



Roger Kneebone: Explorer of Ideas

Making connections...the creativity is in thinking of it in the first place and making things happen

Roger Kneebone knew he wanted to be a surgeon from the outset of his medical training and career. He gained his early experience in trauma surgery in the troubled zones of Soweto and Namibia but, on return to the UK, made the first significant change of career direction to become a general practitioner in the county of Wiltshire. Never one to stand still, his educational work during that time led him to explore those attributes of embodied surgical practice that were rarely articulated by the practitioners. Out of this, he pioneered an innovative surgical training programme based on simulation workshops and computer-based learning. Over the years, he has worked on many innovative projects with the Science Museum, Victoria & Albert Museum, Wellcome Trust as well as major science festivals. Amongst his distinguished awards, he became a Wellcome Trust Engagement Fellow in 2012 during which he explored ways of enabling scientists and the public to share ideas and different world views. In January 2019, he was elected Professor of Anatomy at the Royal Academy of Arts, the fourteenth to hold this post since William Hunter in 1768.

Roger's quest to understand embodied expert knowing in different disciplines and how these can inform one another was to become an enduring pursuit. He continues to work in ever more novel and inspirational ways that rely on creative thinking and a drive to connect people from different disciplines. His capacity for reflective thinking is exemplified in the story he tells of constructing a harpsichord from a kit while on hospital call at night: he realised that the making and playing were inter-twined processes that: *brought a richness of perspective that bubbled up into something new.*¹

A key aspect of his creative reflective practice is making visible the hidden dimensions of cross disciplinary knowledge by engaging in public disclosures and performances. Encounters with the people who make the cultural crossings is available as a legacy of insights into practitioner experience in voice and text for others to explore and learn from. Roger explores these kinds of complex scenarios of making and thinking creatively in the *Countercurrent* conversations with practitioners ranging from magicians to violin makers to jazz pianists, artists and scientists². His encounters with the people who make the cultural crossings is a legacy of recorded documentation in voice and text, all available for others to explore and learn from. His short essays for The Lancet series called Art in Medicine³ explore the divergent paths he has taken in the interests of public engagement and his own curiosity.

In his interview, Roger gives an account of his role as a prime mover of unusual and illuminating intersections between unlikely areas of practice.

Q: Could you sum up the history of your practice- where you started and where you are now?

R: I have a medical background. I qualified in 1977 having been to St Andrews And Manchester University. I decided fairly early after qualifying that I wanted to do surgery so I did a few things that got me along the way. I spent a year teaching anatomy to medical students. I spent a couple of years doing junior jobs in this country- orthopaedics, A& E and a year of obstetrics. Then I went to southern Africa for five years- it was going to be one year but ended up being five. I did general surgery which ended up being largely trauma surgery- people who were shot and things; half of it in Soweto in Johannesburg and the other half in Cape Town and then, before coming back, a while in Namibia, once I'd become a consultant. And then I decided to change direction and I became a GP and for the next 17 years or so I

was a GP in Wiltshire in Trowbridge which is 100 miles out of London, ten miles from Bath, down in the south west. I'd always been interested in education so I did a lot of work teaching, developing programmes for teaching, initially GPs doing small surgical procedures and ended up exploring those aspects of surgery that experienced surgeons take for granted and inexperienced surgeons don't even know when they don't know. So, I started looking at various ways of exploring that and tried writing a book writing articles but ended up with some colleagues making a multi-media program with a firm called Primal Pictures who make anatomical multi-media things. And used that to try and explore these forms of knowledge, as I would now think of it embodied forms of knowing that don't easily fall into words. I did a PhD at the time at Bath University and then my work was noticed by Ara Darzi, a well-known surgeon in this country who at that time was doing a lot of work on simulation at Imperial College⁴. To cut a long story short, he offered me a job and I took it.

Q: What year was that?

R: I started working there part-time in 2000, I think, while still being in my practice. But two part-time jobs turned into two full time jobs so I made the decision to resign from my practice and come full time to Imperial. I think that was 2004, 2005.

