



Widening Participation in Medicine

What role do students' backgrounds play in their journey to study medicine?

Widening Participation → work done on the belief that all individuals who have the ability and desire to study medicine have the opportunity to do so (Medical Schools Council, 2017).

Background

- Medicine is becoming increasingly considered as a profession for students from under-privileged backgrounds (Mullins, 2009).
- British Medical Association (2009) state the medical workforce must be clearly representative of the community it serves.
- Leeds University use the Access to Leeds scheme to widen participation. Criteria include social class but also other characteristics (Fig 2).
- Students from lower socio-economic groups and ethnic minorities lack a supportive environment and encouragement (Greenough et al., 2008).

Aims

- Explore students' experiences of the application process to medicine.
- Understand the support students received.
- Interpret these findings to understand how future students could be supported.

Methods

- Medical students who met one of more of the Access to Leeds criteria (Fig 2) recruited by email.
- Participants were a mixture of ethnicities, ages, were female and one male.
- Semi-structured interviews.
- Interviews lasted 21-45 minutes.
- Audio recorded and transcribed verbatim.
- Ongoing qualitative data analysis.

Preliminary Findings

- Most students were well supported by their school, family or friends, this was perceived as important during their application.
- Students reported a lack of support from medical professionals and felt students were recruited and interviewed.
- Schools filled the gap in support through financial support.
- Experience of the application process was varied.
- Many students were unaware of the Access to Leeds scheme and its advertised.

Key Messages

- Strengths: Researcher interested about the process and as ethnics were reported first in that generation.
- Limitations: Participants accessing medical entry should be wary to avoid those not to really enter.

Graph 1: More applicants were accepted from less deprived backgrounds in 2009-12 (Stamen et al., 2008).

Year	% Applicants accepted from less deprived backgrounds
2009	3.2
2010	5.2
2011	6.9
2012	7.0
2013	9.1
2014	10.6
2015	12.2
2016	14.4
2017	22.9

Key Messages

- Only 10% of students attend a local secondary school.
- Students identified the nearest GP surgery in their area.
- Students identified the nearest GP surgery in their area.
- Students identified the nearest GP surgery in their area.

Fig 2. Access to Leeds Criteria University of Leeds, 2017.





A welcome by Professor Trudie Roberts

Welcome to the fourth LIME annual report which highlights our work in delivering exceptional educational programmes. Our sustained excellence is maintained through our identity as an innovative, responsive and supportive institute. We work together as a medical education community and continue to enhance our capabilities by networking, developing and collaborating. This report sets out our commitment to innovation, our working in partnership and our responsiveness to changes in technology, education and the healthcare environment. We are gratified at the global recognition of our work in the field of medical education and our acknowledged scholarship which ensures that our students receive an outstanding experience.

I am very proud to be a member of this medical education community and have the great pleasure of being able to communicate the outstanding work of LIME. I hope you enjoy reading this report, sharing in our passion for sustained excellence in education. If you are interested in any of the projects we are involved in and would like further information, please do not hesitate to contact us.

Professor Trudie E. Roberts

Director, Leeds Institute of Medical Education (LIME)



Leeds Institute of Medical Education

excellence through scholarship

DELIVERING

Graduation 2017 – congratulating our graduates

Graduation of our students, undergraduate and postgraduate took place in the Great Hall, University of Leeds, on 18 July 2017. At the ceremony, honorary degrees (Doctor of Science) were presented to Professor Anne Chamberlain and Professor Paul Workman - Professor Chamberlain for her pioneering and extensive work in rehabilitation medicine in Leeds, nationally and internationally and Professor Workman for innovative and impactful research into cancer therapies.



We congratulate all our graduates and wish our newly qualified doctors a fulfilling future

A leading university – TEF and National Student Survey 2017–sustaining excellence

The results from the National Student Survey for academic year 2016-17 has shown that Leeds Medical School is placed sixth overall across all UK Medical Schools and second overall in the Russell Group ranking of research intensive universities.

Final year students are asked questions over eight aspects of their learning experience. Results from Medicine are as follows, numbers expressed as percentage agree:

Teaching on my course	89
Learning opportunities	84
Assessment and feedback	75
Academic support	82
Organisation and Management	82
Learning resources	91
Learning community	79
Student voice	75
Overall, I am satisfied with the quality of the course	89

Consolidating the quality of a Leeds education, the University of Leeds attained a GOLD rating in the Teaching Excellence Framework (TEF), the highest award available. The TEF panel judged that the University delivers “consistently outstanding teaching, learning and outcomes for its students, of the highest quality found in the UK.”

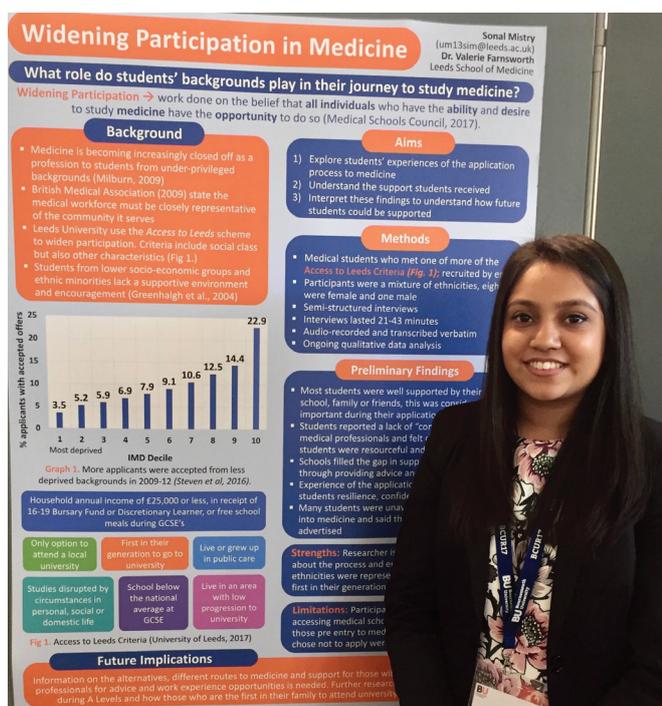


Medical education intercalation making an impact

Graduates of the BSc in Applied Health (Medical Education) are increasingly maintaining involvement in medical education through presenting and publishing their medical education research. A number of recent graduates have received external awards for their research presentations, including Nicole Hrouda, Rebecca Lumley, and Toby Price (2015-2016 graduates) and Sonalben Mistry (2016-17 graduate).

Dougal Williams (2014-2015 graduate) published his research in the highly competitive journal *Medical Teacher*. Co-authored by Dr Anne-Marie Reid and Dr Matt Homer, this paper assessed the effects of Leeds' enhanced "super-assistantship" placements on final year medical students' objective structured clinical examination (OSCE) performance.

A diverse authorship team of Dr Alison Ledger (Programme Lead), Lydia Edwards and Sonalben Mistry (2016-2017 graduates), Dr Drew Harding (2013-2014 graduate), and Ken Hargreaves (IDEALS facilitator) published a critical reflection on the medical education students' teaching for first year MBChB students. At last check, this paper has received over 600 views on *MedEdPublish* and two excellent reviews from esteemed medical education academics. These achievements are a testament to the hard work of the students, their research supervisors and the wider BSc in Applied Health teaching team. We look forward to working with our graduates as they progress in their clinical and education careers.



Sonalben Mistry presenting her medical education research at the British Conference of Undergraduate Research at Bournemouth University, 25-26 April 2017

Physician Associate workforce development

We are delighted that the first group of University of Leeds qualified Physician Associates have all been employed by NHS providers within the Yorkshire and Humber region. In anticipation of the unprecedented expansion of the profession locally, we have created a clinical leadership fellow position to liaise with providers across all sectors developing roles and educational programmes for qualified Physician Associates.

This work, based at the University of Leeds, is being carried out across the Yorkshire and Humber region and supports providers interested in developing the role of Physician Associates within their organisation. We are encouraging collaboration between organisations to enable lessons learnt in Trusts already employing Physician Associates to be applied to those interested in developing a programme. We are working with providers employing Physician Associates to forge links that will promote educational and professional development of this emerging role across the region and develop leadership and educational positions for experienced Physician Associates.

We hope that this work will embed the profession in the region and create an environment in which Physician Associates continue to contribute to a sustainable and dynamic multi-disciplinary workforce.

For more information on developing roles for Physician Associates in your organisation contact: Dr Sam Roberts s.roberts1@leeds.ac.uk



The initial group of Physician Associates working within Leeds Teaching Hospitals Trust

Patient | Carer Community (PCC) put on a warm welcome for overseas students

For the second year running the PCC have run sessions for the overseas students who are hoping to study Medicine and Dentistry in the UK. The programme 'Introduction to Dentistry and Medicine' aims to provide the students with clinical observation and opportunities to understand UK healthcare.

The PCC deliver a day called 'Conversation Rounds' at the beginning of the course. Small groups of students rotate round tables every thirty minutes meeting pairs of PCC Members in a 'speed dating' model. It is an opportunity for students to practice talking informally with patients and carers about their healthcare experiences and what it is like living with a health condition. The PCC also ask the students questions about their lives and why they have chosen to study in the UK, this promotes conversation rather than history-taking.

The students prepare and deliver a ten minute presentation about what they have learned and how they will implement it. The PCC members give each presenting group feedback and finally announce a winner.

At the end of the day students are better able to communicate with patients and carers in an informal setting, demonstrate empathy when interacting with people with a diverse range of needs and to recognise the importance of exploring the patient and carer perspective in health.

Such a deep and insightful session that really allowed me to value the influence the Patient | Carer Community has had on my own learning experience and I know I will carry this with me into practice.

students on the course

Postgraduate research in Clinical Education

In LIME, we welcome a number of students pursuing doctoral research degrees (PhD, MD, EdD) focusing on medical education. LIME staff supervise five School of Education EdD students who are researching clinical education, two await transfer and three have successfully transferred. In the past academic year, Faye Bennett and Lauren Clunie, both Anatomy Demonstrator Scholars, have successfully completed transfer which is the first stage of their PhD progression. Lauren's project involves evaluating the educational impact of technology-enhanced learning in anatomy. Faye is researching the educational impact of the extent to which anatomy students relate to the lives of the people who donate their body. Her project was a runner up in the University's annual Postgraduate Research Poster competition. Sara Idris, Anatomy Demonstrator Scholar (2016), has joined the team to research into Open Book Examinations. Research students, Matthew Shaw and Helen Ireland presented their work at a recent Quality Improvement Conference at the University of Leeds organised jointly by the Faculty of Medicine and Health School of Medicines Optimisation, and Health Education England (HEE). Roselyn Masamha also had a chapter accepted for "Decolonising Teaching and Gender", which will be published by Routledge U.K.

