The 5th eSTEeM Annual Conference
STEM Futures: Lifelong Learning in the Digital Age
14-15 April 2016

FINAL PROGRAMME

Day 1: 14 April 2016

Time	Session	Venue
9.00 – 9.30	**Registration and Coffee**	**Bay Reception/ Medlar and Juniper**
9.30 – 9.35	**Welcome and Introduction**	**Hub Lecture Theatre**
	Nick Braithwaite and Clem Herman, eSTEeM Co-Directors	
9.35 – 9.45	**Opening Address**	**Hub Lecture Theatre**
	Patrick McAndrew, Director, Institute of Educational Technology	
9.45 – 10.15	**Opening Keynote Presentation**	**Hub Lecture Theatre**
	Andrew Smith, Senior Lecturer in Networking, Faculty of Mathematics, Computing and Technology *Our classroom has escaped!* Social media is here to stay with many platforms having been with us for over ten years - it is embedded into the daily lives of around 3 billion souls. As academics we have to face facts; our classrooms virtual or face to face have long ago escaped into the ether via social media. The Cisco Networking team at the Open University have explored how social media can help extend the 'classroom'. Finding ways of using Twitter, LinkedIn, Facebook and Periscope amongst other sites to engage students and enhance the way the subject is being taught.	

10.15 – 10.30	**Coffee-to-go**			**Medlar and Juniper**
10.30 – 11.30	**Parallel Session A: Short Oral Presentations – *Supporting students***			**CMR 1**
Session A **Chair: Suresh Nesaratnam**	Linda Robson, Lynda Cook and Nicolette Habgood	Student experience of university email communication	This project investigated student's perception of email communications from the OU. Both quantitative data and qualitative data from U116, SDK125 and S142 were analysed. The conclusion was that although students do receive a significant number of email communications, they are content with this and self-filter to suit their own needs.	
	Janet Haresnape and Nicola McIntyre	Sharing good practice and creating community spirit online - an AL Staff Development initiative in Science	This Staff Development initiative, involving a regular programme of OU Live sessions for Science ALs by Science ALs, provides opportunities for ALs to meet online to share good practice in supporting their students. Moreover, it helps foster a feeling of community among ALs on modules which are delivered entirely online.	
	Ann Walshe, Anne-Marie Gallen, Anne Campbell and Mark Jones	Associate Lecturer perspectives on supporting students through tuition in groups	For our eSTEeM project, we have gathered evidence of AL perceptions of group tuition and what ALs think students expect from it. We can learn much from this group of practitioners about the effective provision of group tuition, particularly as we move towards implementation of the new Group Tuition policy.	
10.30 – 11.30	**Parallel Session B: Short Oral Presentations – *Technologies for STEM learning & STEM engagement***			**CMR 11**
Session B **Chair: Ekkehard Thumm**	Andy Lane	The impact of technology on the teaching and assessment of 'systems diagrams'	Diagramming is a creative process where the context and tools used to create the diagram may hinder or help students and tutors. Students were either enthusiastic or sceptical about their value and the technologies used to create and share them were often burdensome in the two modules investigated.	
	Sally Jordan and Christine Leach	Establishing the force-concept inventory using free-text questions: Can we do it? Why would we do it? Is it the same?	We will describe and discuss the implications of a project which is seeking to establish the force concept inventory (an instrument that is widely used around the world as a measure of student understanding of Newtonian mechanics) using short-answer questions rather than the usual multiple-choice questions.	
	Frances	Breaking the coding barrier:	We present the early results of an exploration of the	