Q: So, there was a period when you were still a medical practitioner and also an academic researcher – and teacher as well?

R: Yes. I'd done a lot of teaching in the past in hospitals and as a GP, I'd become a GP trainer which was very interesting; and when I joined Imperial I did quite a lot of under-graduate teaching to begin with. The I set up a Masters in surgical education which is still the only one in the UK and one of only two in the world: there's another one in Australia now. Most of the teaching I now do is post-graduates. Since then I was appointed in surgical education as opposed to medical education- a niche. That broadened out and I became increasingly interested in simulation of one sort or another, particularly physical simulation and that led to expanding the idea of simulation as something for teaching surgical insiders. How to do the things they needed to do in their profession to opening that up to wider publics and that led to me becoming involved in the whole area of public engagement. I was very fortunate, I got a number of grants from the Wellcome Trust and after doing that for several years, I was then awarded an engagement fellowship by Wellcome Trust which was a transformative experience. I've remained at Imperial but my role, my work has change there so now my position is in surgical education certainly but also engagement. That's it in a nutshell.

Q: Thinking about the transition from the surgical education into the simulation work: did that bring you into contact with people working in the theatre, the arts area?

R: Not immediately because the world of surgical simulation is a bit of an enclosed one. This is surgical teams learning to do the things they need to do in surgery and a lot of that time was creating quite realistic settings, operating theatres etc. Very often people would be brought in there and they would undergo a series of scenarios when they'd be videoed and assessed on how they did. But that was very much in a surgical framework and when I started thinking about it, I realised, it was pretty much as difficult (for someone who wasn't in that world) to get into a sophisticated simulated operating theatre as it would have been to get into a real one - because it put up barriers. Then I developed various approaches to simulation, some of which you've seen, which includes portable operating theatres, which made it possible to invite people to come and see and take part in a world they wouldn't normally have access to. But then, I started to think that in the world of medicine - I think we are invited by that system, that world to see ourselves almost as applied scientists - as people who apply scientific and medical knowledge to make individual sick people better. And of course, that's important. But I think there are other ways of looking at it as well and I think medical care, particularly clinical care and especially surgery, but not only, you can also see as having elements of performance, and elements of craftsmanship and all sorts of things- team working. Then I started to think what might come into view if we looked at other people who did things in those more general categories, even if what they did was very far from the application of

scientific knowledge, which makes it even better: it might be dancers, or silversmiths or whatever.

That led to a line of enquiry which I'm very much involved in now. The simulation became very useful because it was a means of inviting people to share experiences to take part in something physical not just conversations but actually do things. Some of them were theatre people, some were craftsmen, sculptures as well. A very influential one on me was a tailor, a bespoke tailor. Then I started working with magicians and puppeteers and a lot of musicians. Then I jointly established a centre for performance science between the Royal College of Music and Imperial. The idea is to look at performance across medicine, science, engineering, music, sport, teaching...

There is the symposium 'The art of performing science'⁵. It was in October 2017 and we had a group of about 60 people at Imperial sitting at tables, 4-5 each table and somebody taking notes. I ask them to bring something that would show the kind of thing they did. Here is a glimpse of some of them⁶. They brought something they do with their hands... here is a letter cutter explaining to a plastic surgeon how he cuts inscription in stone or wood. And there he is again, this time he's with a consultant hand surgeon and they are both explaining how they use tools. You can see very clearly there's a gestural language and what they have in common is they are using sharp tools on hard materials.

Q: Where for you is the creative aspect of what you do?

R: I think part of it is making these connections. Choosing which people to invite and for what purpose. We put them on tables with themes: one of them was indescribable knowledge, one was small scale knowledge, one of them was precious materials. From my point of view the creativity is in thinking of it in the first place and making things happen.

Q: Having got them together, is there a creative element then in how you assimilate and interpret that knowledge?

