Interdisciplinary Learning and Teaching: Frameworks and Practice

University of Sheffield

Thursday 7 April 2016

10-4.30
## Conference Schedule

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<td><em>Interdisciplinary learning and teaching provision: findings from a UK study</em></td>
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<td>David Morrison, Plymouth University, UK</td>
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<td><em>New evidence on interdisciplinarity and how we can teach it</em></td>
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Exhibition

Emma Yarwood, University of Sheffield, UK
Using life story work with people with dementia to promote shared learning with speech and language therapy and nursing students: A Pilot Project

Rachel Carter, Plymouth University, UK
Making a Difference: a qualitative study to demonstrate the educational benefit of interprofessional placements across the health disciplines

Gaetano Lotrecchiano, Paige McDonald, Kenneth Harwood, Ozgur Ekmekci
George Washington University, USA
Learning Theory, Operative Model, and Challenges in Developing a Framework for Collaborative, Translational and Implementable Doctoral Research

Tom Foster and David Reid, University of Sheffield, UK
Positive reflection and projection: iTunesU and Dementia Futures

David Cameron, University of Sheffield, UK
ROBO-GUIDE: interdisciplinary collaborations in creating a robot tour guide

Patrick Rickles, University College London, UK
Learning GIS in Interdisciplinary Research: By Hook or By Crook
Abstracts

Morning plenary session

Catherine Lyall, University of Edinburgh, UK
Interdisciplinary learning and teaching provision: findings from a UK study

Recognition of the need for interdisciplinary research to address global, societal challenges is accelerating. Policymakers and non-governmental organisations frequently call for an evidence base that integrates social, cultural and economic dimensions with the natural and medical sciences. This evolving landscape generates new demands for global citizens and future employees who have the skills to work in multi-professional teams and adopt holistic approaches to complex problems but higher education largely remains structured on a conventional, disciplinary basis. While disciplines will continue to underpin the foundations of our knowledge, nonetheless the issue of interdisciplinary provision becomes increasingly relevant for institutions preparing students for a changing world. This talk will report on some of the findings from a study, commissioned by the UK Higher Education Academy, which sought to map the scale and type of current interdisciplinary provision within the UK; to assess future trends; and to identify some of the core principles and pedagogies supporting interdisciplinarity in undergraduate and postgraduate taught education.

Catherine Lyall is Professor of Science and Public Policy at the University of Edinburgh where she is Head of Science, Technology and Innovation Studies. She is an experienced science policy researcher and evaluator of knowledge exchange and interdisciplinary research activities with particular interests in the strategic development of support for interdisciplinary researchers and learners. She has recently led a study for the Higher Education Academy on interdisciplinary learning and teaching provision in the UK.
Parallel paper session 1

Orkhon Gantogtokh and Kathleen Quinlan, Oxford Learning Institute, UK

Challenges of designing interdisciplinary postgraduate curricula: Case studies of interdisciplinary master’s programmes at a research-intensive UK university

This study, based on case study analyses of two interdisciplinary programmes in a research-intensive university in the UK, focuses on the challenges involved in designing, coordinating, and leading interdisciplinary postgraduate curricula, including workload, student heterogeneity, and difficulties in achieving coherence. Solutions and approaches developed within these case study programmes are also highlighted. This study raises awareness of the complex nature of interdisciplinary curricula so that it may help academics pro-actively develop better strategies and approaches to address common challenges. It also syntheses disparate literature into a framework for investigating curricular coherence.

Orkhon Gantogtokh has 15 years’ experience in educational management, policy and research. She has completed an MSc in higher education at the University of Oxford in 2015, and an MA in international education and development at the University of Sussex in 2009. Her previous professional experience includes positions as a Higher Education Specialist at the Ministry of Education and Science of Mongolia, Director of Studies at the Institute of Language and Civilization, and Director of the Art of Language School. In addition, she is a Founder of two educational NGOs. Her research interests include higher education curricula, teaching and learning, educational policy, university governance and management, and educational development.

Dr Kathleen M Quinlan is Head of Educational Development at the University of Oxford. She has previously held academic and leadership posts in educational development at the Australian National University and at Cornell University. Her research interests are broadly in the areas of teaching, learning and curriculum in higher education. She has a particular interest in students’ holistic development and is the editor of How Higher Education Feels: Commentaries on Poems that Illuminate the Experiences of Learning and Teaching, forthcoming from Sense Publishers.

Kathrin Kaufhold, Stockholm University, Sweden

Developing research-based writing in interdisciplinary postgraduate study

Interdisciplinary study increasingly shapes master’s programmes in the Humanities and Social Sciences. Similar to traditional disciplinary courses, writing is one of the foremost means for learning and assessment in these programmes. While various approaches have been developed to support student writing in general, little attention has been payed to the challenges students face in interdisciplinary writing and learning. This paper therefore examines how master’s students develop their research-based writing within an interdisciplinary programme. It further considers how an academic writing course can support this development. The paper presents a qualitative case study with 21 master’s students in an international, interdisciplinary programme based at the Faculty of Humanities of a Swedish university. These students participated in a cross-disciplinary, faculty-wide course on academic writing. The data material consists of the students’ submissions for the writing course including expression of aims, analysis of sample texts, students’ drafts and their final research proposal assignment. In addition, two of the students and their programme director were interviewed. Published considerations on the state of the research field provided further background information. Results demonstrate that students in interdisciplinary studies face the additional task of explicitly situating their research within their interdisciplinary field. At the same time they find little explicit guidance on textual form and style for research-based writing due to the variety of styles they encounter in their reading. The cross-disciplinary writing course became a forum for discussion and exploration of research intent that both confirmed and challenged students’ preconceived notions on academic writing.
Kathrin Kaufhold is a lecturer at the English Department at Stockholm University, Sweden, where she teaches English for Academic Purposes and professional communication. She holds a PhD in Linguistics from Lancaster University, UK.