	Chetwynd, Helen Jefferis and Fiona Aiken	Transition from Level 1 to Level 2 programming	effectiveness of the MCT Faculty Level 1 modules - TU100 and TM129 - in preparing students for their Level 2 - M269 and M250 - programming studies. Audience views on conducting whole cohort data analysis will be sought.	
10.30 – 11.30	**Parallel Session C: Short Oral Presentations – *Online/onscreen STEM practice & Technologies for STEM learning***			**CMR 15**
Session C **Chair: Maria Kantirou**	Victoria Nicholas, Nick Braithwaite, Sarah Chyriwsky, Dave Edwards and Mark Hirst	Perceptions of online group work	In "Practical Science: Biology and Health" (SXHL288), students undertake online group work and reflect on the experience as part of their final assessment. Students often reflect negatively on some aspects of group work. This presentation outlines our analysis of the reflections and the subsequent changes to the way group work is carried out on the module.	
	Angela Coe, Pallavi Anand, Tom Argles, Nigel Harris, Victoria Nicholas, David Rothery, Philip Sexton, Clare Warren and Graham Healing	Inspiring and enabling academic authors so they can better support students learning online	The production team for S309, Earth processes, have utilized, developed and integrated a wide range of features of online technology to provide a direct, efficient, responsive and tailored work environment to inspire both students and educators. Highlights of the work and results of the pilots will be presented.	
	Tara Hawes, Chris Hough, Will Rawes, Peter Twomey and Andrew Norton	The trials and tribulations of S217: putting a second-year physics module online	They said it couldn't be done, but S217 Physics: from classical to quantum is a second-year OU Science module that is now offered 100% online. Taking a hefty print-based course and adapting it for online use posed several challenges for production that required innovative solutions.	
11.30 – 11.45	**Coffee-to-go**			
11.45 – 12.45	**Parallel Session D: Short Oral Presentations – *Supporting students***			**CMR 1**
Session D	Carol Calvert and Rachel Hilliam	Improving retention: using a voluntary diagnostic quiz	The study outlines the improvement in retention achieved when students were encouraged to use a voluntary diagnostic quiz on a Level 1 mathematics	

Chair: Mark Endean			module – MST124. Initially the power of the diagnostic quiz, in predicting future success on the module, was identified using predictive analytics.	
	Susan Pawley and Chris Hughes	Provision of online drop-in centres for students requiring additional support in mathematics	How can we adapt the model of face-to-face mathematics drop-in centres used at most UK Higher Education Institutions, to fulfil the needs of our diverse student body? Currently halfway through our pilot, we will discuss our findings and look forward to how it can be improved and implemented.	
	Gerry Golding, Martina Gibbons and Anthony Brown	Bitesize virtual mathematics support	Bitesize virtual mathematics support is one of a number of initiatives within a wider virtual mathematics support project that seeks to support students who are struggling with the mathematical content in their undergraduate studies. It draws on the premise that we don't all learn mathematics in the same way.	
11.45 – 12.45	**Parallel Session E: Short Oral Presentations – *Employability, Innovative assessment & Supporting students***			**CMR 11**
Session: E **Chair: Victoria Nicholas**	Rachel Hilliam, Rosaria Gracia, Carol Calvert and Victoria Pearson	Enabling Staff Tutors to achieve their potential and equipping them with the correct support in STEM	The University and departments within STEM need to share best practice and consider ways to support staff tutors through their career progression and enable them to effectively undertake this important role in a distributed network.	
	Yao Xu and Simone Pitman	Enhance students' employability: EMA for publication	Enhance students' employability and raise the OU's global profile by turning module assignments into published articles.	
	Martin Reynolds	Developing praxis for learning, teaching, and working amongst OU postgraduate students	A praxis model of postgraduate pedagogic (re)design based on engaging students, alumni, employers, and educators, is presented. Such praxis invokes the need for promoting 'conversation' (engaging dualities rather than reinforcing dualisms) at different levels; a praxis that builds on OU interactions between research, teaching and capacity building.	
11.45 – 12.45	**Parallel Session F: Short Oral Presentations – *International curriculum delivery & Technologies for STEM learning***			**CMR 15**
Session F	Lorraine Hudson, Gerd	Evaluating the design and delivery of a Smart Cities MOOC for an	The Smart Cities MOOC explores the role of technology and data in cities, teaching international learners how to	

