

Leading radiography research to deliver clinical outcomes

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## **Abstract**

In this invited commentary we examine leadership within the radiography context. Not only will the term 'leadership' be examined, but we remain conscious in asserting how leadership can be applied in research in both higher education and clinical practice. The authors will importantly offer foresight, based on previous experiences in what will continue to become an emerging technological environment, vis-à-vis the rise and integration of varying technologies in medical imaging. Lastly, considering our experiences to date, we reflect on the value of teamwork and collaboration within radiography and how we must continue our engagement and collaboration with peers both nationally and internationally. As will be appreciated in this paper, the view, of others, will become increasingly central if leaders are to be accepted amongst their peers, vis-à-vis, their followers.

## **Introduction**

Research in radiography is integral to the profession as we create and work from a robust evidence base, created by radiographers, for radiographers, seeking to optimise person-centred care. Building the right teams to undertake research is an essential first step towards disseminating high-quality evidence within the radiographic profession, which after all, patients require and deserve. Unfortunately, the implementation of evidence into practice remains slow and thus remains timely to discuss here. In this commentary, we assert that more is required to ensure a more structured and applied manner to ensuring radiography remains an evidence based profession, of which, the concept/field of 'implementation science', which is becoming increasingly commonplace, reflects a paradigmatic shift (1). Research is essential to underpinning the optimisation of imaging and therapeutic practice in radiography, with academic radiographers traditionally best placed to lead research. In addition, clinical academics and/or clinical radiographers provide an essential contribution,

which will increase in future years. Clinical radiographers understand important contemporary issues in practice and identify appropriate research questions but are perhaps ill-equipped with the methodological skills to undertake research. In such circumstances, collaboration with experienced researchers can progress studies, whilst helping to develop the skills to deliver research goals. In the longer term, more radiographers need to be educated to a doctoral level, which will require some basic research education, which remains recognised, and perhaps, provided by some employers/funders (2).

Radiography needs research leaders who have an excellent track record, are innovative problem solvers, able to build appropriate research teams and focus on delivering high quality multi-centred research, which changes practice for the better. A commitment to nurturing future research radiographers and leaders is also key to succession planning. Clinical research into radiography practice should be led by radiographers who understand not only contemporary issues faced, but also foresee challenges. Further, in our view, a research leader should be able to work in a wider multidisciplinary team, both nationally and internationally, and successfully deliver on projects. Looking back in practice, radiographers do not work in silos and work collaboratively in several clinical settings, which is not dissimilar to research leaders whereby research questions and implementation solutions require working relationships outside of medical imaging. Whilst plausible, the authors are conscious of current backlogs (in the United Kingdom at least) due to COVID-19, and recurrent COVID-19 waves, adding to increased workplace pressures, both in academia and practice. In addition, the emergence of 'long COVID', a new disease that did not exist two and a half years ago, currently has 2 million sufferers, and growing (12). This means that while academic and clinical practitioners in radiography remain stretched to deliver key services, it will becoming increasingly essential that research continues to not only grow in radiography but also sustained.

In short, what will remain paramount is that interdisciplinary research continues to utilise complementary skills and expertise of our partners to deliver research objectives, which would otherwise not be possible (3). This commentary seeks to reflect on the authors experiences that facilitate research leadership in radiography. We begin by discerning leadership from management.

### **Leadership vs. management in radiography: What is the difference?**

Developing research ‘leaders’ in radiography is essential to ensure radiography research can lead change in the future. It is perhaps more important than ever that radiographers lead large research studies to tackle big issues and address the implementation of new technology, techniques, and patient pathways. First, we feel it is important to discern management from leadership. The literature offers some distinct attributes between what might constitute a ‘leader’ and/or a ‘manager’, the former considered to have ‘followers’ (4), whereby managers are attributed as senior members of staff that have employees who ‘work for them’. This is supported by others (5, 6), providing some acceptance that leaders acquire [or require] a ‘following’, created by virtues akin to an individual. A caveat, however, identifies that such terms are interchangeable (6), often adding confusion (5). It is unsurprising, however, that a research leader in radiography will need attributes of both manager and leader.