The Postgraduate Research Team has hosted international collaborations in the past academic year. Two visitors from Suez Canal University, Egypt – Rania Alkhadragy, spent six months as a visiting researcher, working on the Clinical Skills e-Book and Enjy Abouzeid has a two year placement with LIME while she completes her doctorate. Rachmadya Hidayah, Universitas Gadjah Mada, Indonesia continues to work on her study of the introduction of the medical licensing examination in Indonesia.

Interprofessional Postgraduate Clinical Education goes from strength to strength

The Taught Postgraduate Certificate (PG) and Masters in Clinical Education offer clinical educators working in a range of health care professions the opportunity to develop their knowledge of learning, teaching and assessment in clinical contexts and to develop their own practice-based research. Despite concerns about how the withdrawal of funding through the Specialist Skills and Post Registration Development (SSPRD) contract would affect the distinctively inter-professional character of the provision, recruitment is good.

The PG Certificate in Clinical Education in 2016-17 was achieved by 26 health-care professionals with a further 28 registering for the 2017-18 programme. This programme has been successfully reaccredited by the Higher Education Academy (HEA) for a further four years – and two course tutors who completed their studies prior to accreditation achieved Fellowship of the HEA.

The Masters degree in Clinical Education is run over 2 years and currently yearly cohorts of 14 and 16 are completing their studies. Graduates from the Masters contributed research papers to an education-based Quality Improvement Conference at the University of Leeds organised jointly by the Faculty of Medicine and Health, School of Medicines Optimisation and Health Education England (HEE) and attended by 80 people.

Both postgraduate programmes received a 100% agreement for satisfaction in the National Student Survey (NSS). Programme approval has been given for an online MSc in Medical Education.

Recognition of students' professionalism and commitment

The seventh Professionalism Ceremony, recognising the professionalism and commitment of Year 3 MBChB students, took place on the 28 October 2016, in the Great Hall. We were pleased to include and recognise the Year 2 Postgraduate Diploma in Physician Associate Studies students in the ceremony.

The ceremony was opened by Professor Paul Stewart, Dean of the Faculty of Medicine & Health with Professor Trudie Roberts, Director of the Leeds Institute of Medical Education (LIME) welcoming and introducing the keynote speakers.

The first keynote was delivered by Miss Sanja Besarovic, Consultant Paediatric Surgeon and Clinical Lead for Paediatric Surgery, at Hull Royal Infirmary. Sanja has worked in Great Ormond Street Hospital, Bristol Children's Hospital, Birmingham Children's Hospital and Royal London Hospital. Born in Sarajevo, former Yugoslavia, Sanja earned a medical degree in 1978 at the University of Sarajevo, she then completed training in General and War surgery at the Military Academy (VMA), Belgrade and Kosevo Hospital. Sanja was awarded Healthcare Hero of the Year 2016 at Hull Health Expo Awards.

Professor Martin Marshall, Professor of Healthcare Improvement at UCL provided the second keynote, he leads Improvement Science London, an initiative to promote and embed the science of improvement across both the health service and academic sectors. He has been a GP for 26 years, now serving an inner city community in Newham, East London.



Keynote speakers Professor Martin Marshall and Miss Sanja Besarovic congratulating students

This year at the ceremony, the commitment and contribution of members of staff were also recognised. Leeds School of Medicine Awards for Excellent Longstanding Service to Undergraduate Clinical Education were presented to three clinical teaching staff who have engaged with the school for many years and provided outstanding student experiences in a variety of specialities.

Teaching Recognition Awards, new awards introduced this year were made in recognition of our clinical colleagues and aim to convey our thanks to them. Nominated by members of the School, winners were chosen based on their contributions to Patient | Carer Community; interprofessional learning; a continued positive feedback from students and best improved placement.

Longstanding Service Awards to Undergraduate Clinical Education, were awarded to:

Dr John Dickinson, for his role as an Academic and Personal Tutor serving the School and his tutees with distinction over the last ten years.

Mr Tony Shenton, has worked as a Consultant in Emergency Medicine at Bradford since 1987. He has always been an active participant in undergraduate medical education in Bradford and was instrumental in organising the first medical student placements in Accident and Emergency when Leeds medical students started placements in Bradford.

Mrs Rose Watson for her involvement in the education of undergraduate medical students for over 15 years during which time she has made a significant contribution to the development and delivery of clinical skills teaching.

Teaching Recognition Awards 2016, were awarded to:

Howard Beck, Consultation and Involvement Officer in the Deaf Equality Team at Leeds City Council.

Dr Sue Calvert, Consultant Gynaecologist and Gynaecology, Obstetrics & Sexual Health Personal Tutor at Bradford Teaching Hospitals NHS Foundation Trust.

Frank Cottingham, Clinical Educator at Leeds Teaching Hospitals NHS Trust.

Kay Henderson, founding member of the Patient | Carer Community and has worked with students since 2003.

Miss Shireen McKenzie, Consultant Oncoplastic Breast Surgeon at Leeds Teaching Hospitals NHS Trust.

Dr Ian Pickering, Medical Educator at South West Yorkshire Partnership NHS Foundation Trust for nine years.

Dr Charmian Reynoldson, was a FY1 at Bradford Teaching Hospitals NHS Foundation Trust and this year was based at Calderdale and Huddersfield NHS Foundation Trust.

Dr James Rowley, was a Core Trainee Year 2 in A&E, based in Airedale NHS Foundation Trust last year and this year was based at St James'.

Anita Solanki, Lead Pharmacist at Leeds and York Partnership Foundation Trust.



Keynote speakers, LIME staff and students at the post-ceremony reception



INNOVATING

Assessment Research Group

Members of the Assessment Research Group in LIME (Professor Richard Fuller, Dr Matt Homer, Dr Jenn Hallam and Godfrey Pell) have carried out a range of successful scholarship, research and knowledge transfer activities in the last year. These include:

- Publishing academic articles on the benefits of sequential testing (forthcoming in *Medical Teacher*), the concept of 'borderline' students in performance assessments and the use of children as simulated patients in OSCEs (with Dr Jonathan Darling).
- Presenting workshops on OSCE quality and workplace validity and a range of conference papers at the international meetings AMEE- Helsinki, APMEC- Singapore and ASME- Exeter plus several invited plenary talks.
- Providing assessment consultancy at the GMC alongside delivering advice and support to a number of other Medical Schools and Departments at the University of Leeds.

They have also significantly developed other strands of research, particularly in workplace-based assessments and behaviour change. This has led to the re-design of workplace-based assessments (co-designed with students), deploying 'nudges' to support students 'at risk' of future failure and streamlining summative and formative assessment feedback across MBChB assessments.

Clinical Skills eBook

The clinical skills ebook, launched in 2014, is an interactive web-based resource developed to support clinical skills teaching on the MBChB. The ebook contains descriptive walkthroughs of key clinical techniques enhanced with high quality photographs and video demonstrations and is available via the clinical skills website: <http://clinicalskills.leeds.ac.uk>

The original ebook, developed as a collaborative project between the Clinical Skills team and the TEL team in LIME, has been significantly expanded this year to include contributions from new authors and now includes chapters on Clinical Examinations and History-taking.

Working closely with the RESUS teams at St James' University Hospital and Leeds General Infirmary we have also been able to include an innovative, interactive Virtual Crash Trolley. The Virtual Crash Trolley allows students to explore the contents of a Crash Trolley at their own pace using a desktop PC or smart phones/tablets. Each piece of equipment can be seen *in situ* in the trolley and is annotated with a zoom image and text descriptions of its use and/or application. The video includes a demonstration of the use of some pieces of equipment. A second resource – the Generic Crash Trolley – which contains both paediatric and adult equipment is planned for inclusion early next year.

Clinical Skills Passport app

The Clinical Skills Passport app allows the students and their tutors to view their progress in clinical skills. This is essentially a reporting App which interfaces with the ePortfolio. It provides a progressive record of development that maps to curriculum outcomes and the Students Expectation Guide:

- Observe
- Direct Supervision
- Indirect Supervision
- Perform Independently
- Teach

The app tracks essential requirements at each stage of the programme. It allows for a personalised experience and further learning opportunities within safe practice limits building in option complexity through Medical School years to reach foundation level. Supporting the learner, built into the app are nudges, signposting to additional support and resources. This in turn will help tutors to focus their teaching and give them confidence that they are teaching students at an appropriate level.



RECOVERY POSITION	
Not assessed	
RISK ASSESSMENTS	
Not assessed	
SENIOR ESCALATION	
Not assessed	
SHARED CARE, TRANSFER BETWEEN TEAMS AND MDT	
Level at Observe	

[Help](#)

Tea, cake, and death – running a Death Café in the Medical School

How do you bring a group of strangers together to talk about death and dying?

In September 2011, Jon Underwood and Susan Barsky Reid, Underwood's mother, facilitated the first Death Café. Jon held the event in his apartment in Hackney, London, to trial the idea that talking about death can help the living.

Since then, the Death Café movement has become a global phenomenon with thousands of cafes happening across 51 countries.

As a social franchise it has two key rules: tea and cake to foster a sense of warmth and safety, and facilitators set the scene only, they avoid leading the conversations.

I felt a great sense of privilege facilitating the Patient | Carer Community's first Death Café in October 2016 with Jools Symons, Patient & Public Involvement Manager. Then our second Café in April 2017, and our third in October 2017 with the medical student society Humanities and Spiritual Health (HuSH).

I am never less than astonished at the power of the Death Café ethos. As a facilitator and active participant, I get to witness the candour, compassion and humour, from the simple idea of giving people permission to talk about death and dying, all washed down with tea and cake.

I am never less than astonished at the power of the Death Café ethos – tea, cake, and the permission to talk about death and dying.

Phil Sheridan



3rd Death Café at Leeds Institute of Medical Education. Hosted by the Patient | Carer Community (PCC) and the medical student society – Humanities and Spiritual Health (HuSH).