R: Definitely there's a creative element: there's an element of making sense of what it shows. The reason I did this one was I felt very strongly there's a strong element of performance in science as well as in medicine but that's even less recognised in science than it is in medicine. And yet, when you talk to these people, my colleagues in Imperial are very eminent- a lot of them, physicists and chemists and bio-chemists and things and they will all say that some people can make experiments work and others can't. There's a huge amount of artistry and creativity and performance in the carrying out of scientific experiments but that's not recognised. The quality of a dance is judged by people who go and see it performed but the quality of science is judged by the results published in journals and they do not give the story of what happens in the lab, they only give the results that came out. I am making links between people who do stuff and for whom the doing is part of what they are and how they think.

Q: From your experience, what would you say you've noticed in terms of the differences when they are doing their own work, what are they getting out of it creatively?

R: I think creativity is quite a difficult word because it means so many different things to different people. The creative process, I think, is something people find deeply satisfying- working intently on something that they find beautiful and they've made it. I think there is a sense of work being creative or can be when it is done well. You can get it in a mechanic's workplace or a sculptor's studio, any of these places really, I think. In the scientific world they go into it because that's the sort of work they want to do. It may be because it's a secure job or because of the money, whatever it is. Or it may be because they have a burning desire to discover new things, but I think usually it isn't. I think people usually go into something because they want to be a professional engineer or chemist or whatever it is. And they get absorbed in a system that sets up expectations for them of how work is done, and very often, like people always go into medicine wanting to help people and they become quite cynical

and disillusioned about halfway through. You see this everywhere, people think they are going to make bespoke jackets and gloves because it's highly creative but actually there's so much drudgery you have to do... I think a lot of it is about the expectations that turn out to be there within the domain of practice people go into.

Q: What makes a person move out of a particular process and go into something else?

R: I don't know. I think it's a sort of restlessness. In my case I think it's this- and a curiosity. It's probably a cast of mind because some people seem drawn to that kind of making connections. Other people are drawn to staying in the same area and getting very, very good at a narrow compass of things. People like that are highly effective very often. A lot of the big advances are made by people who take that approach.

I mean you can do that within or out or across boundaries. A lot of people who have the similar sort of restlessness to mine in the world of surgery channel it into surgical innovation which is developing new operations and new processes; that's where the big changes like keyhole surgery and robotic surgery and intervention radiology, all these things come from: people who are unsatisfied with the status quo and want to do something about it and they channel their creative energies into making changes within a particular surrounding frame. I think where the work that I do is slightly different is that it moves between frames more. That has its pros and cons but it can leave you feeling a bit like a dilettante. You make these transitions and you learn a little bit about all assortments of people and it's jolly interesting but so what? That is a question I've been struggling with for a long time and it's beginning to become a little clearer now that I've started to recognise that there is unacknowledged art and performance in areas like science and medicine where that is largely unrecognised and undervalued and, therefore, in danger. In a way these are false dichotomies, this is the problem really that there are these convenient but fundamentally unhelpful distinctions between art and science. They really get in the way because they allow people to stereotype themselves and one another. I've been talking a lot to Gunter Kress who has established the area of multi-modality⁷ and I think that it is a very helpful way of looking at this because it broadens things out. We talked a lot about to what extent we might be able to come up with a lexicon of embodied knowing. Even that is not right because it implies words and we are not talking about words only. And that's a revealing thing rather than a creating thing or is it? Probably is.

Q: Can I ask you about reflective thinking and the notion of reflective practice? Do you have a view of what it is and how it works in your case?

R: It is central to my work and one of the things I want to do as an academic is to write about things and that involves quite a lot of letting things simmer and then using the act of writing as a means of crystallising. I think that is a creative process rather than a revealing one. I think that the creative process can reveal things but in essence it is creating something that wasn't there before; it is bringing something into existence or a way of looking at things which was not there before which I had not had before and which people who read it haven't had before in the way that a painting might do; because it then invites people to think differently.

Q: When performing brain surgery, is this a process of doing it without thinking or must thinking come into the action?

