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**CoRIPS Research Grant 149**

**£9123 awarded**

**Title: The legacies of contemporary medical imaging education: Graduate perspectives on preparedness for the workplace**

**Principle Aim**

Against a backdrop of rapid and ongoing reconfigurations in the delivery of UK care services <sup>[1]</sup>, this study aims to qualitatively investigate the ways in which current diagnostic radiography graduates - in the early stages of their professional lives - identify themselves as having been prepared (or unprepared) for working in the modern NHS, with a view to positively informing the work of future curriculum development groups.

**Primary research question**

On a national basis, and from the perspective of recent diagnostic radiography graduates (with one to two full years of post-qualification experience), in what ways are current undergraduate curricula effective and/or ineffective in preparing individuals for the interlinked technical and personal demands of the modern healthcare sector?

**Secondary research questions**

1. What are the specific ways in which undergraduate radiography education effectively prepares, or does not prepare, new graduates for the *technical* demands of workplace?
2. What are specific ways in which undergraduate radiography education effectively prepares, or does not prepare, graduates for the *personal* demands of workplace?
3. What is the relationship between the two domains in the experience of the participants themselves?

**Outcomes**

1. The manifest purpose of this enterprise, in line with the first step of the curriculum development approach advocated by Thomas et al.<sup>[2]</sup>, is to contribute to a critical analysis of the manner in which contemporary curricula align with the needs of service. As such, the investigative model outlined below is designed to concurrently open-up debates and deepen understanding of current workplace issues.

2. As a secondary outcome, it is anticipated that the findings might facilitate the provisional development of a broader (largely quantitative) online survey, grounded in the concerns of

participants themselves that can elucidate the emergent concerns of a much broader population of graduates.

## **Review of literature and identification of current gap in knowledge**

While the Health and Care Professions Council (henceforth HCPC) standards for radiographers have not changed significantly since their initial publication in 2003<sup>[3]</sup>, a simple examination of current NHS medical imaging workload data and case mix<sup>[4,5]</sup> reveals that real-world medical imaging (henceforth MI) practice itself is undergoing a period of rapid change. Substantial increases in the number of examinations undertaken using cross-sectional imaging modalities are widely reported. For example, the number of MRI examinations conducted in England grew by 220% between 2004 and 2014<sup>[4]</sup>. There have also been conversant increases in the number of CT examinations, currently showing an annual growth rate of 10% per annum, and Ultrasound (a 5.3% annual expansion)<sup>[4]</sup>, while the most recent reliable figures indicate that the frequency of PET/CT examinations rose by 14% between 2008 and 2012<sup>[5]</sup>.

In order to fully contextualise this upward trend in demand for a variety of MI procedures, it is important to reflect not only upon the technical usefulness of the various modalities, but also upon a series of significant socio-political and cultural shifts in the modern healthcare environment. Notwithstanding the impacts of increasingly stringent governmental target-setting around acceptable waiting times for any given procedure, increasingly litigious behaviour by patients - within the UK and US in particular - has been widely reported have expanded the exercise of 'defensive medicine' among General Practitioners and other clinicians<sup>[6,7]</sup>. Such recurrent ordering of batteries of potentially unnecessary tests, so as to negate the possibility of legal action from both the authentically sick and the 'worried well' further explains why many MI services have become progressively more pressurised in recent years. Whatever these causes might be, however, the essential and objective facts-of-the-matter around MI in the UK, remain clear and stark. The Society and College of Radiographers (henceforth SCoR) reports that by 2014, 18.1% of UK ultrasound vacancies, for example, remained unfilled, a substantial rise from the 10.9% reported in 2011, and the 10.1% reported in 2009.<sup>[8,9]</sup> Similar problems exist in plain radiography and MRI. Consequently, workload is escalating for extant clinicians across-the-board, an issue further exacerbated by increasing rates of early retirement due to exhaustion, disillusionment or even physical injury through overwork.<sup>[10,11]</sup>

This would imply two key issues for new diagnostic radiography graduates. Firstly, radiography programmes which remain fundamentally grounded in the development of projection radiographic imaging skills will likely increasingly find themselves out-of-step with the demands of the workplace. This is prospectively disadvantageous for both new graduates and their employers in the short-to medium terms, as extensive on-the-job training may well be necessary before a freshly-qualified professional can actually be deemed fully competent to handle the increasingly variegated demands of working in a modern medical imaging department. While recent work by Sloane and Miller<sup>[12]</sup> has addressed how Radiology Unit Managers view the 'fitness for practice' of contemporary graduates, however,

there remains very little research addressing the interaction between current curricula and actual working practice. Secondly, the core resilience of new radiography graduates will likely need to be greater, and more rapidly developed, than was necessary for their forebears for whom working conditions were less extreme. This importance of this matter has been elucidated across a range of public discussions and reports emergent of SCoR itself, in published work by current bid applicant Julie de Witt, and elsewhere in the healthcare sciences.<sup>[13-15]</sup>