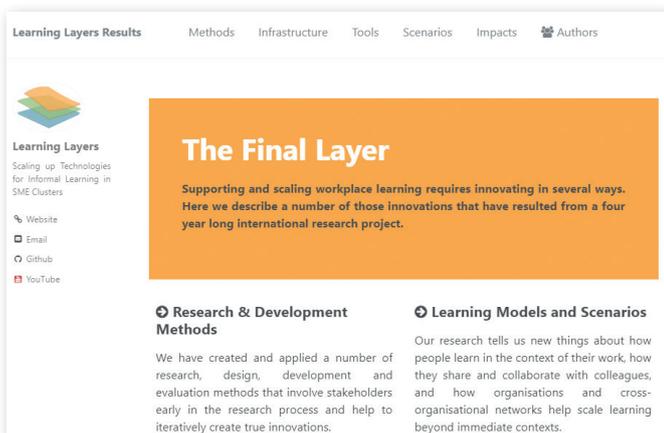
Learning Layers impact – four years of working with our European partners to explore how technology can support workplace learning

LIME has been a key partner in the EU-funded Learning Layers project, which officially finished this year, and we have played an important role in helping to ensure that the learning technologies developed, partnerships built and lessons learned have a life beyond the project. This large research project involved 20 partner organisations across Europe, who worked together to explore how technology could be used to support informal learning at the workplace. LIME led the work in healthcare in which we co-designed (with healthcare professionals) new technology tools to support informal learning and piloted and evaluated these tools in local, regional and national healthcare networks.

The project officially finished in January 2017, but the impact and the work lives on in many different ways, as seen on our website.

The Learning Layers research work is continuing beyond the project in many different and interesting ways

Tamsin Treasure-Jones
(Lead of the healthcare work on Learning Layers)



The Learning Layers Results Website
<http://results.learning-layers.eu/>

Leeds MEDtalks

Leeds Institute of Medical Education (LIME) were delighted to launch the new Leeds MEDtalks this year, introduced as part of the Continuing Professional Development (CPD) resources and activities for clinical teachers. MEDtalks are short talks produced by clinical colleagues and MBChB students (approximately three - five minutes), projected through influential videos to help share tips, good ideas, areas of teaching innovation and good clinical teaching practice.

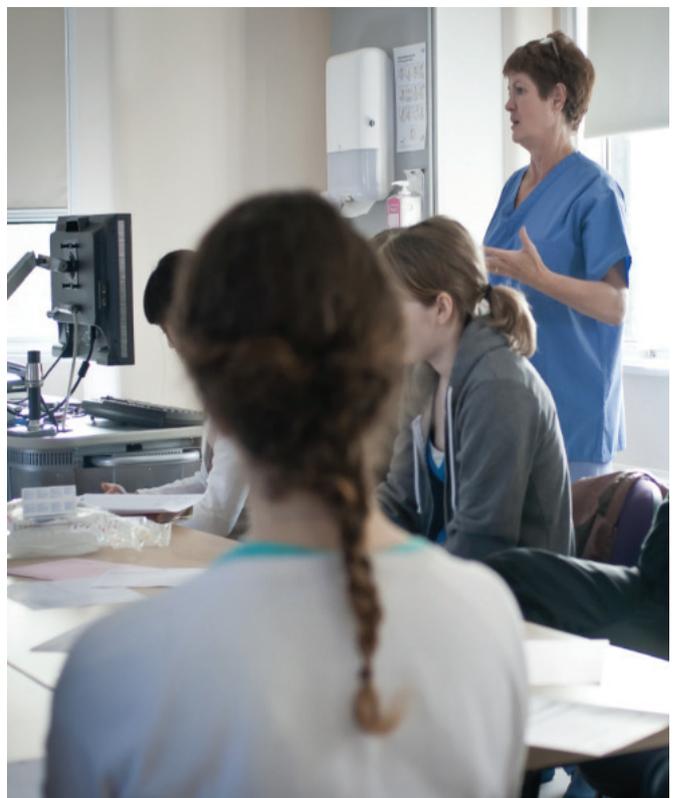
MEDtalks have been developed in partnership with our local education providers, students and patients:

The aims are for:

- Sharing and showcasing good practice across placements
- Promoting Excellence in Undergraduate Clinical Teaching and placement innovations

MEDtalks can viewed via the weblink or via the QR code below:
http://medhealth.leeds.ac.uk/info/860/cpd/2416/leeds_medtalks

If you are interested in producing a MEDtalk for your placement please contact Liz Allen, Undergraduate Medical Education Coordinator, School of Medicine, Leeds; e.allen@leeds.ac.uk



Leeds**MED**talks

Researchers and students get creative in co-designing new application - My Personalised Adaptive Learning (myPAL)

Researchers and developers within LIME have decided to take a novel approach to designing the next version of myPAL (My Personalised Adaptive Learning), an application designed by LIME that uses feedback and data analytics to give students valuable insights on their progress.

Staff will be working alongside students and tutors to use creative games and hands-on exercises to co-design improvements to myPAL. From tables and visualisations to the nuts-and-bolts of how the application works, students and tutors will be involved throughout the entire process.

The first round is set to get underway in the new academic year and will focus on deciding which patterns students want to be able to find within their data. They will work together with developers to design visualisations that will then be made into prototypes that students can test out.

LIME is keen to involve students in this process as they want to ensure that myPAL can meet their needs as closely as possible. The purpose of the application is to empower students to use their data to their own advantage and as such, students have a key role to play in the application's development.

For more information and to get involved please email mypal@leeds.ac.uk

Staff will be working alongside students and tutors to use creative games and hands-on exercises to co-design improvements to myPAL.

Rosie Dent-Spargo

Evaluating and understanding impact and transitions: the first home-grown Physician Associates in the Yorkshire and Humber region: from postgraduate students to employed practitioners

Two-year regional programme evaluation

Researchers in LIME are currently conducting a Health Education England-funded evaluation of the Physician Associate courses in the region. The aim is to establish a rich wealth of data on who the students enrolling on these newly established courses are, where this new workforce will emerge from and how the programmes compare in terms of recruitment and retention.

Ten-year longitudinal cohort study

A project that aims to explore the experience of Physician Associate students through training and beyond into employment is being carried out. An online survey will be taken by students in their first year of training and every year after for a period of five years (there will be five cohorts of students recruited from all courses across the Yorkshire and Humber region).

The findings of this study will broaden our understanding of this new profession, such as whether the expectations of Physician Associate students match reality, if the training provided is sufficient and how wellbeing is impacted across the five years. This in turn, will inform the development of the national curriculum and provide an insight in how we can better support students, staff and patients in the development of the role within the NHS.

For more information on either of these research projects, please contact Sarah Howarth s.d.howarth@leeds.ac.uk

Integration of Physician Associates into the NHS workplace

The first group of Leeds-trained Physician Associates have recently begun work across the region and as a new professional group, there is little evidence to support their needs around the transition from student to practitioner. A LIME-based Leadership Fellow is undertaking a mixed methods exploratory study of this first cohort via surveys, focus groups and semi-structured interviews in order to develop an understanding of how we might better facilitate this transition for future cohorts.

For more information on this research project, please contact Dr Sam Roberts s.roberts1@leeds.ac.uk

Developing inter-professional understanding of patient safety

Improving patient safety is a national imperative. However, supporting medical students to understand the centrality of patient safety to their practice can be challenging. Further, ensuring the safety of patients is arguably only possible with good team working and multidisciplinary collaboration. Interprofessional education is therefore, ideally placed to support a more nuanced, deeper understanding of safety for future healthcare professionals.

In November 2016, researchers at LIME began a two year project - funded by Health Education England, Yorkshire & Humber - aiming to explore the feasibility of a patient-centred interprofessional education intervention. This work asks students from different professions to speak to hospital inpatients about safety, using an evidence-based patient-centred patient safety questionnaire (O'Hara *et al*, 2016; Lawton *et al*, 2017). Using this feedback, students then work together to make patient-centred recommendations for service changes. We believe that this approach has a number of potential positive outcomes that we are exploring in more detail:

- learning about patient safety within a clinical setting;
- understanding the role of patients in managing patient safety;
- meaningful engagement with students from other healthcare professions, which underlines safety as a team activity and responsibility.

This project will complete in October 2018.

I was surprised that it made me think about me changing my practice in the future



Speaking to an inpatient at their bedside.

Using patient feedback on safety to support interprofessional education

PRASE (Patient Reporting and Action for a Safe Environment) has been developed by researchers in the region as a way to systematically collect and act on patient feedback about the safety of care. To date, it has been trialled in more than 33 wards across six NHS Trusts.

PRASE is a powerful, evidence based tool to capture patient feedback on patient safety. It is local (ward-based, rather than top down) but with the capacity for trust-wide collation. It can improve interdisciplinary relationships and enhance a culture of true patient-centred care

Robin Jeffrey, Consultant Renal Physician, Bradford Teaching Hospitals NHS Foundation Trust (BTHFT)

Sarah Howarth, Shelley Fielden and Dr Jane O'Hara in LIME are extending this line of work by exploring whether the PRASE intervention can also be used to deliver interprofessional education on patient safety to students in a clinical setting. In order to do this they will ask students from different health professions, rather than hospital volunteers, to work in pairs and speak to inpatients at their bedside about safety (using the PRASE measurement tools). The feedback report will be analysed and quality improvement recommendations to ward staff will be made.

Individual interviews shall be carried out with the students and NHS staff to investigate whether the intervention broadens students' understanding of quality improvement and patient safety and to what extent it helps them grasp the significance of interprofessional teamwork in a ward setting.

Fourteen wards across four Trusts (Airedale, Calderdale & Huddersfield, Harrogate and Leeds) have been recruited and medical, nursing, pharmacy and physiotherapy students from universities in the Yorkshire region are currently being approached. Please contact Sarah Howarth s.d.howarth@leeds.ac.uk for any further information.



Shaping projects with return on investment methodology

At a time when funding is stretched and every penny must be made to count we have been exploring the Return on Investment (ROI) of some of our key projects. Building on over ten years of research in the arena of Technology Enhanced Learning (TEL), we have delved deeper into the impact these innovations are having not just on the student learning but their wider impact on our staff and stakeholders such as the NHS, patients and the wider HE community. We are leading the sector in applying ROI within the academic setting, examining the value of projects to medical education relative to the cost through Cost Benefit Analysis (CBA).

LIME has a strong reputation in TEL, regularly showcasing our work at international conferences such as Association for Medical Education in Europe (AMEE). We have a robust research and evaluation strategy which shows us that our innovations in technology are beneficial to students and well used. It is important though that we also examine the impact created by the work we do to ensure that we provide maximum value for money.

Over the past year we have worked with specialists 3C Associates to generate a methodology of CBA for educational interventions with a specific focus on TEL projects. The methodology uses both qualitative and quantitative measures to create a systematic process to assess value and impact. This process helps to identify potential benefits but also serves as a review process to ensure that effort is continually targeted where it is most valuable.