Adam Smith and Angela Vickerstaff, Nottingham Trent University, UK

Evaluating Consultancy Projects as an Interdisciplinary Learning Opportunity for Postgraduate Students

This presentation relates to an interdisciplinary learning opportunity within the HEFCE-funded Multidisciplinary Master’s courses at Nottingham Trent University. Whilst the structure of the course is ‘multidisciplinary’ in that the learning is additive rather than integrationist, the learning opportunity is ‘interdisciplinary’ in that it offers a group consultancy project which combines different disciplines to bridge or synthesise knowledge (Cluck, 1980; Ellis, 2009; Kline, 1995). Interdisciplinary learning is associated with a range of pedagogical techniques, driven by a need for more complex problem-solving, critical thinking, communication, and employability skills (Lyall et al, 2015). Learning outcomes require students to adopt the role of specialist practitioners; applying knowledge creatively to critically analyse organisational issues. Students are taught a range of techniques, including project-based (Thomas, 2000) and student-led (Healey, 2005) learning, with additional project management, consultancy and team-working tools. Findings from 18 projects across 4 cohorts draw out the impact of interdisciplinary study on the student learning experience and share practice in the pedagogy supporting this challenging project. Whilst clients were typically outcomes-focused, student feedback centred on the difficulties of working in interdisciplinary teams; being exposed to new contexts and responding to changing client needs. The real-world nature of complex and changing environments, outside of a controlled teaching environment, proved challenging but valuable as a learning experience. Pedagogical insights include the importance of communicating and applying tools which aid student learning and reflection, the support for effective multidisciplinary teamwork and the value of interdisciplinary opportunities as an intensive learning experience.

Adam Smith is a Multidisciplinary Master’s Lecturer at Nottingham Trent University. An experienced Management Consultant and Member of the Chartered Management Institute, Adam supports small businesses across the East Midlands region and leads the core module for Nottingham Trent University’s innovative HEFCE-funded Multidisciplinary Master’s (MDM) course. The module aims to expose students to the realities of working in multidisciplinary teams; adopting the role of consultants to investigate a real issue for an organisation. Adam is also a Marketing Lecturer and has supervised undergraduate and postgraduate consultancy projects.

Angela Vickerstaff is Course Manager for NTU’s Multidisciplinary Master’s (MDM) course, an innovative project partly funded through HEFCE’s Postgraduate Support Scheme. Angela has led the academic development and delivery of the cross-university multidisciplinary course, overseeing the multidisciplinary consultancy project. The course strongly emphasises practitioner development and employability using multidisciplinary learning experiences as an opportunity to experience differing theoretical perspectives and extend skill sets. Our experiences in teaching and supporting multidisciplinary learning across a diverse cohort of students are informing initiatives across NTU.
Parallel paper session 2

Marie Evans and Luke Wilson, University of Sheffield, UK

This House Believes...Using debate to enhance interdisciplinary learning across the Faculty of Science

All 1350 level 1 Faculty of Science students take part in a team-based scientific debate during semester two within the Achieve More module ‘Breaking Boundaries’. We will discuss the motivation behind the use of debate as an educational tool, outline some of the challenges faced as well as considering ways to improve the process. The freedom of Achieve More allows us to consider new ways to engage students in interdisciplinary learning and encourage them to develop as active learners. The ‘Breaking Boundaries’ debate model provides students with an opportunity to achieve higher levels of critical thinking through the use of persuasive evidence. Students choose a debate topic from an extensive list, with the emphasis on engaging students with topical scientific research and policy, with global impact. Examples of debate topics include artificial intelligence, antibiotic resistance, genetic modification of human embryos and legal highs. Students work together in small interdisciplinary teams to research, analyse, synthesise and evaluate relevant information relating to their debate topic. This approach also allows students to integrate critical thinking with other key competencies such as teamwork and communication. Support is provided through tutorial sessions to help students prepare for the debates. Throughout the process, our new level 1 science students are encouraged to think like scientists and appreciate that genuine different views within science should take into account all of the available evidence.

Dr Luke Wilson is Reader in Quantum Nano-optics, Physics and Astronomy and Assistant FDLT in the Faculty of Science. He has a strong interest in connecting undergraduate students with academic research as early as possible in their studies. In Physics, he has established the only ‘Quantum Information Lab’ in the UK, enabling students to explore new research directions in Quantum Technologies. As academic lead for ‘Breaking Boundaries’, the Faculty AML1 activity, he has worked closely with LeTS to develop a debate model aimed at enhancing interdisciplinary learning and engaging students with current research at Sheffield and beyond.