R: I think it is absolutely about the process of thinking. There are bits of it you have done so often you can hand over to ...? (like driving) so you are not thinking 'do I put my little finger here?' You are thinking 'Do I join these two things together?' and then you will join them together but all the time there is thinking. I think it is a myth that this happens somehow automatically. Always there are years and years of having done loads of stuff and done it better, always. In surgery there are moments when you have to be sure you are not just trundling along, for instance when you are about to cut some structure. You have to make sure that it is that structure because you have committed yourself to a course of action you can't go back on and you have gone into a new phase.

Q: What procedures are there in place whereby critical moments are identified?

R: In many operations there are well-known points where you can easily make mistakes- things around the gall bladder is a good example where there is inconstant and you can easily be deceived into thinking something is one particular anatomical structure and it turns out to be a different one. And you can cut something thinking it's the duct that goes to the gall bladder and instead it's the duct that goes from the liver to the intestine and this is catastrophic. There are loads of cases of that sort of thing when it is well recognised that it is a time to have your wits about you.

Q: Is that because when you open someone up their anatomy is always different?

R: Always different. The overall plan is the same but there are individual variations. You have to know that it might not be what you think it is. Do you know the stuff about routine and adaptive expertise? Routine expertise is when you have learnt how to do things and you do it the same way each time, and the advantage of that is you are doing something that works but the danger of it is well to the man with a hammer everything is a nail and so if something abnormal happens you don't recognise it, you squeeze it into the way you've already developed. Whereas the adaptive expertise is where people who work in that way, reinvest the freed up potential resources from being comfortable with doing something, to putting themselves deliberately into awkward situations where they have to think freshly rather than just turning on the radio. We have both of those but the adaptive expertise is the one that allows you to say 'hang on, there's something not quite right here- it looks as it usually does but there is something not quite right.' You see it in the police, in medicine, all over.

Q: This sounds like Schon's notion that what makes a truly reflective professional practitioner is someone who can respond to a situation that they have not previously encountered.

R: That's right. I think one of the things is being able to recognise weak signals of impending emergency. Things you need to catch early because very often if people are going along in this mode, in retrospect after something's gone wrong you could have seen early signs. My favourite example of the adaptive expertise is the racing driver Fangio. Do you remember when he avoided a crash? He was on the race track at Le Mans in the 1950s and he was coming round a curly-wurly track in front and as he was coming around a corner at 180 miles an hour, although he couldn't see what was ahead of him he slowed down and stopped. Beyond that there was a huge pile-up. It turned out he had been looking before the race at a 1937 photograph, taken 15 years earlier, and when he was coming around the track he noticed that the colour of the crowd was different. That's because instead of looking at him they had turned their heads around and were looking at something they could see but he couldn't. And at a 100 and so miles an hour he registered that, made sense of it and did something about it in time to stop.

I think that's adaptive expertise. He just said "I was lucky"...

1 <https://www.theguardian.com/society/2014/nov/05/doctor-change-view-nhs-roger-kneebone>

2 Countercurrent podcast series: go to iTunes (<http://apple.co/2n5ROy1>)

3 Kneebone (2017): Four essays on The art of medicine: Bespoke practice; The individual and the system; Performing magic, performing medicine. Materiality and thread *Lancet* 20; 389: 19 and Perspectives pp 389: 28.

4 <https://www.imperial.ac.uk/people/a.darzi>: Professor Darzi holds the Paul Hamlyn Chair of Surgery at Imperial College London, the Royal Marsden Hospital and the Institute of Cancer Research. He is Director of the Institute of Global Health Innovation at Imperial College London and Chair of Imperial College Health Partners. He is an Honorary Consultant Surgeon at Imperial College Hospital NHS Trust.

5 <https://www.imperial.ac.uk/news/184493/working-with-your-hands-podcast/>: The Art of Performing Science symposium .

6 Embodied knowing: <http://performancescience.ac.uk/embodiedknowing/>

7 Kress, G. (2010). *Multimodality: A Social Semiotic Approach to Contemporary Communication*. New York, NY: Routledge.