Initially we selected to explore two existing projects MedEX and RRAPID (time.leeds.ac.uk) as pilots to shape the process. 3C Director Hedda Bird, then interviewed representatives for all stakeholders involved in the projects to examine the nature and reach of the work. Hedda then created four core models detailing the broad areas of benefit which serve as a platform to measure the projects against. Going forward, this model will be systematically applied to all major TEL projects from the beginning to help shape projects to provide maximum value. The models created by 3C have the flexibility to also be applied to many other educational developments which we will continue to explore and expand on.

Leeds Virtual Radiology website

Radiology has always been a post-graduate specialty mired in the myth of dark rooms, radiation and incomprehensible images. However, recent years have seen an explosion in information technology that has launched radiology to the point where imaging is the decisive factor for many patients' care.

In 2012 the Royal College of Radiologists aimed to address teaching with their Undergraduate Curriculum (1). This was in response to the General Medical Council (GMC) document – Tomorrow's Doctors – superseded by 'Promoting excellence: standards for medical education and training' (2).

Inspired by this, a dedicated LHTT Radiology / LIME collaborative team has created the unique Virtual Radiology website: time.ac.uk/vrad

The site also links to a novel case library which provides succinct year appropriate clinical case studies deemed essential for a junior doctor, with the stated aim that reflection on each case is essential for maximal benefit. A simple format is used to display the imaging that is smart phone and tablet compatible.

The case library extends access to radiology resources across all 5 years of the Leeds MBChB undergraduate course, complimenting the simultaneously developed Undergraduate Radiology Program with its well-established 1st and 2nd year anatomy course, new 3rd Year radiology placement and the 5th year radiology breakfast club.

The case library is now the sole source of year-end exam cases. So if the students correctly interpret cases in the library, then they should pass the radiology part of their exams – or from a patient's perspective they should immediately recognize important / life-threatening conditions.

The library was launched in the 2015/16 academic year and received over 18,000 hits. This year (2016/17) has seen a phenomenal increase in engagement with the cases being accessed over 48,000 times. 84% of usage this year was in the two months prior to exams indicating that students are using this as an exam resource, which we have confirmed by written student feedback.

The Virtual Radiology development team were recent finalists in the Leeds Teaching Hospitals Trust 'Time to Shine' Awards for their work developing this site and resources.

www.leedsth.nhs.uk/time-to-shine-awards-2017/shortlist

They were shortlisted in the category 'Educator of the Year/Education Team of the Year', they received a Highly Commended Award. The promotional video created as part of their submission can be viewed here: <https://time.leeds.ac.uk/vrad/index.htm>

References

1. Royal College of Radiologists. Undergraduate Radiology Curriculum. London: The Royal College of Radiologists, 2012
2. Promoting excellence: standards for medical education and training. GMC.2015
3. Mann K. A Reflection and reflective practice in health professions education: a systematic review. Adv in Health Sci Educ. 2009;14:595–621

CELEBRATING

Clinical Teaching Excellence and Development Award winners 2016/17

Clinical Teaching Excellence and Development awards are bestowed by Leeds Institute of Medical Education (LIME) on behalf of Leeds School of Medicine, to recognize and encourage excellent undergraduate clinical teaching. The awards support the development of healthcare professionals and applications are welcomed from primary, secondary and community care – individuals, medical and non-medical and multi-disciplinary teams.

The awards were presented at the Annual Clinical Teachers Day, March 2017 by Professor Laura Stroud, Director of Student Education, School of Medicine.

The Clinical Teaching Excellence Awards reward those who advance and enhance undergraduate teaching, enrich student experience and support staff in teaching responsibilities. Recipients this year:

Dr Christian Macutkiewicz

Consultant Pancreatico-Biliary and Laparoscopic Surgeon at St James' University Hospital, The Leeds Teaching Hospitals NHS Trust.

Dr John Benjamin Alderson

ST6, Old Age Psychiatry, Leeds and York Partnership NHS Foundation Trust.

Team awards are given for integrated and well-developed placement teaching. Recipients this year:

Emergency Department Undergraduate Education Team, Leeds General Infirmary, The Leeds Teaching Hospitals NHS Trust

Dr Jennifer Russell; Dr Charlotte Michael; Dr Nisreen Hathiari; Dr Michael Harrison.

The Spa Surgery Clinical Team, The Spa Surgery, Harrogate

Dr Dariush Saeedi, Dr Lucy Maw - Lead GPs
Dr Carol Wright - Clinical Pharmacist
Dr Edward Scott - Clinical Pharmacist
Dr Mary-Jane Prowse - Clinical Pharmacist
Dr Mark Hammatt - Clinical Pharmacist
Dr Emma Goldstein - Clinical Pharmacist
Idoya Pezonaga - Clinical Pharmacist
Sally Madeley - Nurse practitioner
Andy Ashton, Annette Given - Practice Manager
Mel Bayley - Data Quality Manager
Abigail Larkin - Receptionist
Elaine Higgins - Secretary

Clinical Teaching Development Awards are awarded to staff who are within their first five years of a career in medical education, active and innovative in teaching and have received good student feedback. Recipients this year:

Dr Joseph McFarlane

FY2, Calderdale and Huddersfield NHS Foundation Trust.

Dr Anshuman Sengupta

ST6, Department of Cardiology, Leeds Teaching Hospitals NHS Trust.

Dr Kanwal Uzair

Speciality Doctor, Emergency Department, Harrogate District NHS Foundation Trust.

A certificate of merit for teaching excellence was awarded to:

Dr Matthew Milsom

Speciality Doctor in Anaesthetics, Harrogate District NHS Foundation Trust.



Dr Christian Macutkiewicz



Dr John Benjamin Alderson



Dr Jennifer Russell and Dr Charlotte Michael



Dr Matthew Milsom



Dr Joseph McFarlane



Dr Dariush Saeedi, Dr Lucy Maw and Annette Given

For further details of the award winners please see: medhealth.leeds.ac.uk/ctewinners201617

Celebrating Excellence in ESREP

The Research, Evaluation and Special Studies (RESS) strand is sector-leading in a modern curriculum, providing research-based education.

Leeds medical students benefit from opportunities in RESS as each student engages with high quality research-led teaching putting them at the cutting edge for their future careers as doctors.

Extended Student-led Research or Enterprise Project (ESREP) has gone from strength to strength with a grand total of 762 students completing their projects over the last three years! The students have benefited from wide-ranging opportunities thanks to our committed supervisors. It is due to the enthusiasm and guidance of a wide range of supporters that 88 students achieved an A grade this year. Students have presented their work at conferences and some have published as part of the project team.

Rewarding Excellence:

James and Mabel Gaunt Prize in Paediatrics

Fiona Brown and Fiona Campbell

Dr Jamie Yarwood Mid Yorkshire NHS Trust

Hillman Prize in Therapeutics

Daniel Drayton, Joseph Fennelly and Lauren Potter

Dr Sarah Mackie Leeds Teaching Hospitals NHS Trust

Hillman Prize in Clinical Medicine

Joshua Janvier, Callum McKell, Eric Richardson, Jennifer Utting

Dr Jennifer Parr Leeds Institute of Health Sciences / **Dr Angela Rickards** GP Tutor

Garland Prize in Neurology

Calum Murdoch and Alex Jay Monk

Dr Pawan Gupta Leeds Teaching Hospitals NHS Trust

Positive feedback from the students included 90% agreeing with Supervision of my ESREP was of a high standard and 93% agreed that Supervisor(s) were enthusiastic about ESREP. They clearly enjoyed the challenge!

GP work experience project

The School has worked hard to develop a nationally renowned work experience programme in partnership with local GP surgeries and Leeds Teaching Hospitals Trust (LTHT).

The scheme has enabled 24 prospective candidates from a widening participation background to experience a period of work shadowing in General Practice, offering placements in GP with supportive workshops pre and post placement at the University.

In 2015 the project was expanded to 60 placements and as a collaboration between The University of Sheffield, Hull York Medical School and in 2016 it was extended to Wales.

In 2017, funding of £30,000 obtained from Health Education England for national programme in partnership with Royal College of General Practitioners (RCGP) for 200 placements within England involving multiple sites across several regions of the country utilizing the same model, learning gain tool and evaluation. 17 universities are involved in this pilot with more than 350 placements being offered across the devolved nations. The reflective diary and learning gain tool development, and evaluation has been funded by RCGP. Dr Gail Nicholls, Lead for Campus to Clinic in Year 1 MBChB, has been invited to lead on the national RCGP work experience programme participating in their student strategy working group.

Our GP work experience programme was nominated for the Guardian Higher Education Awards 2017 and Dr Nicholls was shortlisted for the RCGP Award for Outstanding Contribution to Education Engagement.

Awarding sustainability – The Green Team at LIME makes an impact

The Green Impact Team in LIME has continued to be successful and received three awards at the University of Leeds Sustainability Awards 2017.

A Silver project award was received for developing student sustainability representatives. The School of Medicine is one of only two schools to introduce a sustainability dialogue between the student body and the School.

A Gold project award was achieved for the Special Studies Project (SSP) in Sustainability and Healthcare— a two week module for second and third year students where the fundamentals of sustainability practice is taught.

In addition, the SSP teaching was mentioned by Sir Alan Langlands at the awards ceremony as ‘an important milestone for the university’s sustainability strategy’.

The team received the silver accreditation for Green Impact, and Jodi Gunning was nominated for an individual award- the silver accreditation.

Further information, please contact:
Jodi Gunning J.Gunning@leeds.ac.uk



The LIME Green Impact Team with their awards. From left to right, Steph Briggs, Heather Marquis, Jodi Gunning, Lis Hamilton and Barry Ewart

Innovation prize awarded to Leeds Medical Student Matthew Goldsworthy

Matthew Goldsworthy, a fifth year MBChB student, was awarded this year's Dennis Parker Prize for his multimedia education project. The aim of this project is to improve patient understanding of chronic liver disease by using an educational screencast. This is a clinician-narrated information video, supported by on-screen text, diagrams and animations. It was produced in collaboration with Dr Waleed Fateen, Dr Mark Aldersley, Dr Ian Rowe and Dr Rebecca Jones from the Leeds Liver Unit at St James's University Hospital.

An Open Access article in the British Medical Journal's *Frontline Gastroenterology* reporting on an evaluation of this tool was also submitted with his application. Goldsworthy and co-authors showed that the screencast led to a significant and sustained improvement in patient knowledge. The format also rated favourably with patients and their families. The approach has potential to be applied in other areas of patient education.

The Dennis Parker Innovation Prize was established by the School of Medicine through the generosity of Dr Dennis Mackinder Parker. Matthew Goldsworthy was awarded £250 for his innovative approach to empower patients with essential, up-to-date information on liver cirrhosis. The judging panel was composed of: Valerie Farnsworth (LIME), Jonathan Darling (LIME), Kim Edwards (Patient | Carer Community) and Sarah Underwood (LUBS).