Elena Riva, University of Warwick, UK

New adventures in the interdisciplinary world

In the last year we decided to explore how an interdisciplinary approach could be helpful to undergraduates and postgraduates with a very diverse scientific and not-scientific background for reflecting and learning in a new and exciting way complex and global scientific topics and issues creating connections between the scientific disciplines and the humanities. In order to develop this idea, the Institute for Advanced Teaching and Learning (IATL) and the Institute of Advanced Study (IAS) at Warwick University supported us to create ‘Science on Screen’, a series of workshops dedicated to cross-faculties undergraduates where popular scientific and ‘superpowers’ films and radio plays from the twentieth and twenty-first centuries were the starting point to explain the scientific principles behind them and their applications in our real world. This successful experiment led us to the development of two new interdisciplinary modules ‘Genetics: Science & Society’ (for undergraduates) and ‘Thinking Water’ (for postgraduates) that will be deliver at the University of Warwick in next academic year. With these new modules, we bring together the disciplines of Chemistry, Statistic, Biology, Philosophy, Sociology, History of Medicine, Drama and Film & TV Studies for engaging students to look at global topics, such as genetics and water, in their complexity. Students will gain a multidisciplinary learning and more importantly they will become able to summarise it into a global approach to genetics and water related issues and problems, developing their own research for answering to such problems in a holistic way that crosses disciplinary boundaries.
Elena Riva is a Chemical Biologist and Teaching Fellow at the Institute for Advanced Teaching and Learning (IATL) at the University of Warwick. She develops modules for undergraduates and postgraduates that explore complex and global scientific topics and issues creating connections between scientific disciplines and humanities. Elena obtained a master degree (2007) and a PhD (2010) in Chemistry from the University of Milan. After holding a Research Associate position at the University of Cambridge (2011), she became a Research Fellow at Warwick (2012) and was subsequently awarded an IAS Postdoctoral Fellowship. In 2015 she has become an IATL Teaching Fellow.

Elizabeth Hauke, Imperial College London, UK

Using and abusing TBL to sow the seeds of interdisciplinarity

'Lessons From History' is an interdisciplinary cross-faculty module option available to all third and fourth year undergraduate students at Imperial College. It offers students the opportunity to learn about significant global events such as natural disasters, conflicts and humanitarian crises from a historical, cultural and scientific perspective.

Organised as a team-based learning programme, the students study set materials and draw key learning points from each historical case study. They then work in teams to apply this learning to the modern world, specifically thinking about policies for future disaster mitigation and managing global challenges.

With an emphasis on empathic engagement with real-world situations, the students are challenged to understand the multiple and complex perspectives involved including those of leaders, perpetrators, victims and the wider public.

We have adapted the team-based learning process to accommodate such an approach, with student teams undertaking to study varying perspectives from which we as a whole class then build up our understanding of the event. We use a range of interdisciplinary activities to introduce each new event studied to help the students think and work in completely new ways.

This presentation will introduce this module as a case study to explore the integration of some of these approaches within the structure of team based learning.

Dr Hauke is a Senior Teaching Fellow in the Centre for Languages, Culture and Communication. As well as teaching on the Science Communication Masters programme, Dr Hauke is responsible for developing and delivering the Global Challenges suite of Sustainable Human Development courses as part of the cross-faculty undergraduate Imperial Horizons programme. The eight Global Challenges courses have been recognised with an EU Best Practice Award and voted best teaching innovation by the Student Union.
Parallel paper session 3

Marcus Hill and Joan Maclean, University of Leeds, UK
Interprofessional Learning

Our presentation will explore the way in which a 30 credit module has been delivered to first year students on a range of undergraduate programmes in the School of Healthcare at the University of Leeds. We will discuss how the module has been structured to allow students to learn in small interprofessional sets. These include student nurses, midwives, social workers and health scientists, who study together and are assessed both individually and in groups. We will explore how our approach prepares students for the increasingly collaborative environment in which they will practise both before and after registration.

Stephen Marshall, University of Strathclyde, UK
Interdisciplinary Learning and Teaching through the Vertically Integrated Project

The Vertically Integrated Project (VIP) Program was developed and refined at a number of institutions in the United States, most notably Georgia Tech and Purdue. It has now been taken up by a consortium of Universities but so far the only one in Europe is the University of Strathclyde which has over 200 students participating in 10 teams across all disciplines. See www.strath.ac.uk/viproyects and vip.gatech.edu for more details. Also the link www.strath.ac.uk/viproyects/viproyects/ provides an overview and some video clips of each project made by the VIP students. Whilst not a strict requirement more projects have an interdisciplinary aspect and VIP is an ideal vehicle for introducing undergraduates to interdisciplinary working from an early stage in their academic career. A key interdisciplinary VIP is Polarised Growth with involves students from Biology, Electrical and Electronic Engineering and Maths to improve the yield of antibiotics. The project Textlab integrates students from English and Computer Studies to develop software algorithms design to uncover near insights into Shakespearean text. Several of the projects include aspects of outreach into high schools, the local community (especially areas of high social deprivation), international development and the business community. For example Performance VIP reaches into schools where STEM concepts are introduced through drama. Others include projects to deliver Solar Energy and Sanitation in Sub Saharan Africa. The Department of Architecture has a designated plot in the Gorbals area of Glasgow carrying out community projects. The response of students to VIP could not be more positive and they find it an inspiring as well as educational experience.