For Gardner (7), he has encountered a first-class manager, who also turned out to possess leadership qualities; an acceptance that workplace leaders and workplace managers may not wholly be distinguishable. This is often termed the leader-manager and routine manager. The former concerned with thinking longer term, developing research visions perhaps, reaching, or aspiring to longer-term goals and values by motivating others. Importantly, then, we should appreciate that research leaders in radiography are not simply

managers or leaders *per se*, but perhaps a blend of attributes that allow them to lead on research or scholarly projects for radiography. This is supported by Kyratsis (8) who acknowledges that there are nearly as many definitions of the term leadership as attempts to characterise it. Here, we appreciate that varied metaphysical and ontological assumptions will exist for the term ‘radiography leader’ in radiography research.

For us to understand what it takes to become a research leader in radiography we will need some general acceptance on what characterises it in the first place. Providing an argument here in this commentary clearly stems from a constructivist ontology, thus immediately apparent that our worldview of ‘what’ or ‘who’ a leader is, which will differ amongst individuals. By grappling with some of these assumptions we can not only question what leadership *is*, but importantly recognize limitations to prospective readers, allowing themselves to critically think, what leadership in research means to them.

### **Emerging technology: Leading the profession in a fast-evolving world**

Radiography is the most rapidly evolving allied health profession, partly due to being inextricably linked to technological advances and Moore’s law (9). With increasing artificial intelligence (AI) software to assist with the interpretation of images and treatment planning, radiographers are seeing operational change in their daily roles (10). Rapidly advancing technology brings ever-improved scans, better resolution, but sometimes increased complexity and a larger burden on scan time. In response, radiographers will need to develop and implement novel solutions, but also question status quo, embrace emerging and disruptive technologies (11) and challenge patient pathways to ensure both cost effectiveness and high quality patient care. Healthcare is probably the most complex system to work within. Clay Christensen once said “*Typical hospitals are not complicated. They are impossible*”. This suggests that patient pathways are individual, reemphasizing personalised

radiography, and importantly reflecting on complexities beknown to the individual themselves. Changing one aspect within a hospital may have multiple knock-on effects on other care services and therefore remains important that research leaders consider the pathway implications of their own work, in addition research questions.

Disruptive technologies are likely to play an increasing role in future years and as more demand is placed on higher value imaging such as computed tomography (CT), magnetic resonance imaging (MRI), nuclear medicine or positron emission tomography (PET/CT), it is essential that radiographers have the research skills that evaluate new technologies, both high value and disruptive. Creating an evidence base of where new technology may be useful, coincided with understanding diagnostic or therapeutic advantages, and when and where these are best implemented is essential for our evidence base. Disruptive technologies have the potential to ease the burden on the high-cost imaging, but patient pathways are going to be important to consider the most effective use. It is essential to keep patients, cost-effectiveness, and improved outcomes at the centre of prospective research in the future. Coming back to what leadership may mean upon considering the above, and especially within in an emerging technological healthcare environment, it is recognised that our practices and expertise may also need to mature and become a contextually emergent. In response to this, leadership, just like clinical intuition, requires experience, expertise and perhaps more importantly, existential collaboration with specialists in fields pertinent to our field.

### **Teamwork and internationalisation: Collaborating with peers worldwide**

Undertaking research that will lead to clinical change will become increasingly paramount. It is important to develop the correct team, whilst considering at what stage the research fits is essential for the study design to be appropriate. This may be from a feasibility

study through to the implementation or evaluating effectiveness. The Medical Research Council's (MRC) complex interventions framework provides an excellent framework to help researchers identify where proposed research should sit to answer the right question(s), and at the right stage(13). Having the right people in a research team is essential and will mean thinking strategically about factors that feed into the overall research project. It is essential to think about the wider pathway for patients and whether other healthcare professionals are required as part of that team. Radiographers work closely with radiologists, oncologists, physicists, and other healthcare professionals. Members of the research team, then, should naturally form part of a complex jigsaw puzzle adding value. Having the right people on the bus and ensuring they are in the right seats is a useful analogy of ensuring the correct research team is brought together, and at the right time.

Methodologists are integral to any research team and while some radiographers may have quantitative or qualitative expertise, deemed as methodological specialisation, this will naturally support a research team and subsequent funding application(s). Researchers, in their respective paradigmatic approaches naturally add value and ensure methodological rigour within their respective methodology. Further, health economists are essential to understand cost effectiveness of research and without their expertise it is unlikely to be implemented into practice. Operational researchers focus on understanding pathway changes, which are integral to a research team, for example exploring changing imaging pathways. Discrete event simulations can also be a powerful tool to underpin pathway change by exploring unintended consequences, but also outcomes of any change.