The screencast on the Leeds Teaching Hospitals NHS Trust website can be viewed: www.leedsth.nhs.uk/a-z-of-services/leeds-liver-unit/information-for-patients

Award for Higher Education teaching

Dr James Pickering, Associate Professor in Anatomy, in the Division of Anatomy, was awarded a National Teaching Fellowship from the Higher Education Academy in August 2017. A National Teaching Fellowship is one of the most prestigious awards for higher education teaching and is in recognition of how Dr Pickering has developed his own teaching practice of innovating, integrating and researching the use of technology in anatomy education.



Dr James Pickering receiving his award from Professor Rama Thirunamachandran - Chair of the Higher Education Academy Board

CONNECTING



Physician Associate Students at a Bright Sparks session

Bright Sparks Theatre Arts – promoting understanding of the learning disabled community

We don't stop playing because we grow old; we grow old because we stop playing

George Bernard Shaw

Commitment to Play was a project devised by Bright Sparks Theatre Arts offering medical students a chance to meet, play and develop a greater understanding of the learning disabled community; how they communicate and the struggle they go through to be valued as adults in their own right. It is always a fun, dynamic experience for everyone involved and we find that it challenges all the participants in different ways. A key area of what we try to do is look for the positive and for people's abilities, rather than their disabilities. These gems are unlocked throughout the process of using drama games and devising to help improve communication skills, concentration and self-esteem. It pushes the students into personal areas they might not be totally comfortable with, using movement

and dance as forms of expression and performing on stage in front of their peers. It also helps to develop their ability to improvise in a conversational manner with a community they may not usually have any contact with and help build a better understanding of non-verbal communication. Everyone always leaves happy and willing to come back for more.

This project has been developed as a Student Selected Project (SSP) for December 2017. For further information, please contact Bright Sparks Theatre Arts Company brightsparkstheatre@gmail.com

Tell me and I'll forget. Show me, and I may not remember. Involve me, and I'll understand.

**Tribe Unknown
(Native American Proverb)**

Developing a Mock OSCE for final year PGDip Physician Associate students at the Calderdale and Huddersfield Trust

As the role of Physician Associate has successfully incorporated itself into the dynamic multidisciplinary teams in secondary care at Calderdale and Huddersfield NHS Foundation Trust (CHFT), it is pivotal that the standard of knowledge and training trusts provide to facilitate student placements equip students to feel confident and competent to sit final examinations at the Royal College of Physicians (RCP).

In order to prepare students with this, a mock OSCE was adapted from the existing MBChB OSCE. The stations included a combination which are specified in the competence and clinical framework.

All stations included trained patient simulators and trained examiners to provide student feedback. Students were provided with written feedback in order to improve performance. The medical education team offered further support for students who wished to receive additional training.

Feedback from the students and all faculty members was encouraging and positive. The students found it thoroughly helpful and constructive. This was an excellent opportunity for the medical education team at CHFT to be directly involved in the training of the students, and it something we shall continue annually.

The mock OSCE helped me gain both confidence and practice. I was impressed with the planning and construction of it

Leeds PA Student

A well organised event, excellent learning opportunity. We all enjoyed helping, felt as if everyone else enjoyed it on the day. The feedback was really positive. Very pleased- and look forward to doing it!

Senior Medical education co-ordinator

Inclusion health – valuing diversity programme

A series of small group interactive workshops were carried out as part of the IDEALS strand of the MBChB. Many individuals and organisations facilitated providing a comprehensive outlook on diversity for the medical students. Students appreciated and valued these workshops which addressed the following:

- An introduction to stammering and speech plus language therapy, **Alex Wileman**.
- Attention Deficit Hyperactive Disorder (ADHD), **Elaine Powell**.
- Bereavement - the Great Taboo, **Chris Wood**.
- No Decision About Me Without Me: **The Voice of Asylum Seekers and Refugees** - **Rose McCarthy, Jeff Morgan, Leeds City of Sanctuary**.
- Deaf Awareness (plus lecture), **Howard Beck, Leeds City Council, Adult Social Care**.
- Supporting People Living with HIV, **BHA Leeds Skyline**.
- Drug Addiction, **Paul Sullivan and Fiona Dudley**.
- Emmanuel Syndrome: One in Fourteen Million, **Joanna Holmes**.
- Living with Motor Neurone Disease, **Sue Smith**.
- Molecules of Emotion, **Vivienne Crawford**.
- Pets as Therapy, **Ruth Boyes**.
- Positive Approaches to Adoption and Fostering, **Julie Pearmain**.
- Religion and Health, **Ghazala Mir**.
- Severe Depression, **Tony Frais**.
- Trans & Non-Binary Identities, **Kit Heyman**.
- Understanding Autism, **Julie Lambert**.
- Valuing Diversity: Inclusive Practice, **Robina Mir**.
- Visual Impairment, **Joan Marshall**.
- What is an Alcohol Problem? **Miranda Powers**.
- Working Class Doctors, **Barry Ewart**.
- Working with Perpetrators of Domestic Violence, **Kath Grogan**.
- LGBT Health Issues, **Tanner Gibbins-Klein**.
- The Right to Healthcare, **Anna Miller, Doctors of the World**.

For more information, please contact
Barry Ewart B.R.Ewart@leeds.ac.uk

Sustaining skills development – Continuing Professional Development

The Continuing Professional Development (CPD) Team delivers a comprehensive programme throughout the academic year to support and enhance the teaching within the MBChB and Postgraduate Diploma in Physician Associate Studies. Workshops, courses, e-learning and mentoring provide opportunities for shared learning through the creation of facilitated networks of medical education practitioners and specialists.

All staff involved in formal and informal teaching are welcome to attend, clinical and non-clinical staff, university and non-university staff. Events are free to attend, accredited by the Royal College of Physicians (external CPD points) and aligned with educational and professional frameworks. CPD events can be used to evidence educational activity for General Medical Council (GMC) revalidation.

CPD workshops have been rated highly by delegates during the academic year 2016/17 with nearly 100% reporting as 'Excellent' or 'Good'. The programme of events is dynamic and evolving, responding to delegate feedback and can be adapted to accommodate the changing healthcare environment by delivering bespoke training onsite. Workshops are enhanced by the excellent team of co-facilitators adding value and context to each event. In the 2016/17 academic year, 506 delegates attended CPD events and 620 OSCE Examiners participated in the MBChB and Diploma Physician Associate Studies high stakes end of year exams.

The CPD team, comprising Dr Cairiona Dennis, Educational Staff Development Manager and Mrs Havita Mandande, Coordinator, also communicate opportunities that arise to engage with the medical school. A database of contacts with an interest in teaching is maintained by the team. Opportunities to engage that span the breadth of the educational programmes output by LIME are communicated to the database. If you wish to recruit volunteers to teach or wish to be added to the database, please contact the CPD team mededcpd@leeds.ac.uk

Very useful workshop – good balance of theory & practical applications

Delegate at Effective Feedback Workshop

Very interactive. Practice OSCE session was highlight. Level of teaching very good

Delegate at OSCE Examiner
Training workshop

Leeds Community Healthcare Trust and the School of Medicine renew the Associated Teaching Trust Agreement

Leeds Community Healthcare Trust (LCHT) is a pivotal partner in the delivery of MBChB teaching. The Trust hosts placements for Year 4 students – Gynaecology, Obstetric and Sexual Health and Paediatrics, for Year 5 students – Community rehabilitation teaching and Research Evaluation and Special Studies (RESS) / Extended Student-led Research or Evaluation Projects (ESREP). In recognition of their delivery of placements and teaching, the prestigious status of Associated Teaching Trust is conferred. The Agreement is awarded for five years and in July 2017, a signing ceremony was held to mark the renewal of the Agreement.

Professor Trudie Roberts, LIME, hosted the event which was attended by Professor Paul Stewart, Dean of the Faculty of Medicine and Health, Ms Thea Stein, CEO LCHT, Dr Mandy Thomas, Medical Director LCHT, Dr Dave Scott, Undergraduate Clinical Lead LCHT and members of LIME faculty.

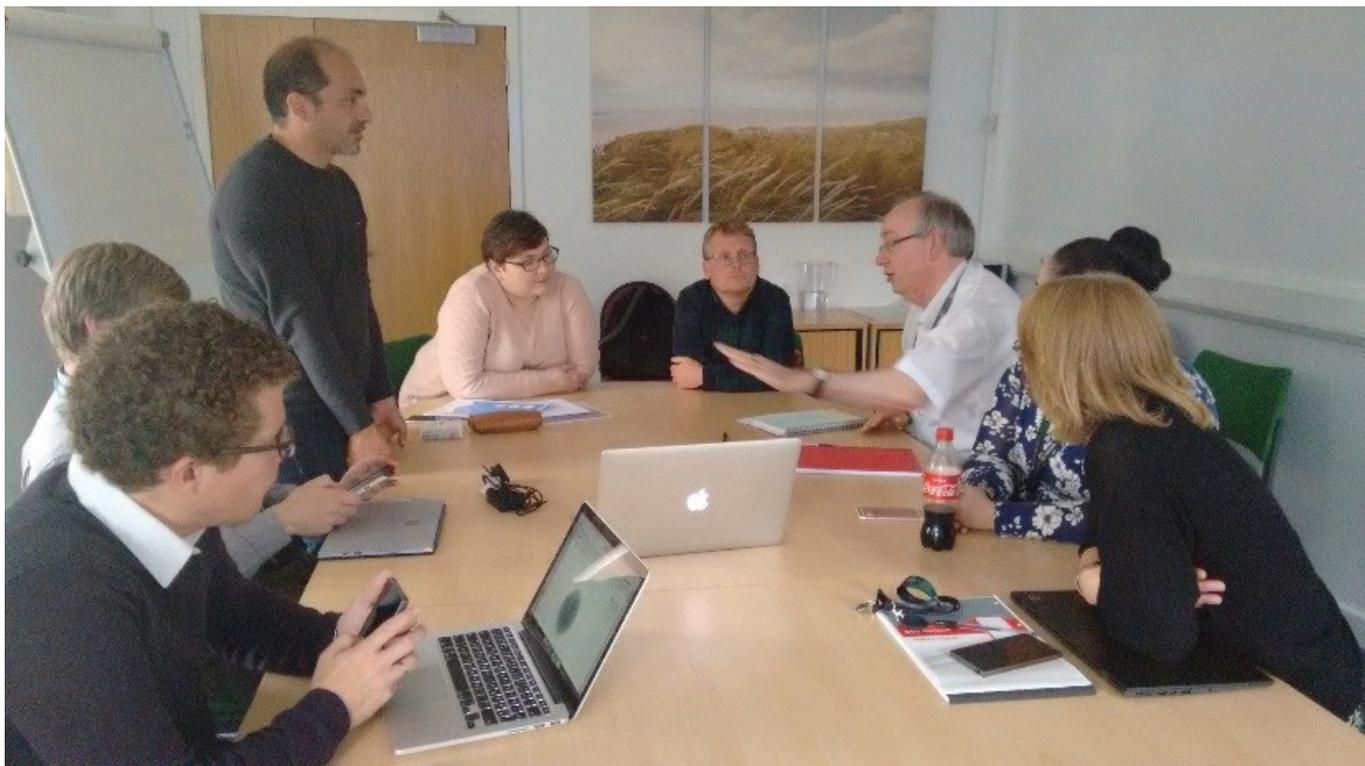


Signing the Agreement, Professor Paul Stewart, Ms Thea Stein, Professor Trudie Roberts and Dr Mandy Thomas