Prof Stephen Marshall received a first class honours degree in Electrical and Electronic Engineering from the University of Nottingham in 1979 and a PhD in Image Processing from University of Strathclyde in 1989. In recent years he has established the Hyperspectral Imaging Centre at the University of Strathclyde. He has published over 200 conference and journal. He is a Fellow of the Institution of Engineering and Technology (IET). He has also been successful in obtaining research funding from National, International and Industrial sources. He is the lead academic for the Vertically Integrated Project Program.

Oli Johnson, University of Sheffield, UK
Inclusive Learning and Interdisciplinarity: Study Skills beyond the Curriculum

At 301 Centre for Student Skills and Development we offer a programme of study skills workshops that are open to students at all levels and from all departments. The broad range of disciplinary and educational backgrounds represented within a single workshop poses a challenge in terms of session design, but it also has the potential to shift the emphasis away from knowledge transfer to allow students to focus instead on the process of learning: a transdisciplinary approach that encourages the sharing of experiences. Although the 301 model for study skills provision is sometimes described as ‘generic’, I prefer the term ‘inclusive’ to
describe an underpinning philosophy that foregrounds student participants as co-producers of knowledge within workshops. This presentation will draw on student responses to 301 workshops as well as my own experience of designing sessions to discuss strategies we use to facilitate interdisciplinary learning and explore the tensions, perceived or actual, that emerge around interdisciplinarity within workshops. Specifically, the following questions will be addressed: what happens when students are encouraged to separate learning skills from subject-specific knowledge? Are study skills methodologies transferrable across disciplinary boundaries? How successfully are students able to apply their learning following a workshop? This discussion will contribute to current debates around the role of study skills in HE to suggest that the process of ‘learning how to learn’ stands to gain tangible benefits from taking place in an interdisciplinary environment.

I am an Academic Skills Development Adviser at 301 Centre for Student Skills and Development at the University of Sheffield where I run a programme of study skills workshops, support a team of PhD student tutors and work with departments to support the development of student skills in the curriculum. I have a background in research and teaching in the Department of Russian and Slavonic Studies.
Parallel workshops 1-3

Laura Meagher, University of Edinburgh, UK
Interdisciplinary Integration: Whose responsibility?

Learning and teaching labelled as 'interdisciplinary' is likely to grow, particularly since graduates are expected increasingly to enter the workforce able to work in diverse teams and to devise integrative solutions for multi-faceted problems. Our recent study of current and likely future interdisciplinary provision in the UK, commissioned by the Higher Education Academy, uncovered some key challenges. One of the most striking differences was that between academic publications which called for teachers of interdisciplinary courses to provide intellectual integration across disciplines, and what appears to be the most common practice, offering components to students and expecting them to accomplish integration. A professionally facilitated workshop is proposed to encourage sharing of experiences and suggested solutions for key issues of interdisciplinary integration. Questions to be tackled will include:

- What does/should interdisciplinary ‘integration’ mean, in a learning and teaching context?
- Do tensions exist between theoretical aspirations for integration and practical feasibility in an educational setting?
- Can people share related experiences?
- Who bears the responsibility for integration across discipline-based elements of an interdisciplinary course or programme: teachers? students? both?
- What ‘good practices’ can be shared in helping students achieve sufficient intellectual integration that their interdisciplinary learning experience adds distinctive value to their education?

Dr Laura Meagher, Senior Partner, Technology Development Group, has throughout her professional career facilitated, led and evaluated interdisciplinary initiatives and capacity-building schemes. She herself is the product of a liberal arts education in the US, followed by an interdisciplinary PhD. Her UK-based consultancy on strategic change in research and higher education has included evaluations of interdisciplinary programmes for Research Councils and other funders. An honorary fellow at the University of Edinburgh, she has co-authored with Catherine Lyall a number of briefing notes, articles and a book on interdisciplinarity, as well as the recent HEA-funded study on UK interdisciplinary provision.

Willy Kitchen, Camilla Priede, David Vessey and Anthony Warde, University of Sheffield, UK
Title TBC

Willy Kitchen is Head of the Department for Lifelong Learning where he directed its Foundation Programme in Combined Studies for many years. He was co-lead of the cross-institutional ‘Academic Skills Hub’ project at the University of Sheffield and an active participant in the work of the University’s Centre for Inquiry Based Learning. With a degree in Law, a doctorate in Archaeology, and many years’ experience working with mature students at all levels of undergraduate study, Willy has taught everything from contract law to trigonometry to rites of passage, and is a firm believer in the power of student-led learning.

Camilla Priede is an interdisciplinary academic, having been programme director of an interdisciplinary degree here at The University of Sheffield since 2010. I am currently one of the programme directors for the Department for Lifelong Learning’s Foundation Programme and Certificates in Higher Education. I am interested in the various modes of beyond-disciplinary learning, and developing a understanding of the application of these for Widening Participation in Higher Education.
David Vessey is a University Tutor (Department for Lifelong Learning) and Teaching Associate in Modern History (Department of History). In my role with DLL, I work with mature students from diverse backgrounds who enter higher education with different skills and challenges to traditional school leavers. Consequently, I am interested in innovative pedagogical methods, such as case-based learning scenarios, and particularly the utility of trans-disciplinary learning and teaching to broaden student engagement with the Humanities at the beginning of their university education. This has been to the fore in existing and ongoing module development for DLL’s new Level One curriculum.