Critically, for the purposes of this project, the literature described above has typically addressed either the matter of technical proficiency or the matter of personal resilience. In the broader realm of the social psychology of health, including that relevant to radiography itself, however, it has been robustly demonstrated that these order of phenomena are often, in the experience of actual practitioners (and particularly junior practitioners) functionally indistinct.<sup>[16,17]</sup> In short, in healthcare, a sense of proficiency is to (at least some extent) reliant on a sense of resilience, and to feel resilient is (at least some extent) reliant sense of proficiency. Thus, to handle the concerns analytically independently may do a disservice to the cohesion of participants' own working narratives.

Given the above, Thomas at al.<sup>[2]</sup> recommend a six-step approach to the effective development of medical education curricula, the first of which always involves identification of current problems and a general needs-assessment. This centrally involves (a) a critical analysis of the current context, and (b) a wide review of extant services. Regarding (a), in particular, the specific requirements of patients, healthcare professionals and educators themselves become of key concern. In short, in order to develop an effective and (immediate) future-proof curriculum, it is crucial to develop an unambiguous, evidence-based understanding of the practical experience of pertinent agents within a defined contemporary social and structural healthcare milieu. This knowledge will then be central in informing the subsequent stages in the planning process.

A Straussian model of Grounded Theory (henceforth SGT) will be adopted as the core qualitative research framework herein. This facilitates a close-detail approach to developing cohort-specific findings that would hold over the quality of data collected<sup>[18]</sup>. The purposes of this project, i.e. to develop a clear and grounded picture of the broader practical knowledge of recent diagnostic radiography graduates, requires a practice-facing approach that elucidates their own experience with both positive and negative prior employments. This knowledge might also have been captured with, for example, Interpretative Phenomenological Analysis<sup>[19]</sup>. However, the concurrent need to reflect forwards, and the imperative draw upon extended experience in doing so, renders a SGT approach more applicable, particularly over the larger order of sample necessary to make a clear point about practical clinical work across multiple radiography departments<sup>[18]</sup>.

## **Methodology**

### ***Piloting and stakeholder involvement***

Prior to undertaking the main body of work, N=5 unstructured interviews regarding the experiences of recently-qualified radiographers (i.e. within a year of graduation) from the University of Cumbria and the University of Derby, recruited via Alumni Associations, will be conducted so as to inform the development of a formal semi-structured interview schedule to be latterly administrated over the broader population. Once developed, this schedule will be returned to the pilot participants for scrutiny, and also to N=5 professional department leads in the NHS previously involved in a study conducted by Sloane and Miller,<sup>[12]</sup> so as to further ensure the practical relevance of the research. All critical feedback will be incorporated into the final semi-structured interview design.

### ***Sampling strategy & sample size***

N=40 radiography graduates of between one and two years post-qualificatory professional experience will be purposively recruited. This sample will be divided evenly between participants with one and two years of experience, so as to elucidate the issues which may have arisen for the participants in the short and medium terms without any extended separation from those direct experiences. Given the inductive nature of the project, variables such as age and gender will not be treated as key selection issues; rather, the relevance of any such concerns are expected to be emergent features of the data themselves. The overall sample size projected, meanwhile, would typically be sufficient for theoretical saturation to arise in a project of this order,<sup>[18]</sup> while also facilitating strong geographical coverage within the UK itself without exceeding the prospective CoRIPS costs.

### ***Recruitment***

Participants will be recruited from public sector medical imaging departments across the UK, using pre-existing alumni connections. An initial short invite will be sent to Medical Imaging Department leads across a range of UK universities, with a view to it being forwarded on to recent graduates who fit the selection criteria. The first twenty graduates in each category (i.e. one and two years of experience) to respond will be invited to provide a telephone interview.

### ***Data collection***

A semi-structured interviews designed through stakeholder involvement will be used; this should facilitate a degree of inter-interview comparison along topical lines, while also allowing for participants to voice specific and nuanced accounts of their own unique personal experiences.<sup>[20]</sup> Key general elements for discussion will be framed in line with the secondary research questions outlined above. It is anticipated (from the prior experience of several applicants) that the interviews will last, on average, around 30 minutes.