Dr Dave Scott presenting an overview of teaching provided by LCHT

Learning Layers Impact – partnerships beyond the project



Know Center visit to Leeds in Summer 2017

LIME is continuing to work with many of our Learning Layers partners beyond the project lifetime, showing the strength of the relationships developed. These collaborations mean that we can continue to share expertise and ideas, directly impacting on the ways we use technology to support our MBChB students and generating new project ideas and opportunities for further joint research. LIME now has a partnership with the Know Center www.know-center.tugraz.at/en (Austria's leading research centre for big data analytics) and we are working with their researchers who have an interest in using data analytics to support learning. This collaboration has already included:

- Know Center researchers visiting Leeds and working with us to produce potential new visualisations for myPAL (our student-facing learning analytics tool)
- Professor Richard Fuller meeting with the Rectors of the Technical University of Graz to advise on the adoption of TEL to enhance student learning
- Professor Richard Fuller, Tamsin Treasure-Jones and Nancy Davies working with the Know Center to develop and deliver a workshop on Technology Enhanced Learning in Healthcare Education at the international iKNOW Conference 2017
- Dr Vania Dimitrova working with the Know Center and other Learning Layers partners to lead the TEL@work workshop at EC-TEL 2017, at which LIME had 3 papers accepted and presented.

Together with the Know Center and other Learning Layers partners we are continuing to explore and develop new project and funding bids, that will help us to research and develop how technology can support our students' learning.

We are excited to be continuing our collaboration with LIME beyond Learning Layers

Professor Stefanie Lindstaedt
(Director of the Know Center)



Learning Layers Impact – Leeds to host European Conference on Technology Enhanced Learning (EC-TEL) in 2018

The Learning Layers project provided LIME with the opportunity to work with leading Technology Enhanced Learning developers and researchers across Europe. The positive impression that our partners obtained of Leeds (our work, the university and the city) led to us being invited to put in a bid to host the annual European Conference on Technology Enhanced Learning in 2018. LIME led the Leeds bid (along with the School of Computing and the Research Center in Digital Learning), and were announced as the winning bid in September.

EC-TEL 2018 will be held at the University of Leeds between 3-6 September, 2018 and we have added several unique additions to the conference in order to maximise the benefits that this will bring to medical and healthcare education. We have added a TEL in healthcare education stream to the conference and we will be leading on the organisation of that stream along with Health Education England's TEL team. We will also be co-locating the conference with the third conference on Medical Education Informatics (MEI) (6-7 September 2018), which will give us a great opportunity to bring these two European research communities together and to connect them with Leeds-based medical educators, professionals and students to explore how new technologies can really enhance learning and professional development in medicine.

LIME has strong involvement through the organisation of EC-TEL 2018. Both Tamsin Treasure-Jones (Local Chair) and Dr Vania Dimitrova are on the local organising committee. Gareth Frith and Dr Sue Bickerdike are co-chairing the TEL in healthcare education stream and Professor Panos Bamidis is the organiser and chair of MEI 2018. Add the dates to your diary and join us next September at this exciting event.

Hosting EC-TEL 2018 puts LIME at the heart of European research and development of Technology Enhanced Learning

Tamsin Treasure-Jones (Local Chair for EC-TEL 2018)



Tamsin Treasure-Jones, Professor Panos Bamidis and Dr Vania Dimitrova announce Leeds as the winning host of EC-TEL 2018 at this year's conference in Tallinn

Masterclasses – delivery of teaching by alumni and retired clinical colleagues

Working in partnership with our alumni and retired clinical colleagues, Leeds Institute of Medical Education have established a programme of clinical examination and history taking masterclasses to enhance existing teaching provision and to support students requiring additional input.

These optional teaching sessions led by experienced and expert clinicians are targeted at third year medical students. During the masterclasses small groups of students can be taught essential skills in a relaxed and supportive environment and receive personalised feedback. Feedback from the students demonstrates how much they value the masterclass teaching with the opportunity to receive personalised feedback. The delivery of these sessions is made possible with the involvement of patients from the Patient & Carer Community.

Very interactive and thorough bedside teaching session

I really liked the thorough discussion at each stage of the examination and putting everything in context

Third Year Medical Students

Partnership working to develop Augmented and Virtual Reality resources

Leeds Institute of Medical Education (LIME) has signed a partnership agreement with Medical Realities Ltd. for the development of Augmented and Virtual Reality (AR and VR) resources.

The focus will be on developing resources which will support experiences where access would not normally be available to a medical student as part of their clinical practice. It should extend the scope and range of material to other medical and healthcare specialties and areas appropriate to both undergraduates and trainees and evaluate their use in medical education.

LIME runs an innovative and award winning Technology Enhanced Learning (TEL) programme which is focused on supporting medical students experience of clinical practice including orientation, mobile assessment, clinical skills and learning with technology. Details of this mobile learning programme are available at <https://time.leeds.ac.uk/>

Medical Realities Ltd. is an award winning organisation that has developed AR and VR resources for surgical training. Established by Professor Shafi Ahmed, Consultant Colorectal Surgeon, Barts Health NHS Trust and leading VR & AR expert Steve Dann, Medical Realities Ltd. offer a comprehensive collection of training modules covering key syllabus material, that uses high-quality 360° video of real operations to provide an immersive learning experience, with interactive material that allows the surgical trainee to test themselves and track their progress.

Interprofessional learning utilising simulation: Fifth Year medical students working with final year student nurses- a team approach.



Over the past three years, fifth year medical students from Leeds Medical School have been learning together with final year student nurses from Huddersfield University in collaborative simulation sessions. The aim was for students to gain an appreciation of each other's roles in patient safety and experience, working together and communicating as a team in helping manage the simulated patient and their condition. It is recognised that simulation-based education has a positive role to play in promoting team working and that the joint training of nursing and medical staff can help achieve interdisciplinary competence which can only enhance patient care (Salminen-Tuomaala *et al* 2017, Visser *et al* 2017)

Scenarios have included treating a patient with anaphylaxis, sepsis, myocardial infarction, a fall, a head injury, fracture and a bowel obstruction. The students also deal with human factors such as a distressed relative, discharge letters, making referrals, TTOs, phone calls and other distractions. A debriefing with timely and constructive feedback is given at the end of each scenario. Students who have been watching the scenario take place via the camera and monitor, also give feedback.

The feedback from the medical students was very positive with many citing how useful it was to work together with the student nurses as well as dealing with situations they had not previously encountered in practice. They felt it added to their preparedness to becoming foundation year doctors. The necessity of good communication contributing to optimising patient care and experience was emphasised along with calling for senior advice in a timely manner.

The feedback from the student nurses emphasised how much they valued the opportunity to “work” with the medical students before they qualified and gain an insight into how an awareness of each disciplines' professional roles and responsibilities have an impact on patients. They enjoyed engaging with the medical students and had discussions on how their courses differed.

In the future, it is hoped to invite the University of Bradford who have set up a nursing school at Dewsbury Hospital to become involved.

The MESH (Medical education Simulation Hub) team
The Mid Yorkshire Hospitals NHS Trust.

Salminen-Tuomaala.M, Jaskari.P, Perala. S,Rouvala.C. (2017)
“Nursing and medical staff experiences of simulation education”
Clinical Nursing Studies Vol 5. No.4 (2017)

Visser.CLF,Ket. JCF, Croiset. G,Kursakar.RA
“Perceptions of Resident, nursing and medical students about Interprofessional Education: a systematic review of quantitative and qualitative literature” BMC-Medical education.2017 17:77

doi.org/10.1186/s12909-017-0909-0

Having the nurses was excellent, very realistic and helpful to practice communication and appreciate each other's roles

Student nurses helped us to understand how to work with nursing staff effectively in an acute situation.

**Fifth Year Medical Students/Student Nurses
anonymous feedback.**

MBChB student engagement and building student-staff partnerships

Student engagement activities this year have aimed to increase the opportunities for students to meet and talk with School of Medicine and placement staff within a variety of settings, to help build the student-staff partnership and gain valuable student views on all areas of the curriculum in more informal settings. They have also been useful opportunities to explore students opinions and ideas on important issues, developments and new initiatives coming up, such as student expansion, curriculum developments and focus on feedback initiatives. Student engagement activities have included:

- Student-staff partnership dinners
- Cake and chat sessions at NHS partnership trusts and on campus
- 5th year focus on feedback world café
- 5th year feedback ambassador partnership dinner
- Student-staff forums

The student partnership dinners took place in January and May at University House, with 30 students and 10 clinical/School of Medicine (SoM) staff attending each event. The aim of the events are to engage students in conversation regarding all aspects of the MBChB curriculum, and to gain valuable student opinion.

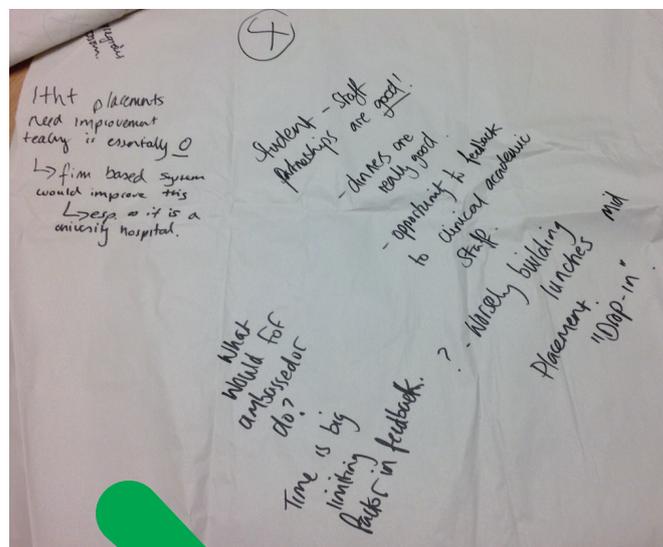
The 5th Year Focus on Feedback partnership dinner in June was attended by six clinical/SoM Staff and eight 5th year students taking on the new role of feedback ambassador as they commence their foundation year training. Our aim is to have at least one feedback ambassador within local trusts that provide attachments and teaching to Leeds students.