Anthony Warde came to Sheffield in 2007 to undertake a PhD on the late fiction of Cormac McCarthy, which I completed in 2010. I have taught at both The University of Sheffield and Sheffield Hallam University since 2008, joining the Department for Lifelong Learning (DLL) in 2009. My core interests lie in modern and contemporary literature and narrative theory, although my teaching spans texts and topics ranging from Beowulf to Virginia Woolf, from classical myth and legend to contemporary culture. Since joining DLL, I have also developed teaching and research interests in academic skills and reflective learning, with a particular emphasis on identifying effective, supportive and transdisciplinary pedagogies and learning strategies for mature and atypical students.

Andrea Haker, Linda de Greef and Jasper ter Schegget, University of Amsterdam, Netherlands
Title TBC
Rachel Clements, University of Newcastle, UK

*Combined Perspectives? Reflections on introducing an interdisciplinary curriculum*

This paper offers insight into the development and implementation of a first year undergraduate Combined Honours module conceived and facilitated by a collaborative teaching team (of staff and students) at Newcastle University. We seek to reflect on our pedagogical framework for the module including our ambitions to design a more coherent curriculum and a more holistic learning experience for our students, inspired in part, by a student project which argued for the virtues of interdisciplinary thinking (Louis, 2014). Previously, we had also introduced cross-subject projects in final year with some success. We examine the trials and tribulations of introducing an interdisciplinary module at this level of study, our main challenge being student willingness and readiness to engage in interdisciplinarity as a theory, when only having left the familiar confines of discipline-based teaching in secondary education so recently. We include both staff and student reflections, focussing on teaching practices and student responses to the module both at the time the module was first run and now, with those early participants looking back in retrospect as they approach their final year of study. The paper concludes on subsequent revisions of our interdisciplinary first year Combined Perspectives module, having moved the module away from a skills and concept led syllabus to an enquiry based approach to learning in which interdisciplinarity is ‘practised’ implicitly rather than taught explicitly.

I’m currently on adoption leave from The Combined Honours Centre, Newcastle University, where I have been a teaching fellow for the past two years. Prior to this I undertook a PhD in human geography, also at Newcastle, though my research was I would say, wholly interdisciplinary, looking at Polish Migrant families in the North East of England, particularly the emotions, familial relationships and everyday lives of Polish migrant parents. Funded by the ESRC on a ‘2+3’ scheme meant embracing two years of language based area studies (supervised at The University of Glasgow) before embarking on my PhD. Leading the new first year undergraduate interdisciplinary module in Combined Honours has been a huge but pleasurable challenge; together with a team at Newcastle we continue to develop this module.

Ida Kemp, University of Sheffield, UK

*Using Vygotsky’s Relationships as an approach to Interdisciplinary study*

Vygotsky’s theories regarding children’s learning development and the notion of developing knowledge in ‘relation’ to things may offer a starting point when approaching interdisciplinary study. Encouraging students to build their knowledge on what they already know is an effective element in obtaining deeper knowledge and wider understanding. Taking time to explore what students know and sharing that between them also encourages discussion and understanding of issues of knowledge production. This short presentation will explore why taking a step back to construct a structure or basis for knowledge at the outset of an interdisciplinary module is likely to provide benefits as the students move through the module. This is not to imply that module leaders don’t take into account their student cohort and experiences, but it is to re-iterate that taking time to set the scene may allow for greater engagement. This approach may also offer a wider range of topics for exploration. The traditional ‘project’ based approach for interdisciplinary enquiry may not be required if students are encouraged to explore the relationships between disciplines rather than ‘solve’ a problem. Longer term, practicing this approach may encourage students to use this method when considering ‘new’ knowledge in other contexts and experiences. This approach may allow for greater ‘transferability’ of knowledge, as well as open up students to the critical engagement of issues of ‘knowledge’, ‘truth’, ‘validity’ and ‘certainty’ as well as the often unarticulated bias that can exist within ‘disciplinary’ practice.
Ida Kemp currently works as the Interdisciplinary Programmes Manager in the Faculty of Arts and Humanities at the University of Sheffield. She manages a three-subject Combined Honours degree and supports processes and developments for a wide range of two-subject Dual Honours degrees. The IPO also supports an Interdisciplinary PGT programme in Public Humanities and four interdisciplinary Undergraduate modules. Previous to Sheffield, she worked in the Centre for Joint Honours at the University of Leeds and as Head of Joint Honours at York St. John University. She has a Liberal Arts degree from the College of Wooster (Ohio, USA).

