# Developing the Academic Radiographer of the future

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**Introduction**

The evolving role of the Radiographer has directly influenced the provision of contemporary patient care pathways. Evidence-based clinical radiography practice is increasingly being promoted as education and research have become an integral pillar of the profession.[1] The changing clinical landscape require radiographers with knowledge and competence to adapt to quickly evolving situations including engagement in continuous professional development and learning to perform efficiently in advanced practice roles.[2] For example, most extended clinical scope of practice skills seen in the last century including vetting and treatment verification, cannulation and image evaluation are now an expectation of threshold radiography competencies at qualification.

The current practitioner-level knowledge, skills and attributes include critical appreciation of the roles "disruptive technologies" play in the delivery of healthcare services.[1,3] Thus, the development of the Radiographer of the future with the relevant competence to addressing current clinical challenges equally require academic Radiography practitioners with enhanced skillset and knowledge to provide quality education of modern relevance.[2]

Over the last two decades, there has been a move to ensure the space between theory and practice is closely entwined, with many Radiography programmes of study undertaking problem based and enquiry-based learning as useful pedagogical models of scaffolding learning, teaching, assessments for the creation and attainment of the graduate level outcomes.[4]  Within the context of the higher education environment, this has been a potential route of career development for Radiographers and both authors of this paper are examples of where this has been the case (See Table 1).

Over the last ten years, the synergies between practice and higher education environments have seen advancements in leadership, research, service improvement and the provision of professional development at pre-registration and at post-registration.  In addition, the development of third space [5,20] working environments within academia offer hybrid opportunities, particularly for professional groups such as Radiographers and other Allied Health Professions (AHPs).  A catalyst for such opportunities has undoubtedly arisen from the Covid-19 pandemics' impact across the sector [6,7] which has created greater permeability and agility for leadership and new ways of working.[8] Many Radiographers who work within academia now find themselves acting as leaders of change, coaching and mentoring and supporting colleagues to develop their skills.[7, 9-11]

The findings of the Gravity Assist report by Sir Michael Barber[12] has created the momentum through the experiences of the Covid-19 pandemic and wider societal changes to highlight the potential to shape a new wave of academic Radiographers. This evolution resonates with the wider purpose of modern universities, which is to focus on social responsibility, learning and research.[13,14]

Our high-level article highlights exemplar career trajectories to an academic radiography career and provides insights into the emerging knowledge, skills and values that are being sought within academic spaces to support students and future learning, teaching and research endeavours.

**Transitioning into a contemporary academic space**

The movement into an academic role has undergone a transition over the last decade and there are now a number of models that support the career pathway of a Radiographer who would like to move into a university environment (See Figure 1).

There is now a greater balance required those who work within an academic environment, in terms of the wider skill set required to support students. Examples include a greater focus on pastoral care and resilience, greater connection, and adherence to various quality frameworks, such as the Teaching Excellence Framework (TEF) and governance in the form of the Office for Students (OfS) and in some cases, Office for Standards in Education, Children's Services and Skills (OfSTED).

The role of an academic also involves acting as an advocate for positive change and supporting the wider endeavours of the profession as a whole and representation through research, quality improvement and ensuring the connections with clinical and community practice are as strong and effective as they can be. It is for this reason that many universities support Clinical Academic Models (CAMs) where there is a joint appointment and/or secondment of a staff member whose time is split between the academic and clinical space.[5,15] There is also the wider connections through to completing Advanced Practice qualifications and the provision of leadership support through programmes such as the Council of Deans of Health Student Leadership Programme.

Promoting a career within academia has required a degree of 'de-mystification' and also promoting the connected benefits from adopting such a move from one defined space (i.e., clinical and/or industry) to another. A series of integrated work pieces was undertaken around identifying opportunities, challenges, and key leadership skills for AHPs [9-11] and these identified the need for the following core attributes of those working within a contemporary academic space with provision for healthcare programmes including radiography.