Dr Lewis Bates, Clinical Teaching Fellow, Mid Yorkshire Hospitals NHS Trust, highlighted good feedback opportunities on placement, and emphasised areas of good practice for giving and receiving feedback.

The World Café event took place in February 2017 for final Year students. For this event, student input into the Focus on Feedback initiative was obtained, allowing students to express their views based on their experiences of giving and receiving feedback, as well as other areas related to their studies.

The cake and chat sessions have been really successful this year taking place at each Trust, meeting with students during their break on their placements to discuss all areas of the programme over cake, these sessions are continuing again this year.

For further information regarding student engagement events please contact: Liz Allen, Student Engagement Lead
e.allen@leeds.ac.uk



Partnership working between South West Yorkshire NHS Foundation Trust and Waterloo Manor Hospital for specialist teaching in personality disorders

South West Yorkshire Partnership NHS Foundation Trust (SWYPFT) has recently introduced specialist teaching opportunities in severe personality disorders for 4th year, medical students at Waterloo Manor Hospital. Commencing from this academic year all 85 students on their psychiatric rotation at SWYPFT are offered three day learning opportunity at Waterloo Manor hospital.

The experience includes insight into the presentation and management of severe personality disorders. Students visit units from locked wards to open rehabilitation facilities and learn service users' journey through treatment. During their time at Waterloo Manor hospital, students attend ward rounds and Multidisciplinary Team (MDT) meetings with consultant psychiatrists. Students are provided inter-professional education by shadowing a range of professionals including psychiatric nurses, occupational therapists, psychologist, therapists, and social workers.

We have received excellent feedback both from students and staff at Waterloo Manor Hospital at the end of first rotation. We aim to review all student feedback at the end of academic year and to improve this experience further in future.

With respect to the previous groups of the medical students I am pleased to inform you that the whole programme was very successful. All students, as reflected in their oral and written feedback were very happy about this experience.

Dr. Mohamad Elmubark
Medical Director, Waterloo Manor Hospital.

Collaborative working between TEL and SES to enhance delivery of educational processes

The Student Education Service (SES) and Technology Enhanced Learning (TEL) Teams in the Institute came together for a collaborative working session over the summer. Using the principles of a 'Hackathon', the teams worked in small groups to define some of the key challenges faced in supporting the delivery of the MBChB programme. The aim of the session was to develop a shared understanding of roles across the TEL and SES teams, to identify practices that could be improved through closer collaboration.

Across the teams, 29 members of staff attended the event which was structured into two workshop sessions. The first session focussed on identifying challenges relating to student education processes, management of student information and communications. During the second session groups were asked to rank their top priorities and suggest approaches to address the areas of discussion.

Following the event, these were categorised into three broad areas; systems, people, communications and processes. An action plan and timeline was produced to establish a number of working groups, each with a specific remit aligned with the issues identified. These are now established and underway and provide a framework for closer collaborative working between the SES and TEL Team.

TiMEtoTeach – helping to shape tomorrow’s medical educators

TiMEtoTeach is an initiative to support, encourage and communicate to medical educators within the healthcare environment. Through communications and showcasing various technological innovations, medical educators receive support in their teaching and an understanding of our curricula. By actively visiting staff in trusts - visits to wards and clinics, and working in partnership, staff gain awareness of how much their input is valued by our students thereby providing an excellent learning experience.

The TiMEtoTeach team can tailor visits according to needs. Attending multidisciplinary team (MDT) meetings, Continuing Professional Development (CPD) sessions or on an individual basis, the team can facilitate - CPD activities; technological training; teaching tips; feedback.

Activities that the TiMEtoTeach team have carried out to date include communicating MBChB Year 5 teaching requirements, training on MiniCex and celebration of good teaching practice. For further information, please email the team timetoteach@leeds.ac.uk



TiMEtoTeach
Medical Education

Widening participation outreach activities to attract undergraduates into Medicine

The School of Medicine outreach activity is based on the wider university aim of recruiting high achieving undergraduate students, including students from a Widening Participation (WP) background.

Outreach activities within MBChB are led by admissions staff and a large number of the student body take part in these through their student group, Widening Access to Medical School (WAMS).

23 medical students on the WAMS committee are mentors and ambassadors and are supported by approximately 155 medical students who help deliver events.

The E-mentoring project with Brightside has 200 places for mentors and mentees. This project enables long term engagement with students in hard to reach areas where there is little support available.

The Ambassadors project involves working with 12 local schools. Embedding ambassadors in the schools allows the opportunity to develop long term relationships delivering workshops and raising aspiration with all year groups. Aspiration events have also been delivered regularly to 10 primary schools.

Taster days aim to give Year 12 students an insight into studying medicine with the opportunity to talk to medical students, qualified doctors and members of the admissions team. Subject-specific workshops include ethics, situational judgement, communication skills, personal statement writing and mock multiple mini interview workshops.

Leeds Medical Education Academy’s fourth summer school was held in July 2017. The event is designed and delivered by medical students and coordinated by the admissions team with support from alumni, Patient & Carer Community, University of Leeds School of Medicine, St Gemma’s Hospice, University of Leeds Educational Engagement Team and Leeds Hospitals NHS Teaching Trust.

Selected Publications

Albutt, A. K., O'Hara, J. K., Conner, M. T., Fletcher, S. J. and Lawton, R. J. (2016)

Is there a role for patients and their relatives in escalating clinical deterioration in hospital? A systematic review. *Health Expectations*. [online] Available on [doi:10.1111/hex.12496](https://doi.org/10.1111/hex.12496)

Almoayad FA, Ledger AJ. (2016)

Entering a new profession: Patient educator interns' struggles for recognition. *Journal of Health Specialties*. 4 (4):262-269. Available at dx.doi.org/10.4103/2468-6360.191907

Armitage G., Moore S., Reynolds C., Laloë P. A., Coulson C., McEachan R., Lawton R., Watt I., Wright J., O'Hara J. (2017)

Patient-reported safety incidents as a new source of patient safety data: an exploratory comparative study in an acute hospital in England *Journal of Health Services Research & Policy*. [online] Available at doi.org/10.1177/1355819617727563

Bardgett RJM, Darling JC, Webster E, Kime N. (2016)

What makes a good children's doctor? Exploring the child perspective in the OSCE setting. *Medical Teacher*. 38 (5):471-475. Available at dx.doi.org/10.3109/0142159X.2015.1060301

Cleland J, Roberts T. (2016)

Through the looking glass: a different lens on medical education. *Medical education*. 50 (12):1184-1185. Available at dx.doi.org/10.1111/medu.13153

Darling JC, Bardgett RJM, Homer M. (2017)

Can children acting as simulated patients contribute to scoring of student performance in an OSCE?. *Medical Teacher*, 39(4) 389-394. Available at [doi:10.1080/0142159X.2017.1291926](https://doi.org/10.1080/0142159X.2017.1291926)

Dennerlein, S., Treasure-Jones, T., Lex, E. & Ley, T. (2016)

The role of collaboration and shared understanding in interprofessional teamwork, AMEE 2016, Barcelona, 27-31st August.

Farnsworth V, Kleanthous I, Wenger-Trayner E. (2016)

Communities of Practice as a Social Theory of Learning: A Conversation with Etienne Wenger. *British Journal of Educational Studies*. 64 (2):139-160. Available at dx.doi.org/10.1080/00071005.2015.1133799

Fielden S, O'Rourke R. (2016)

"My way of giving something back": Patient and carer experiences of involvement in medical education. *MedEdPublish*. 5 (3) [online] Available at dx.doi.org/10.15694/mep.2016.000133

Fuller R, Homer M, Pell G, Hallam J. (2017)

Managing extremes of assessor judgment within the OSCE. *Medical Teacher*. 39 (1):58-66. Available at dx.doi.org/10.1080/0142159X.2016.1230189

Geiger, M., Waizenegger, L., Treasure-Jones, T., Sarigianni, C., Maier, R., Thalmann, S. & Remus, U. (2017).

Not just another type of resistance – towards a deeper understanding of supportive non-use, *Proceedings of the European Conference on Information Systems*, 5-10th June 2017, Portugal.

Hargreaves, K. (2016)

Reflection in Medical education, *Journal of University Teaching & Learning Practice*, 13(2) Available at ro.uow.edu.au/jutlp/vol13/iss2/6

Homer M. (2017)

An Introduction to Secondary Data Analysis with IBM SPSS Statistics first edition. *Educational Review*. [online] Available at dx.doi.org/10.1080/00131911.2017.1330503

Homer MS. (2017)

An international study of mathematical self-efficacy: influences on attainment and degree choice. *International Journal of Science and Mathematics Education*. [online] Available at eprints.whiterose.ac.uk/123294/

Homer M. (2016)

The future of quantitative educational research methods – bigger, better and, perhaps, Bayesian?. *Hilary Place Papers*. 2016; 3 [online] Available at eprints.whiterose.ac.uk/94572/

Homer M, Darling JC. (2016)

Setting standards in knowledge assessments: Comparing Ebel and Cohen via Rasch. *Medical Teacher*. 38 (12):1267-1277. Available at dx.doi.org/10.1080/0142159X.2016.1230184

Homer MS, Fuller R, Pell G (2017)

The benefits of sequential testing: improved diagnostic accuracy and better outcomes for failing students. *Medical Teacher* (Accepted online) Available at [doi: 10.1080/0142159X.2017.1404561](https://doi.org/10.1080/0142159X.2017.1404561)

Homer M, Pell G, Fuller R. (2017)

Problematising the concept of the "borderline" group in performance assessments *Medical Teacher*, 39(5), 469-475. Available at [doi:10.1080/0142159X.2017.1296563](https://doi.org/10.1080/0142159X.2017.1296563)

Fuller R, Homer M, Pell G, Hallam J. (2017)

Managing extremes of assessor judgment within the OSCE. *Medical Teacher*. 39 (1):58-66. Available at dx.doi.org/10.1080/0142159X.2016.1230189

Jha V, Brockbank S, Roberts T. (2016)

A Framework for Understanding Lapses in Professionalism Among Medical Students: Applying the Theory of Planned Behavior to Fitness to Practice Cases. *Academic Medicine*. 91 (12):1622-1627. Available at dx.doi.org/10.1097/ACM.0000000000001287

Johnson J, Louch G, Dunning A, Johnson O, Grange A, Reynolds C, Hall L, O'Hara JK. (2017)

Burnout mediates the association between depression and patient safety perceptions: A cross-sectional study in hospital nurses. *Journal of Advanced Nursing*. Jan 1.