Beverley Gibbs, University of Sheffield, UK

Crossing Boundaries: Principles for Learning and Teaching across Applied and Social Sciences

The allure of interdisciplinary solutions in addressing complex problems has become a recognizable feature of the UK and EU research landscape, spanning a range of activity from project-level collaborations to entirely new academic disciplines. In comparison, pedagogical strategies for interdisciplinary teaching and learning have been somewhat neglected, even though (ironically) the trend for interdisciplinarity was grounded in calls for reform in HE and an academy that would produce graduates better equipped to serve the needs of society (Klein 2008). This in turn is a response to earlier claims that traditional bodies of knowledge and norms were inadequate for the reflection, renewal and judgement required for complex and dynamic challenges (Jantsch 1972). However, explicit curricula did not begin to emerge until this millennium with courses in sustainability, ecosystems and environmental management playing roles as exemplars. As these courses have matured, some clearer principles have come into view. In the first part of this presentation, I will present a pedagogical framework derived from a literature review that outlines what we currently know about successful interdisciplinary learning - a framework that spans attitudes to be cultivated, principles to be learned, skills to be developed and learning modes to be facilitated. In the second half, I will conclude by reflecting on professional practice to describe a sometimes painful but frequently rewarding journey of trying to implement these principles across two disciplinary fields that invoke two quite distinct epistemological traditions: social sciences and SET.

Since 2015 I’ve been helping the Department of Mechanical Engineering deliver and develop its range of engineering management education, liaising with the University’s School of Management. I am a Senior University Teacher and curriculum lead for the Design, Manufacture and Management teaching group. I originally trained and practiced as a production engineer, have managed multimillion pound applied physics research programmes and have worked in commercial and decision support roles in mining and engineering consultancy industries. At Sheffield I tutor and mentor engineering undergraduates/design groups, and lead 4th year/MSc modules on decision making, industrial marketing, and engineering projects and risk.
Facilitating Interdisciplinary Encounters for Foundation Year Learners: A Module Case Study

The Arts and Humanities Foundation Year at the University of Leeds provides learners from widening participation backgrounds with a preparatory year of study at level 0 before they progress into a degree programme on successful completion of the course. This interdisciplinary foundation year curriculum supports learners to develop crucial skills for becoming successful undergraduates, while enabling them to achieve their subject-specific and discipline-orientated goals. Interdisciplinary teaching prepares learners for study in a single discipline by facilitating the development of confidence and independent learning through a diverse programme of education. However, for the learner, this diversity can include topics, concepts and approaches which may seem peripheral to their learning journey. This paper will consequently explore how we have sought to navigate the exciting pedagogical opportunities and the inherent challenges offered by delivering an interdisciplinary module. Using a case study of one module, ‘Modernity and Post-Modernity’, we will consider how the individual interests of students can be engaged within a scheme of work that navigates Cultural Studies as an inherent ‘inter-discipline’, alongside rich intersections between discipline-specific perspectives of the contested nature of its central terms. Mieke Bal (2002, p.8) has proposed ‘to those trying to find their way in the labyrinthine land of a humanities without boundaries. Such a land can only unify through travel, through learning foreign languages, through encounters with others.’ We will reflect on how interdisciplinary encounters are configured between students, subjects and objects of study, and their role as a foundational framework for future success.

After completing a PhD in medieval literature at the University of Leicester, Zoë taught a mixture of English literature and academic skills before starting her current job at the University of Leeds. She is now module leader for the ‘Image, Music and Text’ and ‘The Renaissance’ modules on the Arts and Humanities foundation year in the Lifelong Learning Centre and contributes as module tutor to the other core modules. As a medievalist, she works in an interdisciplinary manner through her subject research, and translates these approaches and skills to her teaching and pedagogic studies.

Madeleine Newman is Programme Leader for the Arts and Humanities Foundation Year in the Lifelong Learning Centre at the University of Leeds. She is interested in the intersections between disciplines, theories and practices within the Arts and Humanities, both in terms of pedagogy and the study of the visual arts. She completed her PhD in the History of Art at the University of Leeds in 2010 and holds a PGCE in Lifelong Learning. Her research interests include sculpture studies and interdisciplinary approaches to learning and teaching.

Holistic education for holistic practitioners: reaching the whole student in midwifery education

Learning how to be a midwife is a great deal more than the acquisition of technical knowledge and skills. It is emotional, physical and political; both a craft and a science. It involves connecting with women at one of the most significant physical and emotional crisis points in their lives. Midwives, if they are to thrive in the tough world of the NHS, need to have a strong sense of their own professional identity, a deep capability for empathetic communication and a developed inner resilience to avoid long-term burnout. My pedagogical approach involves drawing on the humanities: poetry, drama, prose and art, to inspire and enable our midwifery students to express how they feel about their professional practice and their developing sense of themselves as midwives. Through different modes of expression students are lifted out of their own worldview and given a linguistic frame – the story – with which to develop their understanding of themselves and their practice. This presentation discusses the processes and outcomes of these collaborations; with performing arts students and lecturers and with lecturers in Art and Design as well as detailing student’s responses to drama, collage and poetry and the ways they have used them to reach greater clarity regarding their role as midwives and their personal philosophies for practice.
I am a qualified midwife and have been lecturing in midwifery since 1999. In that time, I have used poetry, drama and art to help students reflect on their personal and professional development and on their philosophy for practice. I find working across traditional subject boundaries refreshes my teaching and provides students with a rounder university experience than they might otherwise get, as well as offering students different, less constrained ways of articulating their relationships to their work and development. Student responses encourage me to continue exploring ways of opening the traditional midwifery curriculum out and letting the humanities in.

