

For Students, by Students: a Peer-led Entrepreneurship Course for Medical Students

See Chai Carol Chan¹, George Choa^{2,3}, Oziegbe Eboime⁴, Mohammed Ahmed Rashid³

¹ *East Suffolk and North Essex NHS Foundation Trust, Ipswich, United Kingdom;*

carol.chan.14@ucl.ac.uk

² *Bedfordshire Hospitals NHS Foundation Trust, Luton, United Kingdom;*

³ *University College London, London, United Kingdom*

⁴ *Mid and South Essex NHS Foundation Trust, Southend-on-Sea, United Kingdom*

Abstract

Recognising the growing importance of clinical leadership and entrepreneurship to implement innovative healthcare solutions, final year UK medical students developed a near-peer elective module for first- and second-year students. To date, five cohorts have completed the module and developed skills in the fields of medical technology, quality improvement, and leadership.

Keywords

Medical entrepreneurship; Near-peer teaching; Quality improvement; Medical education

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The Covid-19 pandemic has accelerated technological advancements in healthcare provision in areas as diverse as remote consulting, point-of-care diagnostics, and critical care infrastructure. This emerged against the backdrop of healthcare systems around the world recognising the unsustainability of ever-increasing healthcare expenditure and the need to develop innovations to improve healthcare quality and efficiency. Such transformation relies on future generations of doctors having more diverse skillsets than those developed through traditional medical curricula. This is evidenced by the surge of postgraduate degrees, training programmes, and fellowships to train doctors in leadership, quality improvement, and entrepreneurship (1). However, topics relating to entrepreneurship have had little exposure in undergraduate medical curricula, and there is no consensus about how best to integrate them into medical training (2).

Supervised by a faculty member, three final-year medical students in their six-year medical degree at a UK medical school initiated, conceptualised, designed, and delivered an eight-week elective module on medical innovation and entrepreneurship for first- and second-year medical students. The programme focused on various aspects of entrepreneurship in medicine, including quality improvement (QI) methodology, leadership, innovation, and technology. The founding team of students identified these to be key areas that had helped them to understand the role of a medical entrepreneur, during their involvement in various extracurricular entrepreneurship activities in medical school.

The aim of the module is to foster pre-clinical students' leadership abilities early on and to help students develop an entrepreneurial mindset in order to evaluate common problems in medical education and healthcare settings. Unlike the didactic methods commonly used in UK medical schools for most curricular areas, there is a particular focus on team-based, case-based, and game-based learning to nurture lateral thinking for problem-solving and promote collaboration. It encompasses various pedagogical approaches to cater to students' learning preferences. Examples of the module's session topics, learning objectives, and activities are provided in *Table 1*.

The module consists of a total of eight weekly sessions, each lasting three hours. These sessions are led by the peer tutors and complemented with workshops from 'doctorpreneurs' (3) – doctors working in various entrepreneurial roles (artificial intelligence, mobile application development, medical simulation *etc.*) The module culminates in students working in groups of three to four to design a healthcare improvement project that draws

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on their learning and enables them to pursue an interest further. The assessment for each student is based partly (50%) on a group project presentation that outlines their healthcare challenge and explains how their interventions are implemented and evaluated, and partly (50%) on a 360-degree appraisal and evaluation on their teamwork and leadership dynamics.

Near-peer teaching from senior medical students has been shown to lead to greater cognitive and social congruences, with learners being able to better comprehend complex topics and teachers being more in tune with learners' needs and concerns. It also alleviates pressure on the medical faculty and helps peer tutors to further their educational skills. Prior to graduating, the founding group of students selected successors through a written application documenting teaching and medical innovation experiences, and an interview process. Successors shadowed peer tutors prior to taking on the module leadership roles, ensuring continuity and opportunities for continual module development. Peer tutors who have been involved in leading the module have universally reported that the process has considerably improved their confidence and teaching and assessment skills.