Joynes V, Fuller R. (2016)

Legitimation, personalisation and maturation: Using the experiences of a compulsory mobile curriculum to reconceptualise mobile learning. *Medical Teacher*. 38 (6):621-627. Available at dx.doi.org/10.3109/0142159X.2015.1075651

Joynes V, Kerr M, Treasure-Jones T. (2017)

Exploring informal workplace learning in primary healthcare for continuous professional development. *Education for Primary Care*. 28 (4):216-222. Available at dx.doi.org/10.1080/14739879.2017.1298405

Kennelly, J., Ledger, A. J. and Gledhill, E. (2017)

Critical Junctures in Narrative Research: Collaborative Reflections on Methodological Issues. In: Dwyer, R., Davis, I. and Emerald, E. eds. *Narrative Research in Practice: Stories from the Field*. Singapore: Springer, pp.67-88.

Lawton R., O'Hara J. K., Sheard L., Armitage G., Cocks K., Buckley H., Corbacho B., Reynolds R., Marsh C., Moore S., Watt I., Wright J. (2017)

Can patient involvement improve patient safety? A cluster randomized control trial of the Patient Reporting and Action for a Safe Environment (PRAISE) Intervention. *BMJ Quality & Safety*. Available at [doi:1136/bmjqs-2016-005570](https://doi.org/10.1136/bmjqs-2016-005570)

Learning Layers (2017)

Learning Layers Results. Available at results.learning-layers.eu

Ledger, A. J. (2017)

Entrepreneurship in arts therapies: Not just making a swift buck. In: Thomas, D. and Abad, V. eds. *The economics of therapy: Caring for clients, colleagues, commissioners and cash-flow in the creative arts therapies*. London: Jessica Kingsley, pp. 38-49.

Ledger A, Edwards L, Harding D, Hargreaves K, Mistry S. (2017)

Learning ideals: Critical reflections on a near-peer initiative at Leeds. *MedEdPublish*. 6 (3) [online] Available at dx.doi.org/10.15694/mep.2017.000157

Louch G., O'Hara J. K., Mohammed M.

A qualitative formative evaluation of a patient centered patient safety intervention delivered in collaboration with hospital volunteers. *Health Expectations, In Press*.

Louch G., O'Hara J., Gardner P., O'Connor D. B. (2017)

A Daily Diary Approach to the Examination of Chronic Stress, Daily Hassles and Safety Perceptions in Hospital Nursing. *International Journal of Behavioral Medicine*. [online] Available at [doi:10.1007/s12529-017-9655-2](https://doi.org/10.1007/s12529-017-9655-2).

Nott JP, Bonney EA, Pickering JD, Simpson NAB. (2016)

The structure and function of the cervix during pregnancy. *Translational Research in Anatomy*. 2 (1):1-7. Available at dx.doi.org/10.1016/j.tria.2016.02.001

O'Hara J. K., Lawton R. J., Armitage G., et al. (2016)

The Patient Reporting and Action for a Safe Environment (PRASE) intervention: A feasibility study. *BMC Health Services Research* 16:676. Available at doi:10.1186/s12913-016-1919-z

Pampaka M, Williams J, Homer M. (2016)

Is the educational 'what works' agenda working? *Critical methodological developments. International Journal of Research and Method in Education.* 39 (3):231-236. Available at dx.doi.org/10.1080/1743727X.2016.1170476

Pampaka M, Williams J, Homer M. (2016)

Is the educational 'what works' agenda working? *Critical methodological developments. International Journal of Research and Method in Education.* 39 (4):345-348. Available at dx.doi.org/10.1080/1743727X.2016.1205817

Pickering JD. (2017)

Developing the Evidence-Base to Support the Integration of Technology-Enhanced Learning in Healthcare Education. *Medical Science Educator.* [online] Available at dx.doi.org/10.1007/s40670-017-0424-2

Pickering JD. Cognitive Engagement: (2017)

A More Reliable Proxy for Learning?. *Medical Science Educator.* [online] Available at dx.doi.org/10.1007/s40670-017-0447-8

Pickering JD. (2017)

Measuring learning gain: Comparing anatomy drawing screencasts and paper-based resources. *Anatomical Sciences Education.* 10 (4):307-316. Available at http://dx.doi.org/10.1002/ase.1666

Pickering JD, Bickerdike SR. (2017)

Medical student use of Facebook to support preparation for anatomy assessments. *Anatomical Sciences Education.* 10 (3):205-214. Available at dx.doi.org/10.1002/ase.1663

Pickering JD, Henningsohn L, DeRuiter MC, de Jong PGM, Reinders MEJ. (2017)

Twelve tips for developing and delivering a massive open online course in medical education. *Medical Teacher.* 39 (7):691-696. Available at dx.doi.org/10.1080/0142159X.2017.1322189

Pickering JD, Joynes VCT. (2016)

A holistic model for evaluating the impact of individual technology-enhanced learning resources. *Medical Teacher.* 38 (12):1242-1247. Available at dx.doi.org/10.1080/0142159X.2016.1210112

Pickering JD, Roberts DJH. (2017)

Flipped classroom or an active lecture?. *Clinical anatomy* (New York, N.Y.). [online] Available at dx.doi.org/10.1002/ca.22983

Pickering JD, Swinnerton BJ. (2017)

An Anatomy Massive Open Online Course as a Continuing Professional Development Tool for Healthcare Professionals. *Medical Science Educator.* 27 (2):243-252. Available at dx.doi.org/10.1007/s40670-017-0383-7

Roberts, T.E. (2017)

Teaching, learning and assessing professionalism: the biggest challenge of all. *Fundacion Educacion Medica* 20 (2): 47-51

Roberts, T.E. (2016)

Future healthcare and its impact on education: A personal view *The Asia Pacific Scholar* 1, 1-2

Roberts TE. (2016)

The ASPIRE initiative: Excellence in assessment. *Educación Médica.* 17 (3):106-108. Available at dx.doi.org/10.1016/j.edumed.2016.06.002

Santos P, Dennerlein S, Theiler D, Cook J, Treasure-Jones T, Holley D, Kerr M, Attwell G, Kowald D, Lex E. (2016)

Going beyond your personal learning network, using recommendations and trust through a multimedia question-answering service for decision-support: A case study in the healthcare. *Journal of Universal Computer Science.* 22 (3):340-359. Available at View Open Access version

Sarigianni, C., Thalmann, S., Treasure-Jones, T., Kerr, M., Maier, M. & Manhart, M. (2016)

Informal Learning in Healthcare- An exploratory evaluation approach, AMEE 2016, Barcelona, 27-31st August.

Seneviratne, R., Bradbury, H. and Bourne, R. (2017)

How Do Pharmacists Develop into Advanced Level Practitioners? Learning from the Experiences of Critical Care Pharmacists. *Pharmacy*, 5(3), 38

Sheard L, Marsh C., O'Hara J. K., Armitage G., Wright J., Lawton R. (2017)

The Patient Feedback Response Framework – Understanding why UK hospital staff find it difficult to make improvements based on patient feedback: A qualitative study. *Social Science & Medicine*, 178, 19-27.

Sheard L, Marsh C., O'Hara J., et al., (2017)

Exploring how ward staff engage with the implementation of a patient safety intervention: a UK-based qualitative process evaluation *BMJ Open* 7:e014558. [online] Available at doi: 10.1136/bmjopen-2016-014558

Sheard L, O'Hara J, Armitage G, Wright J, Cocks K, McEachan R, Watt I, Lawton R. (2016)

Erratum to: Evaluating the PRASE patient safety intervention—a multi-centre, cluster trial with a qualitative process evaluation: study protocol for a randomised controlled trial. *Trials*. Dec 20;17(1):605.

Swanson DB, Roberts TE. (2016)

Trends in national licensing examinations in medicine. *Medical education.* 50 (1):101-114. Available at http://dx.doi.org/10.1111/medu.12810

Swinnerton BJ, Morris NP, Hotchkiss S, Pickering JD. (2017)

The integration of an anatomy massive open online course (MOOC) into a medical anatomy curriculum. *Anatomical Sciences Education.* 10 (1):53-67. Available at http://dx.doi.org/10.1002/ase.1625

Tekian, A., Watling, C., Roberts, T.E., Steiner Y. and Norcini J. (2017)

The Role of Qualitative and Quantitative Feedback in the Context of a Competency-Based Curriculum *Medical Teacher* [online] 19th September 2017

Topps D, Dennerlein S, Treasure-Jones T. (2017)

Raising the BarCamp: international reflections. *MedEdPublish* 6 [3] 8 [online] Available at doi.org/10.15694/mep.2017.00012

Walsh, K., Noben, C., Gregory, S., Lim, W. S., Green, C., Roberts, T., Maloney, S., Ilic, D., Rivers, G. and Reeves, S. (2017)

Cost-benefit analysis of healthcare professional education: report of a conference workshop. *BMJ Simulation and Technology Enhanced Learning* [online] Available at doi:10.1136/bmjstel-2017-000214

Williams, D., Reid, A., & Homer, M. S. (2017)

Boosting clinical performance: the impact of enhanced final year placements. *Medical Teacher*, 39(4), 383-388. Available at doi:10.1080/0142159X.2017.1291925

Wright SR, Homer M. (2017)

Addressing the theory-practice gap in assessment. Perspectives on *Medical education.* 6 (1):7-9. Available at dx.doi.org/10.1007/s40037-016-0323-z

Yiasemidou M, Roberts D, Glassman D, Tomlinson J, Biyani S, Miskovic D. (2017)

A Multispecialty Evaluation of Thiel Cadavers for Surgical Training. *World Journal of Surgery.* 41 (5):1201-1207. Available at dx.doi.org/10.1007/s00268-016-3868-4

Zijlstra-Shaw S, Roberts T, Robinson PG. (2017)

Evaluation of an assessment system for professionalism amongst dental students. *European Journal of Dental Education.* 21 (4):e89-e100. Available at http://dx.doi.org/10.1111/eje.12226



UNIVERSITY OF LEEDS

Leeds, United Kingdom

LS2 9JT

Tel. 0113 243 1751

www.leeds.ac.uk