Within the quickly evolving landscape of academic practice, additional competences are required for effective operation in current and future Radiography academic roles. For instance, the introduction of artificial intelligence and other new 'disruptive' technologies in clinical radiography practice[16] meant that both the academic and the clinical radiographer of the future needs to learn new things, adapt and share knowledge differently. Thus, these new competences including, digital/simulated learning and professional growth, in the domain of management and leadership needs to be weaved into the opportunities that being in academia presents and how as a profession, we need to continue to evolve and connect with other subject disciplines (i.e., AI / philosophy, creative industries, computer science and informatics etc) towards developing a critical thinking radiographer of the future.

**Connecting with other subject disciplines**

Radiography as a discipline integrates knowledge from other specialist fields such as medicine, medical physics, nursing, computer science and information technology among others. It is therefore crucial as part of students learning to provide opportunities to connect

with others from different disciplines both in practice-based and university environments. Hill et al[8] highlights the need for '*creative abrasion, agility and resolution*' within any space where there is opportunity for the creation of new knowledge and skills and in this context, the outcomes include improved patient care. These opportunities will prepare students to be innovative in readiness for the collaborative and multidisciplinary working approach that exist in all healthcare settings. Of note, the process of embedding interprofessional learning models remains a complex topic[17] however, there exist opportunities to implementing this model for radiography education curriculums especially in institutions where faculties are structured to oversee a range of healthcare and allied training programmes (see Figure 3).

## Digital and simulated learning

Working within the third space of academia,[5,20] there is a clear role for Radiography academics to be leading the development and creation of simulated learning and practice. Established models of learning, such as problem and enquiry-based learning have been proven as essential pedagogical approaches for the development of critical thinkers who are able to adapt and make good clinical care decisions across varied settings while safely caring for patients.[4] The outcomes of this scaffolding learning approach are powerful and relevant to the future needs especially in a technologically dependent profession such as radiography. These outcomes require the radiography academic of the future to learn to understand and appreciate the integration of digital technology and their usage for teaching and learning and in clinical practice.

The emergence of key publications over the last few years, such as commissioned work by Professor Eric Topol[18] and Sir Michael Barber[12] highlight the essence and key approaches to integrating these technologies for preparing the future healthcare professionals to deliver efficient care and in a safe manner. In the pandemic, most radiography training institutions employed the use of simulation activities to augment students learning and to make up for the clinical placement hours required for professional registration with statutory bodies and this phenomenon is expected to be normalised in the post-Covid era.[6,7]

Virtual reality learning had been demonstrated to have a positive impact on the performance of students across a range of clinical radiography practice assessment domains, including patient positioning, exposure parameter selection and image appraisal. In a recent meta-synthesis[19] that explored the clinical readiness of healthcare students (including radiography), the findings indicate that readiness was enhanced with increased use of simulation activities that were embedded into training programmes. These findings confirm the direction of teaching and learning of the future and consequently, calls on the radiography academic of the future to understand these technologies to be able to efficiently support student learning.

Barber [12] highlights the need for several forces to come together to create an effective '*gravity assist*' and ensure the experiences of the Covid-19 pandemic are utilised to further enhance the educational offer for students.  Radiographers and other AHPs are well positioned to further develop curricula, assessment designs and graduate outcomes with students and the pandemic innovation case studies from several universities[4, 5, 7,13] highlight the work that has already been undertaken. Digital innovation, pedagogy redesign, technology enablement to

create greater inclusive learning practices and change knowledge are all core competencies of the Radiography profession and should also influence wider curricula design and strategic direction.

**Applied data analytics and real time feedback**

The use of data analytics within the higher education sector has become crucial to business modelling and scenario planning. Having accurate and single point of truth data on areas such as student demographics, retention/student engagement levels, learner engagement analytics and greater sector insight creates an opportunity to gather important data to either support existing curricula or research or accelerate a subject discipline.

Data is now so accessible within the modern learning environment, particularly with the advent of cloud-based and integrated learning platforms. However, data tells us part of the narrative in relation to the engagement and wellbeing of students, but it is the pastoral support provided by academics and the connection with wider university services, such as student support services and wellbeing which has a significant impact on their progression and success. Thus, the academic of the future needs to understand the wider interpretation and applied use of data to track student wellbeing for provision of personalised pastoral care that enhances learning and development of the softer skills that are so accustom within clinical practice.

