016; Gatenby et al., 2016). However, the informality of co-design raises questions about its stability, transferability, and scalability within universities. These questions will be addressed, drawing on staff-student experiences and evidence of experiments the authors have undertaken.

Co-design also challenges traditional notions of ‘purpose’ in learning. Purpose is no longer simply defined by the teacher-as-expert through intended learning outcomes; nor is it simply defined instrumentally by, for example, scoring highly in satisfaction surveys or league table positions. Instead, purpose emerges from the complex social dynamics of the co-design process, and is deeply embedded in the context-specific meaning of knowledge structures (Hidalgo, 2015). It is therefore closer to Dewey’s (1938) classic treatment of purpose in education in which he stresses the ‘importance of the participation

of the learner in the formation of the purposes which direct his [or her] activities' (p. 67). For Dewey, the purpose of education can only take shape through a cooperative process of 'social intelligence' (p. 72).

The paper will take on these challenging topics and sketch out the organizational and pedagogical implications for higher education systems in the future.

## **90. Research-based learning: Visual learning aids for students created by students**

**Asma Buanz, Sarah Hunt, Simon Gaisford and Pamela Robles Martines**

Courses for applied sciences, such as pharmacy, benefit considerably from having research-active staff involved in teaching especially in terms of deepening their learning and understanding (Healy, 2005). Furthermore, experiments performed in the lecture theatre can be an engaging way to explain difficult concepts to students. However, this requires extensive preparation, often making it unfeasible for busy research staff to perform.

Currently, some lecturers use internet videos to complement their teaching, but the quality of these videos can be poor or they do not exclusively convey the desired message to the students. Hence, this project aims efficiently to create bespoke videos to complement undergraduate lectures at UCL School of Pharmacy. This will involve engaging research students in creating these teaching aids by either filming experiments they perform as part of their research, or using the skills they acquire during their research to create videos not directly related to their study. This will be conducted in collaboration with the academic teaching staff and thus these videos can then be used to complement their lecture courses.

The first stage of this project was to investigate what undergraduate students thought of videos and the incorporation of research in lectures. To allow for open-ended questioning and to interpret accurately opinions, individual interviews were conducted as opposed to surveys. Final year undergraduate students from the Pharmaceutics Department, UCL School of Pharmacy, were asked about their experiences of research representation in lectures and the use of videos, their likes and dislikes about these, and their suggestions to improve teaching aids used in lectures. Students interviewed thought that the effective use of videos in lectures varies depending on the lecturer. Some had good experiences when the videos used were prepared specifically for the lecture, whilst others thought their use in the lecture was distracting and unfavourable. The students also wanted more contact with research in the department. Hence, the concept of bespoke videos showing current research, as teaching aids was well received, as long as they did not disrupt the flow of the lecture. The idea of creating an animated summary for lectures seemed to appeal to the participants.

For the second stage, postgraduate research students will collaborate with a member of academic teaching staff to create videos of their research after they are tailored to their lecture course, with a focus on creating interactive videos. These will then be used by the lecturer to complement their teaching. Research students will gain experience in video making and learn to make their research suitable for a wider audience. Interviews with students after the lectures will be conducted to collate feedback on the videos. The videos will be made available to staff on the UCL School of Pharmacy Moodle page. They can then easily add the videos to their lectures and make them available to students, allowing them to watch the videos back in their own time.

In conclusion, this project aims to bring together academics and postgraduate students to enhance the visual learning aids used in lectures for undergraduate students at the UCL School of Pharmacy. Videos showing postgraduate research will be used in lectures to aid explanation of key concepts discussed in lectures, helping to close the gap between teaching and research.

## **91. The green landscape of an educational change programme**

**Ellen Kloet, Mark Boiten and Hanno van Keulen**

Even though we do not really know what the future holds, it is possible to make some general predictions. Information is already available everywhere, this will have profound impact on the choices of students. There will be more competition in the higher-education market than is now the case (Teixeira, Rocha, Biscaia, & Cardoso, 2013). A university of professional education must provide excellent education, conduct high-level applied research in close involvement with the surrounding area and have a strong international focus (Montesinos, Carot, Martinez, & Mora, 2008). The target group for higher education will become increasingly diverse in terms of age, experience, prior education and cultural background. Creativity and personalized solutions in all complex problems will become more and more important and will be asked of the institutions for higher education (Naidoo, Shankar, & Veer, 2011). In this presentation we explore a holistic approach to an institution-wide change program to meet these predictions. We evaluate interventions and communication platforms and describe their effects.

In 2015 Windesheim, a vocational oriented comprehensive university in the Netherlands, started to change its sixty-plus programs, inspired by a new educational concept. This concept stimulates incorporation of working and thinking skills relevant for the future (the so-called '21st century skills') and explicit attention to 'Bildung' and reflection on the value and normative aspects of being a skilled professional. Program developers are stimulated to design a more inspiring, interactive and creative learning environment with enhanced flexibility of teaching and learning in order to accommodate diversity with respect to age,



ability, personal situation (e.g., having a relevant job or not), et cetera. The educational concept is visualized as a diamond.

A major operation is to establish a less 'top-down' and more 'bottom-up' culture with respect to curriculum design and support, allowing academic staff more autonomy and responsibility. This is a breach with the top down and centralized history of the university. In terms of Mintzberg the shift is towards a more professional and collaborate organization (Mintzberg, 2013). Educational development, supportive processes and control will become less dependent upon the central policies and agencies of the university (Mc Nay, 1995).