Chair: Chris Douce	Kortuem and Annika Wolff	international audience	co-create a smart cities project. This talk will present research evaluating the design and delivery of the course including the analysis of FutureLearn datasets and exploring learners' views on smart cities.	
	Michel Wermelinger and Tony Hirst	Learn to Code for Data Analysis on FutureLearn: the good, the bad and the ugly	We report on lessons learned in producing and presenting the FutureLearn course 'Learning to Code for Data Analysis', reflecting on the advantages and limitations of MOOCs in general and the FutureLearn platform in particular for hands-on teaching of technical skills.	
	Kris Stutchbury	Supporting the teaching of Science in development contexts: OpenScience Lab and TESSA	OpenScience Lab (OSL) and Teacher Education in Sub-Saharan Africa (TESSA) are two major OU projects focusing on making materials available as Open Educational Resources (OER). This talk will highlight how, by working together, we could make a significant impact on science learning in secondary schools in development contexts.	
12.45 – 14.00	**Poster Presentations and Lunch** Delegates are invited to vote for the best poster at this year's conference. The winning poster will be announced during the closing keynote session.			**Hub Lecture Theatre/Medlar and Juniper**
14.00 – 15.00	**Parallel Session G: Workshop/Demonstration – *Accessibility***			**CMR 1**
Session G	Karen Vines, Chris Hughes, Hilary Holmes, Victoria Pearson, Claire Kotecki, Laura Alexander and Chetz Colwell	Listening to graphs	In this workshop we will describe an alternative representation of graphs – sonification. That is using sound to 'draw' graphs. So come along to hear some graphs, to compare the sounds with the originals and find out what some students and visually impaired people made of them.	
14.00 – 15.00	**Parallel Session H: Structured Discussion/Briefing – *Technologies for STEM learning***			**CMR 11**
Session H	Janice Ansine, Will Woods, Kevin McLeod and Mike	Exploring Citizen Science and STEM learning through iSpotnature.org	www.iSpotnature.org provides a unique informal to formal learning journey, building identification skills in natural history; on the cutting edge of technological innovation in pedagogy, it utilises and embraces new	

	Dodd		forms of teaching, learning and assessment identified as the way forward for Science education. Come and discuss the future of this citizen science platform in STEM leaning.	
14.00 – 15.00	**Parallel Session I: Structured Discussion/Briefing – *Technologies for STEM learning***			**CMR 15**
Session I	Elaine Thomas, Karen Kear, Helen Donelan, Leonor Barroca and Jon Rosewell	Student perspectives on learning in OpenStudio, the online 'studio' environment	The 'Using OpenStudio in STEM learning' project is evaluating the use of online studio-based learning in the Open University. Comparison between findings from student data gathered by the project, a simple model of the processes involved in OpenStudio activities and Kolb's Experiential Learning model has yielded some valuable insights. The workshop includes a practical activity using OpenStudio so please bring your laptop or tablet.	
15.00 – 15.15	**Afternoon tea-to-go**			
15.30 – 16.00	**Closing Keynote Presentation**			**Hub Lecture Theatre**
	Helen Beetham, Consultant in Higher Education *Supporting lifelong learners: resilience and care in a digital age* For all the opportunities afforded by the ongoing digital revolution, digital spaces introduce new challenges for learners, new stresses, and even new kinds of inequality. Helen Beetham will explore some recent research into students' expectations and experiences of digital learning outside the OU. She will ask what digital experiences enable learners to become more resilient to change, and whether we can design online environments that meet our learners' needs for care, affirmation and wellbeing, as well as their needs for knowledge and information.			
16.00	**Close**			