### ***Data analysis***

All data will be transcribed verbatim, anonymised at the point of transcription and analysed (using Scientific Software's ATLAS.Ti, v.6.2) in line with the imperatives of a SGT

approach.<sup>[18]</sup> Close attention will be paid to the fine detail of the transcripts, rather than simply addressing the overarching thematic matters that might arise within a traditional (Glasserian) model of GT,<sup>[21]</sup> or a more typical model of thematic analysis.<sup>[22]</sup> Core textual codes will be initially developed by applicants 1 and 2, and then reviewed by applicants 3 and 4. All members of the research team will further address how these codes might inform higher level (Axial) codes and finally Global codes. This approach is optimised to develop a systematic interpretation of the convergence and divergence participants' experience within and between cases, and the manner in which attributions and explanations are variably handled with respect to particular matters in concrete circumstances.<sup>[18]</sup> In this way, it is anticipated that a detailed, grounded and practice-relevant account of the participants' early career experiences will be generated, with a view to accomplishing the previously described aims.

### ***Trustworthiness***

The key concerns identified by Yardley<sup>[23]</sup> will be rigorously observed. The core credibility of the final analysis will be initially addressed through an advanced process of triangular consensus validation<sup>[24]</sup>, in which all four members of the research team will coordinatively review the emergent work until a mutually satisfactory outcome is attained. As a member-check, meanwhile, and as a further guarantee on stakeholder involvement, a précis of the provisional analysis will then be sent to a randomly-selected subset (n=5) of the original sample; all feedback will be incorporated into a revised final analysis. *Sensitivity to context* herein will be maintained through only making statements about the specific, rather than the general, when addressing the data at hand. *Transparency and coherence*, meanwhile, will be evidenced through systematic data presentation in the form of hierarchical code trees; the process of initial codification to thematic discussion will not, thus, be made unclearly, nor without direct evidential support (in the form of direct quotation).

### ***Ethical concerns***

At the time of writing, University ethical approval has already been granted. All selected participants will be sent an interview pack at least two weeks in advance of their contribution, including a detailed Participant Information Sheet and Consent Form, plus a brief summary of the topics for discussion. This should facilitate preliminary reflection upon the issues of relevance, and also further inform the decision to participate. Any participants who then decide not to take part will be replaced (if possible) from a reserve pool of volunteers. Participants will be further asked via the consent form if they are happy (a) for their original recordings to be kept by the research team for future (anonymous) use after the transcription process is complete, and (b) for their anonymised transcript to be publicly archived to help future research in the domain. Where the answer to (a) is "no," the pertinent recording will be securely deleted at source. Where the answer to (a) is "yes," but (b) is "no," the recording will be preserved on the University's own secure servers, in a shared folder accessible only to the original research team.

It is unlikely that any issues of psychological discomfort will become relevant for participants, though the interviews could potentially touch upon experiences that participants

have found uncomfortable and/or difficult in practice. Given that participants will have been forewarned of all primary issues for discussion, and also assured of the voluntary nature of their overall contribution and any specific elements therein, it is not expected that such problems will arise. In the event that a participant does exhibit any fledgling distress, however, the interviewer will propose that the interview be suspended or terminated (subject to the participant's wishes), while also directing them to (or reminding them of) pertinent support services.

As a further model of ethical assurance, all volunteering participants will be directed to check with their managers that their participation does not contravene any internal ethical mandates at their place of employment, and will be encouraged to show them the Participant Information Sheet to this extent. Where there is any doubt raised, the participant will be excluded. While the study directly addresses the impacts of university education, rather any consequences of hospital training itself, this issue will not be overlooked.

## **Potential impact**

The study is designed to add directly to an empirically grounded evidence-base for the prospective development of workplace-sensitive undergraduate degree programmes in diagnostic radiography. Beyond this, however, it is also anticipated that the work (given its originality and direct practicality) will also be impactful in terms of academic publication and dissemination. Critically, however, it should directly address the business of educating future radiographers in the following ways:

1. By monitoring the explicit additional training required by new graduates, and their perceived technical difficulties, it can be monitored which radiographic skills are presently lacking in undergraduate radiography curricula. By extension, thus;
2. It may be possible to delimit some resilience issues by engendering a stronger sense of practical preparedness for the real world of MI practice, however;
3. Technical skills alone are unlikely to fully prepare a student for the real world of a career in the NHS, so;
4. By monitoring the interaction between the technical and personal aspects of a variegated and heavy workload, it might be better understood how to 'soften the blow' of moving between university (where 'safety nets' are a constant feature) into hard clinical practice (where they are not).

## **Dissemination Strategy**

Alongside the formal reports required by the funders, it is anticipated that the findings from the project will be disseminated in the following manners:

1. A short summary of findings for all participants and stakeholders, as is consistent with good ethical practice.
2. At least two formal peer-reviewed academic papers.
3. Conference presentations wherever possible (including UKRC) of both provisional and final results.
4. A short, evidence-based report on recommendations to be made available to educators and curriculum design managers.

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