Naomi Hetherington, University of Sheffield, UK
Thinking Through Things: Object Based Learning as an Interdisciplinary Framework to Learning and Teaching

This presentation considers how object based learning can provide an interdisciplinary framework for learning and teaching. It provides an overview of the different disciplinary frameworks used to analyse objects and shows how object based learning has been successfully integrated into two new programmes in the Department of Lifelong Learning at the University of Sheffield: the Foundation programme in Combined Studies and the level 1 Certificate in Higher Education in Society and Culture. The presentation outlines the particular benefits of this approach in introducing mature students to key concepts in the humanities and social sciences by enabling students to draw on their different backgrounds, experiences and values and relate these to classroom learning. It highlights some of the potential dangers and difficulties of learning through objects which may evoke powerful memories and feelings for students. It discusses strategies for managing these responses in a classroom setting and through the use of online resources. It then discusses the incorporation of object based learning into the design of alternative forms of assessment to the traditional essay, which tends to disadvantage non-traditional learners. Finally, the presentation considers differences in the responses of mature and other kinds of learners to object based learning through the opening up of individual CertHE modules to first year undergraduate students from other departments.

I am University Tutor in the Department of Lifelong Learning at Sheffield University, where I convene two interdisciplinary modules: ‘Introduction to the Humanities’ (level 0) and ‘Ideas That Changed the World’ (level 1). I have an interdisciplinary background in literature, theology and women's and gender history with a particular focus on the Victorian period. I have undertaken a number of collaborative research projects with scholars from across different humanities disciplines and am interested in developing theoretical and pedagogical frameworks for interdisciplinary learning and teaching, particularly with mature and non-traditional learners.
Do you know what a sensor is?: Peer learning in interdisciplinary design teams

Recently we witness a rising interest in interdisciplinary collaboration in both industrial design and engineering education. This interest is triggered by the observation that professionals who do not experience interdisciplinary cooperation during undergraduate education find it challenging to work with people from other disciplines. Considering that developing technology and innovation invites more complex design problems which are often beyond the professional skills and competences of a single person, learning how to work in interdisciplinary teams becomes a central concern within the undergraduate programs of these fields. This paper focuses on peer learning as an important aspect of interdisciplinary design teams in the context of extra-curricular education activities. The empirical data comes from the accounts of 42 undergraduate and postgraduate students who participated in the Interdisciplinary Design Studio (IDS), which is the first educational activity organised by Middle East Technical University Design Factory in October 2015. In IDS, students from the Departments of Industrial Design, Architecture, Mechanical Engineering, Electrical and Electronics Engineering, Metallurgical and Materials Engineering, Computer Engineering, and Business Administration came together in six interdisciplinary teams to develop innovative products following the stages of a design process. Throughout the four-week IDS, students presented their work to and got feedback on their projects from an interdisciplinary team of tutors, which consists of faculty members from Faculty of Engineering, Faculty of Architecture, and Faculty Economic and Administrative Sciences. Drawing on the semi-structured interviews with the students, this paper presents a comparison between learning from peers versus learning from tutors, highlighting that students foreground the former over the latter as a more effective way of learning about interdisciplinarity.

Pınar Kaygan (PhD, Sociological Studies) is Assistant Professor in Industrial Design at Middle East Technical University, Turkey. Her research interests include creative work and workplace; interdisciplinary relations, collaboration and teamwork in design education and practice; and critical aspects of design management, including gender, hierarchy and power relations in the designer’s work.

Harun Kaygan is assistant professor in industrial design at Middle East Technical University, Turkey. A designer by training, he received his PhD in 2012 at the University of Brighton with his thesis on everyday nationalism as embodied by designed products. His teaching and research work focuses on the cultural aspects and political implications of design practices and products. In teaching and project supervision, he emphasizes design ethnography and participatory and generative methods. His current research interests include design activism, bodily interactions with products, and the applications of new materialist theoretical frameworks to design, including actor-network theory and new materialist anthropologies.

Selin Gürdere is a PhD candidate in the Department of Industrial Design at Middle East Technical University (METU). I am also a research assistant in a design research project granted by the Scientific and Technological Research Council of Turkey (TUBITAK) in the Department of Industrial Design at TOBB University of Economics & Technology. Following my graduation from the Department of Wood Product Industrial Engineering, Hacettepe University, I worked for seven years in the furniture industry in Istanbul while I pursued my M.A in Design at Kadir Has University.

Dr. Arsev Umur Aydinoğlu is a Tubitak-European Commission FP7 Marie Curie Cofund Action Fellow at the Center for Science and Technology Policies, Middle East Technical University. His research interests are research collaboration, interdisciplinary work, virtual teams, and teamwork. He worked with different research communities (astrobiology, origins of life, design & engineering, earth sciences) investigating interdisciplinary research and education. He received his Ph.D. from the College of Communication and Information, the University of Tennessee.
Özümcan Demir (BID, Industrial Design) is Research Assistant at Middle East Technical University, Turkey. She is currently pursuing her MSc and focuses on interdisciplinary collaboration between industrial design students and students from other disciplines in her master thesis. Her area of interest includes design management, interdisciplinary collaboration and teamwork in design, and contribution of design to startups and SMEs.