Haptics for Education Workshop

Day 2: 15 April 2016

Time	Session	Venue
9.30 – 9.45	**Registration and Coffee**	**Bay Reception/ Medlar and Juniper**
9.45 – 9.50	**Welcome and Introduction**	**Hub Lecture Theatre**
	Nick Braithwaite, eSTEeM Co-Director	
9.50 – 10.20	**Keynote Presentation**	**Hub Lecture Theatre**
	Astrid Kappers, Vrije Universiteit – *Haptic perception of shape and space* The aim of my research is to gain a fundamental understanding of touch by means of a systematic and extensive exploration on the haptic perception of shape and space. In this talk, I will present an overview of some of the research we did in the last decade. This research yielded many interesting and often surprising findings. Among others, we found strong after-effects of haptic curvature perception: after touching an object for just a few seconds, your perception of the next object you touch will be influenced. We also found that the shape of your hand (longer than wide) biases your perception. Comparing the volumes of small objects in your hand leads to large shape-dependent biases. We developed paradigms for investigating haptic search and found haptic pop-out effects. Finally, it was found that physical space and perceptual space are far from identical. Simple tasks like making two bars parallel or perpendicular yielded large but systematic deviations. By running a diverse set of psychophysical experiments, we now know how to understand these deviations in terms of different reference frames that are involved in performing such tasks.	
	Presentations and Demonstrations	**Hub Lecture Theatre**
10.25 – 10.35	**Music/Motion** Simon Holland – *Haptics in Music and Motion: Multi-Limb Haptic Interaction From Music To Stroke Rehabilitation* The Haptic Bracelets are lightweight wireless devices, designed to be worn on wrists and ankles. They contain accelerometers, gyros, processors and low-latency, powerful, precise vibrotactiles. The multi-limb Haptic Bracelets have innovative applications in music and music education, but also in rehabilitation after stroke. Key theoretical perspectives will be outlined: entrainment, dalcrose eurythmics and neural resonance theory. A range of musical applications are considered, and preliminary results noted. Findings from gait rehabilitation with stroke patients are summarised. Applications are outlined for Parkinsons, cerebral palsy, spine injury, and the deaf.	

10.40 – 11.00	**Materials Design/Lab Haptics** Lisa Bowers – *Touching Creativity – A baseline review on haptics in education for applied design* This presentation offers the highlights of a recent baseline review of literature from three strands of research area 1) haptics (manual/machine), 2) adaption to a universal distance learner, 3) education in applied design. Design Practice – is presented from the 'germinal' stage (otherwise known as the prototype stage) of the traditional Product Design cycle. This specific focus is due to the act that typically the germinal stage is the most 'hands on' section of process and therefore he section where haptic technology could offer the most impact to learners. The presentation also offers a spot light on to how furthering hands on applications via haptic can offer better creative interactions across all STEM (STEAM) subjects. Nick Braithwaite – *Haptic as a contribution to immersive learning in online labs* The OpenSTEM initiative is making available a number of remotely controlled instruments in configured for remote access experiments. In principle the interaction could be entirely via on-screen alpha-numeric text, but we have so far opted built-in webcams and are experimenting with live sound to create the sense of presence. Survey feedback suggests that until it has been tried, sound is not missed – the same was probably true with vision and we do not plan to leave our remote users 'in the dark'. In a hierarchy of sensory data for an observer, texture and force-feedback are next in the expectation that these too will add to the immersive experience. So the questions we wish to explore are about which applications most need a haptic element and how should we develop our expertise.	
11.00 – 11.15	**Coffee Break**	**Medlar and Juniper**
11.15 – 11.45	**Keynote Presentation**	**Hub Lecture Theatre**
	William Harwin, University of Reading – *Haptic interfaces for learning skills and reinforcing spatial concepts* Haptic interfaces are beginning to find application in medical skills training with work in surgery, triage, veterinarian and dental arenas. Haptic interfaces may is also a mechanism to investigate and simulate complex spatial concepts and may be an appropriate way to provide technology enhanced learning in secondary schools. This talk will overview research in these areas.	