The increase in awareness of mental health and the various support pathways now in place across universities and clinical practice also starts to reshape the holistic and pastoral role of an academic and their understanding of learner engagement, data analytics and formative feedback loops from students. Many universities are now starting to create stronger connections with local NHS services to ensure appropriate mental health support is available for students and academics are also involved in training in the form of mental health first aid[14]. Furthermore, there is a need to ensure alternative ways of learning and engagement with the attitudes and behaviours of Gen Z students is firstly understood and embraced.[14]

Understanding student engagement and learning data is particularly crucial to consciously creating access and participation plans (APPs) that enhance inclusivity and improve student experiences. Radiographers are, by the very nature of their professional design, engaged in situations within the clinical environment that require team working, problem solving abilities and cognitive decision making. Therefore, the professional make up of modern Radiographers who transition into academic spaces resonate with the emerging designs of universities in terms of shaping greater collaboration, leadership, professionalism and authentic followship that dissolves traditional 'frozen' cultures of organisations and begins to create third space professionals.[5,20]

**Research, industry partnerships and the evolving role of universities**

The evolving role of universities and the nature of the work undertaken within society is changing. Practice orientated programmes that include Radiography and other AHP subjects, have always connected with direct career links and strong employability opportunities, in

contrast to subjects such as humanities. Lifelong learning and continued professional development have also long been key elements of the profession, however, this has now become a key aspect of modern academia and the interface of pastoral support and self and profession development are now expected across all subject disciplines, through graduate outcomes and other key metrics.[13]

It is for these reasons that Radiographers are synchronised with the requirements of modern academia and the emergence of areas such as artificial intelligence, simulation, integrated care pathways for example, lend themselves to the core required skills and experiences of Radiographers joining academia. We should also remember that learning, research and innovation does not only take place in isolation within academia and the integration and links with clinical partners and wider third sector organisations including industry partnerships is another example where healthcare is already established in terms of creating a contribution to society. Radiography academics are now partnering with industry to design, trial and provide user feedback through commissioned research initiatives for improved care.

In accordance with the CoR educational and career framework,[1] research is an important arm required for evidence-based practice and thus, the increasingly evolving roles in research for radiographers across the NHS and universities. Similarly, academic Radiographers are leading research activities as principal investigators across various methodological domains as well as clinical conditions with competitive funding awards from prestigious organisations. Increasingly, academic radiographers are developing expertise in innovative methodological domains such as citizen science and open-source learning/research (see Figure 4) and producing impactful research that improves wellbeing and these outcomes meet key metrics of the sectors' research excellence framework.

In terms of post graduate education to support research and personal development, there is a long-standing tradition of provision being undertaken through study at university, typically alongside an enhanced or advanced practitioner role, aligning with frameworks such as the College of Radiographers.[1]

**Conclusion**

The modern University require an array of characteristics across key domains to support pastoral care, digital and simulated learning, research and enterprise and understanding of data analytic tools for decision making in higher education. There is no single *'pathway'* into a career as an academic Radiographer and/or an AHP educator. As highlighted by Gibbs and colleagues,[11] many AHPs move into the academic space after gaining some experience in clinical roles while others focus on an academic pathway from early on in their careers (see Table 1 and Figure 1).

The requirement of learners and future healthcare practitioners is evolving and broadening access to healthcare programmes, particularly those who apply from underrepresented groups need to continue. This shift in some societal mindsets of what a university does and what is stands for needs to be advocated by those who learn and work in these organisations. Timms and Heimans [14] refer to the role and value of New Power Universities and their redress of purpose within society. Radiographers have the key knowledge, skills and ways of working

to empower our future workforce, but also ensure there is a professional disruption within wider professional groups. Radiographers who want to move into the space where practice interfaces with curricula design, theoretical positioning and third space working need to be encouraged through role modelling, active promotion and flexible approaches to employment contracts.

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