The aim is also to integrate the three primary obligations of a university, i.e., teaching, research and entrepreneurial activities, so that all mutually benefit from what is going on in the other domains. Students are prepared to understand, use and value research outcomes. Students use their own research to stimulate the innovation of existing professional practices. The growing emphasis on research in professional education allows the university to continuously collaborate with businesses and non-profit organizations as well as by means of enterprise. Enterprise is also a means to valorize research results. This mix of education, research and enterprise results in innovative teaching and an inspirational learning environment.

Curriculum development teams receive a budget to do whatever they seem appropriate to do and to adjust the curriculum with respect to content, teaching formats and partnerships with professional bodies. A project team is established to facilitate this innovation university-wide. The team interacts with the program development teams, monitors progress, and mediates between university wide support systems (e.g., ICT, housing, communication) and the programs.

The project team facilitates individual and organizational learning in a holistic setting. A wide range of innovation strategies is used to address specific target groups (de Caluwé & Vermaak, 2003). The programs are addressed in green and whiteprint thinking, a complex and chaotic setting (de Caluwé & Vermaak, 2003). Because of the freedom in this innovation process, feedback and self-evaluation is an important part of the program as is sharing and learning amongst the programs.

An online 'forum' has been set up to organize profound knowledge sharing; each month the programs meet each other in a relaxed, non-formal setting. A facilitator stimulates the programs to interact within the team and management and to bring together developments within programs. Once every three weeks the facilitators and project team members meet and together they form a learning community.

The project team needs to balance monitoring and the

necessary freedom. Feedback sessions are organized to evaluate the program's curriculum innovation plans and to broaden the views of the individual teams. As a whole the innovation program generates the intended energy level and the university is moving towards a more open and learning community.

## **92. An inclusive support model for curriculum change at a research-based university**

**Stefanie Anyadi and Clive Young**

All major research-based universities now have a strong commitment to develop blended and online education. However as this has become mainstream in the curriculum, a wider range of staff groups beyond academics and learning technologists is now involved in using and supporting digital learning environments. While most universities in the UK have a central services unit to support and plan digital education, there are usually additional local support arrangements in place, often informal and thus virtually invisible to senior managers.

At UCL, local support in academic departments is frequently provided by 'teaching administrators', i.e. professional services staff supporting staff and students. These colleagues have been particularly important for the introduction and expansion of the virtual learning environment at UCL and by working alongside academic colleagues play an important role for the dissemination of innovative approaches to teaching and assessment. The last six years have seen the establishment of a vibrant Teaching Administrator community of practice with an active online forum and annual conference at UCL. Their potential role in improving the student experience was recognised at an early stage via a JISC-funded project identifying the need to improve their digital literacies. The success of the TA initiative encouraged an even more ambitious approach, the UCL E-Learning Champions network that non-academic support colleagues. CMALT has been a key framework to develop skills and share ideas. CMALT, or Certified Membership of the Association for Learning Technology, is a portfolio-based accreditation for people whose work involves learning technology (<http://www.alt.ac.uk/get-involved/certified-membership>).

We will report on the outcomes and insights gained from setting up a programme supporting (so far) five cohort of teaching administrators working towards CMALT accreditation. We will also discuss the benefits of including members from other staff groups and from other institutions in such a cohort.. External accreditation has been a strong incentive to undertake development and has enabled colleagues to achieve recognition for their work. The cohort-based approach developed at UCL has enabled teaching administrators to share ideas across the institution and encouraged them to take a reflective approach to their work.

This positive experience inspired the development and launch in 2016 of a new UCL induction and development programme for teaching administrators, InEDITA, which provides training, development and networking opportunities for teaching administrators in a range of formats. Amongst other goals, this programme aims to ensure that best practice in teaching, assessment and teaching administration is shared across departments and is well supported, and we will report on early results.

### **93. PBL combined with international collaboration for 1st year Civil Engineering students at UCL: a case study**

**Susana Lopez-Querol, Manni Bhatti, Gerardo Araya-Letelier and Carlos Molina-Hutt**

Nowadays, Civil Engineering is becoming more of an international discipline. It is therefore not pertinent to teach Civil Engineering from a local perspective only, as the problems solved by a civil engineer are global. Moreover, theoretical contents in Civil Engineering teaching programmes, although still important, need to be complemented by practical applications. This is the main fundament behind Problem Based Learning (PBL) techniques.

There are many examples of international collaborations in teaching Civil Engineering programmes. The application of PBL is also becoming general, as there are many successful reported experiences throughout the world. However, the combination of both aspects, for 1st year students, has not been previously reported yet. During the academic year of 2016-17, a new module (Engineering Challenge 1) for 1st year Civil Engineering students, combining international collaboration and PBL, has been delivered in the first term, in coordination with Universidad Adolfo Ibáñez (UAI) in Chile. The main aims of this module were: 1) to introduce the Department of Civil, Environmental and Geomatic Engineering to the new students and to showcase relevant research activities within the Department; 2) to present how a civil engineer can contribute to improve the world from a practical perspective; 3) to train the students on team work techniques and networking, as well as communication skills. Due to a lack of experience in appropriate 'soft skills' required as a part of the work, the module was supplemented with the Professional Skills module, delivered also in the first term, and with a few academics involved in both modules. The skills taught therein were also used as part of the development objectives that makes up the portfolio for chartership of civil engineers.

The topic dealt with in the Challenge 1 module was the 2010 Chile Earthquake, which was analysed from different perspectives of Civil Engineering, as a combination of keynote lectures and workshops in which the students, working in teams, analysed different problems and presented solutions. Each UCL team was paired with a team at UAI, with different tasks and deadlines established and agreed by academics at both

institutions. This module was assessed as a combination of individual and team assignments in which evidence of the communication and collaborative work between teams at both universities were required. According to the students' feedback, the experience has been satisfactory, and will be improved and repeated in subsequent academic years.