Five cohorts of students have taken the module thus far from 2019, with approximately 20 learners per cohort. Students' feedback through the University's standardised Student Evaluation Questionnaires has been overwhelmingly positive. Over 90% of students strongly agreed that the module was well-structured and well-organised. Students stated that the peer-tutors were approachable, encouraged collaboration, and facilitated discussions well. Students appreciated the useful and relevant feedback from the peer tutors, as the tutors were familiar with learning objectives and understood the challenges from the students' perspectives. Students were intrigued by the problem-based and team-based approaches, but as these were unfamiliar to them and not covered in the main curriculum, they suggested further training on these approaches which has since been included. Overall, students felt empowered and more confident to pursue opportunities to become future entrepreneurs.

Near-peer teaching is increasingly recognised as an efficient and effective method of teaching and learning in traditional medical curricular areas. The preliminary positive reception of this module suggests that it could also be further developed and evaluated in emerging curricular areas, like medical entrepreneurship. The use of peer tutors who are passionate about, and have experience in, medical entrepreneurship, was a key factor in the success of this module.

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Table 1: Example of 8-week course outline

Week	Title	Learning Objectives	Activities
1	Introduction to Innovation and Leadership	<ul style="list-style-type: none"> • Participate in group tasks to produce innovations • Reflect on experiences of the teamwork challenge and the principles that underpin effective team working • Describe the importance of innovation in healthcare 	<ul style="list-style-type: none"> • Collaborative tasks about teamwork and innovation (Spaghetti Tower, Marshmallow Challenge) • Small group discussion about the tasks and other leadership and teamwork examples • Facilitated discussion about the role of innovation in healthcare with ‘high profile’ and topic examples
2	Quality Improvement 1	<ul style="list-style-type: none"> • Describe the methods to measure quality in medical education and healthcare environments • Outline the importance of QI to improve healthcare outcome 	<ul style="list-style-type: none"> • Large group presentation introducing QI science and practice • Small group work to research QI resources and guidelines
3	Quality Improvement 2	<ul style="list-style-type: none"> • Complete a QI ‘mini’ project and justify the decisions taken in a presentation 	<ul style="list-style-type: none"> • Mini project on QI methodology (Plan, Do, Study, Act - PDSA) • Small group presentation on the mini QI project
4	Medical Technology	<ul style="list-style-type: none"> • List different forms of technology in healthcare • Outline the advantages and disadvantages of technological solutions in healthcare for different populations 	<ul style="list-style-type: none"> • External speaker from medical technology start-up • Cases studies of artificial intelligence in healthcare
5	Medical Education and Technology	<ul style="list-style-type: none"> • Outline the emerging role of technology in medical education 	<ul style="list-style-type: none"> • Visit to high tech simulation centre in teaching hospital

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		<ul style="list-style-type: none"> • Describe new and emerging advances in medical education • Plan a simple lesson that incorporates high tech simulation 	<ul style="list-style-type: none"> • External speaker currently leading medical simulation training
6	Entrepreneurship and Leadership	<ul style="list-style-type: none"> • Describe different entrepreneurial principles (LEAN, rapid testing/prototyping) • Discuss the similarities and differences between the roles of doctor and entrepreneur • List current entrepreneurial opportunities within the NHS 	<ul style="list-style-type: none"> • Facilitated discussion about entrepreneurship and key terminology • Small group activity to list, compare, and contrast attributes of doctor and entrepreneur • External speaker currently on NHS entrepreneurship scheme
7	Leadership	<ul style="list-style-type: none"> • Critically examine the various models of leadership • Reflect on individual leadership strengths and weaknesses • Compare and contrast leadership approaches in healthcare to other business sectors 	<ul style="list-style-type: none"> • Large group presentation introducing leadership theory and models • Individual assignments to reflect on personal leadership attributes • Facilitated group discussion using case examples from healthcare and business sectors
8	Assessment and Presentation	<ul style="list-style-type: none"> • Outline a healthcare sector challenge and present a solution that draws on quality improvement, leadership models, and entrepreneurship 	<ul style="list-style-type: none"> • Small group presentations with feedback

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