The use of "what if" scenarios provide several different models for comparison. These models can be useful to sell proposed changes to other stakeholders. Because the power resides in the data whereby 'real life' data from a hospital, or hospitals, means stakeholders will recognise its value. In addition, they can envisage the impact upon their own services

and possibly scale up services, which are transferrable across other sites. Being able to lead research across multicentre trials is not something that happens overnight and it's important, as a profession, that radiography develops researchers for the future. Developing researchers is a long process. The undertaking of doctoral education begins by providing sound research training and education, which is why the Society and College of Radiographers recommends that Consultant Radiographers have, or are working towards, a doctoral level qualification. This ensures they achieve the research pillar as part of their career requirement. However, a PhD is just the initial phase and merely the beginning of a research career. More postdoctoral positions are needed in radiography to ensure consolidation of skills post PhD and thus enable radiography to move forward with increasing the number of radiographers who are equipped to lead research projects in the future. Focusing on helping junior staff build a research track record, with publications on their CV, coupled with developing funding from small pots to larger pots will become increasingly important to build and sustain research leaders in our profession.

## **Conclusion**

In this invited commentary we began by asking: 'what is leadership'. We compare *leadership* with *management*, whilst recognising the interchangeable need for each. Further, whilst our comments suppose that individuals have their own ontological perspective, linked strongly to constructivism, philosophically, we have identified some common attributes. Next, we appreciate how emerging technology will continue to become an integral part in research leadership roles, but more importantly, how radiography leaders collaborate and connect with peers outside our own specialist field, namely informatics, computer science and data analytics. Lastly, we consider building teams, approaching teamwork and why this should be considered



at both a national and international level. More importantly, we recognise that leaders in radiography research seek out clinical partners in anticipation of building large scale projects that have clinical significance. Overall, the perception of ‘what’ or ‘who’ a leader is will inevitably be driven not only from a metaphysical position, but how it remains to be perceived within the profession.

## References

1. Westerlund A, Nilsen P, Sundberg L. Implementation of implementation science knowledge: the research-practice gap paradox. *Worldviews on evidence-based nursing*. 2019;16(5):332.
2. Burkinshaw P, Bryant LD, Magee C, Thompson P, Cotterill LA, Mulvey MR, et al. Ten years of NIHR research training: perceptions of the programmes: a qualitative interview study. *BMJ open*. 2022;12(1):e046410.
3. Hogg P, Cresswell J. Interprofessional research teams in radiography-where the magic happens. *Radiography*. 2021;27:S9-S13.
4. Parker, M (2013) *Misconceiving Medical Leadership*. 56 (3), pp.387-406.
5. Hackman, J.R. (2010) ‘What is this thing called clinical leadership?’ In: Nohria, N., Khurana, R. (Eds.), *Handbook of Leadership Theory and Practice*. Harvard Business Press, Boston, pp.107-116.

6. Clay-Williams, R. Ludlow, K., Testa, L. Li, Z., Braithwaite, J (2017) Medical leadership, a systematic narrative review: do hospitals and healthcare organisations perform better when led by doctors? *BMJ Open*. 7 p1-11.

7. Gardner, J. W. (1990). *On Leadership*. New York: The Free Press.

8. Kyratsis, Y., Atun, R., Phillips, N., Tracey, P and George, G. (2016) Health Systems in Transition: Professional Identity Work in the Context of Shifting Institutional Logics. *Academy of Management Journal*. 60 (2).

9. Gustafson JL. Moore's Law. In: Padua D, editor. *Encyclopedia of Parallel Computing*. Boston, MA: Springer US; 2011. p. 1177-84.

10. Malamateniou C, Knapp K, Pergola M, Woznitza N, Hardy M. Artificial intelligence in radiography: Where are we now and what does the future hold? *Radiography*. 2021;27:S58-S62.

11. Terry O. Disruption innovation and theory. *Journal of Service Science and Management*. 2020;13(03):449.

12. Routen A, O'Mahoney L, Ayoubkhani D, Banerjee A, Brightling C, Calvert M, et al. Understanding and tracking the impact of long COVID in the United Kingdom. *Nature medicine*. 2022;28(1):11-5.

13. Skivington K, Matthews L, Simpson SA, Craig P, Baird J, Blazeby JM, et al. A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. *bmj*. 2021;374.