Deborah Sporton, University of Sheffield, UK

Critical Interdisciplinarity: insights from the GLOSS initiative

This paper draws on the Global Learning Opportunities in the Social Sciences (GLOSS) scheme to share experiences of interdisciplinary learning and teaching with a particular focus on the international extra-curricular activities the scheme promotes. GLOSS involves staff, undergraduate and postgraduate taught students drawn from across the Faculty of Social Sciences at the University of Sheffield working in partnership with non-academic stakeholders on various international projects. Attention here is focused on two unique and contrasting schemes within the GLOSS portfolio - the Global Leadership Initiative (GLI) and SIDshare. The GLI provides students and staff with opportunities to work as fully accredited policy analysts at major global summits such as the G7 and G20, briefing and publishing up-to-date, real-time policy analyses of global decision-making. SIDshare is a student run social enterprise operating as an international development NGO involving students drawn from across the University working on projects with partner NGOs across the globe. Drawing on ‘critical interdisciplinarity’ frameworks, this contribution discusses with examples from GLOSS, the important yet neglected role of external stakeholders in interdisciplinary learning and teaching. Interdisciplinarity is often conceived as horizontal (within the academy) detaching students from end-users of knowledge. Our experience with GLOSS supports calls for the incorporation of vertical interdisciplinarity (outside the academy) deepening students’ engagement with their studies through co-production. This contribution further interrogates the relationship between interdisciplinary and disciplinary learning. Specifically what do students take back to their disciplines? Are interdisciplinary schemes such as GLOSS complementing their studies or providing a new dimension?

Deborah is Director of the Global Learning Opportunities in the Social Sciences (GLOSS) Programme at the University of Sheffield that seeks to provide unique international learning experiences for students within the Faculty of Social Sciences. Her research and teaching interests lie primarily in the interdisciplinary field of international development where she works with an extensive network of external partners to develop engaged learning activities for students

Jasper Homminga and Jennifer L Herek, University of Twente, Netherlands

New Engineering: teaching and learning at the interface of technology and social science

Traditional engineering education creates specialists. However, engineers need to be generalists who can combine technological and societal approaches with design solutions that can be implemented in a range of technical, social and cultural contexts. Our aim is to train broad-minded problem solvers for the real world: New Engineers. ATLAS (Technology and Liberal Arts & Sciences) is an interdisciplinary Bachelor of Science honours programme at the interface of technology and social science. The programme has a thematic structure, in which a large project forms the foundation of every semester. The projects are complex, open-ended and interdisciplinary, and require integration of knowledge from three different domains: Engineering/Science, Mathematics and Social Sciences. In addition, six learning lines - Research, Design, Organization, Communication, Learning Capacity and Interdisciplinarity - further support student development. For example, the first project of the programme is Human Dynamics: students are challenged to “design a product that stimulates more physical activity” for a specific target group (i.e. teenagers or professors or...). The design of the system integrated learning in the domains, such as movement, force, and energy (Physics), modelling and optimisation (Mathematics), and psychology, motivation, group behaviour (Social Sciences), but also required skills in design methodology, academic writing, literature research, and social research. By the end of the semester the students had designed and built prototypes that were tested with
stakeholder groups. We will present our integrated approach of teaching and learning technology and social sciences, and illustrate how it captivates and motivates students and teachers alike.

Jasper Homminga is a founding Core Team member of the University College for Technology and Liberal Arts & Sciences (ATLAS) at the University of Twente in the Netherlands, where his own experiences help shape the program. He holds a master in Mechanical Engineering and a PhD in BioMechanical Engineering. He has worked at the Radboud University Medical Center Nijmegen (Netherlands) and the Technical University Eindhoven (Netherlands) before joining the faculty at the University of Twente. Next to his work in ATLAS, he teaches in BioMedical Engineering and Technical Medicine and does research on the human spine.

Afternoon plenary session

David Morrison, Plymouth University, UK

New evidence on interdisciplinarity and how we can teach it

While there has been a lot written about interdisciplinarity in the past 40 years, there is still little consensus in the literature on what it is or how to develop it in the undergraduates expected to be able to do it. The chief reasons are a reliance on self-identified, circular, and non-generalisable evidence, and a lack of engagement with wider HE research in much of the foundational literature. This base has left a strong legacy of conflicting approaches to interdisciplinarity in learning and teaching and curriculum design. To address this, my doctoral research at the University of Glasgow turned to well-established but virtually untouched psychological research on expertise, categorisation, knowledge transfer, and collaborative cognition to better triangulate with existing evidence on what interdisciplinarity really is, what it isn’t, and how it can best be learned/taught. This presentation will briefly touch on the nature of the existing problems, but will mainly discuss the findings of the new types of evidence. Attention will be on the reliability and generalisability of different findings, and the degree of relation to existing ideas on interdisciplinarity. I will conclude by offering a new definition of both disciplinarity and interdisciplinarity based on the evidence discussed, and by identifying the key skills and pedagogies necessary to develop real interdisciplinarity in undergraduate students. Note: If requested, this session could be made a 40min workshop instead with practice of different pedagogic models of interdisciplinarity.

I am a former medieval historian, software developer, jeweller, and electrician who turned my eclectic background towards doctoral study at University of Glasgow on what underlying nature of interdisciplinarity is, and how it does and/or should manifest in higher education, particularly undergraduate teaching. Since completing that I have worked on the LEAF project on assessment and feedback across subjects at Glasgow, and am currently at Plymouth University where I am researching/developing internationalisation of the curriculum for home students and evaluation of new a university-wide curriculum structure. Interdisciplinarity has remained key to my work in every project.