	Presentations and Demonstrations	Hub Lecture Theatre
11.50 – 12.10	**Health Monitoring** Shailey Minocha, Duncan Banks, Caroline Holland, Jane Palmer (Age UK, Milton Keynes), Catherine McNulty and Alice Peasgood – *Role of wearable activity-tracking technologies in the well-being and quality of life of people aged 55 and over* We will discuss our project that involves investigating the role of wearable activity-tracking technologies in the well-being and quality of life of people aged 55 and over: how such devices may promote behaviour change but also the challenges associated with making sense of the data, the ethical issues of sharing the data and the perceived risks. We will outline our project's plans for the empirical investigations with older people, family members, carers and medical professionals. The Sir Halley Stewart Trust has funded this project. The views expressed in this presentation and any follow-on publications are those of the authors and not necessarily those of the Trust. More details of the project are here: http://www.shaileyminocha.info/digital-health-wearables/	
12.15 – 12.35	**Devices/Soft Haptics** Iestyn Jowers, Mark Gaved and Gary Elliott-Cirigottis – *Design and materiality: collaborative learning at a distance* Design education is a field in which distance learning based universities can encounter challenges in providing equivalent experiences to face-to-face education institutions. Tangible aspects of design education such as making and prototyping are difficult because access to the tools and materials required are typically highly limited. This can result in graduates with little exposure to the materiality of design processes. In this paper we explore haptics in terms of considering one approach to overcoming the challenge of enabling distance based design students to engage with the physical aspects of prototyping. The RE:FORM project was a feasibility study pairing Open University design students (graduates of T217 'Design Essentials') with vocational workshop based learners in the community makerspace MAKLab. Learners were paired and tasked with designing and making flat-pack chairs from plywood, cut on CNC routers from software designs developed on CAD programs. The two sets of learners were given specific roles to carry out: OU students as designers, with MAKLab trainees as manufacturers. A successful conclusion could only be achieved by the pairs communicating and providing their respective competencies and expertise. This replicated a real-world scenario of distributed manufacturing, which enabled students to develop their technical skills, and also a range of crucial soft skills (communication, collaboration with other professionals, project management) which have been identified as important by the manufacturing sector.	

	OU students benefitted from extending their prototyping experience from small scale cardboard models to full size plywood prototypes, gaining insight into the challenges of moving from conceptual designing to practical realisation. These challenges included the performance of materials and tools, and the need to articulate design decisions in terms of making as well as creative exploration. Trevor Collins – *Soft haptics: Tactile multimedia for immersive learning experiences* Haptic technologies typically use actuators that apply a force against the skin in order to create tactile feedback. Haptic interfaces have been adopted in a range of augmented and virtual reality systems to enhance the user's sense of immersion. In this presentation we'll introduce the use of 'soft haptics' that create the perception of feedback without direct physical force. The idea of 'tactile multimedia' was introduced by Peter Whalley (see http://oro.open.ac.uk/6211) as a means for designing layered media that encourages active enquiry-driven learning. Critically, Whalley argued that interaction could be designed to facilitate learning through active exploration because "the interactivity designed into the interface becomes central to the learning processes that it is intended to facilitate". These 'tactile effects' manipulate or constrain interaction in order to emphasise a point for educational purposes. For example, constraining the available actions within a simulation to mechanically correct movements, or manipulating the dragging movement of a simulation to create a perception of the realistic physical behaviour. The increasingly ubiquitous use of touch interfaces brings an opportunity to use tactile effects through common computing and communication devices to improve the sense of immersion and encourage more analytical manipulation of online simulations and experiments. We will demonstrate how soft haptics have been applied to create a sense of touch within a forces and motion shared simulation on tablets.	
12.40 – 12.55	**Tactile/Vision Impaired** Victoria Pearson, Karen Vines and Andrew Whitehead – *Alternative versions of graphs for visually impaired students* Providing alternative versions of graphs suitable for use by visually impaired students has traditionally resulted in the production of figure descriptions, which are now standard module production items. In this session we will demonstrate two types of alternate renderings of graphs, tactile and sonified, and briefly describe how such renderings can be created.	
13.00 – 14.00	**Lunch**	**Medlar and Juniper**

14.00 – 16.00	**Roundtable discussions** The aim of this session will be to address specific questions relating to haptics in education e.g. what are the potential benefits of additional sensory feedback i.e. texture, resilience, defamation? How far are we from routine use of tactile clues, in addition to the important niche area of visual impairment? Places for the roundtable discussions are limited; if you would like to attend please contact esteem@open.ac.uk. Priority will be given to those actively engaged in the use of haptics for education.	**Hub Lecture Theatre**
16.00	**Close**	