

**Degree apprenticeships for the radiography profession;
are clinical departments ready?**

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Published version

SEVENS, Trudy, NIGHTINGALE, Julie and ALI, Nancy (2021). Degree apprenticeships for the radiography profession; are clinical departments ready? Radiography.

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Introduction

The introduction of the Apprenticeship levy in 2017 motivated large organisations such as the National Health Service (NHS) to embrace degree apprenticeships (DA) as an alternative route to registration for allied health professions in England. National Apprenticeship standards for Level 6 BSc (Hons) sonography, diagnostic and therapeutic radiography were approved in 2019. By early 2021, two diagnostic radiography DA programmes had been launched with more programmes in development. However, recent studies revealed limited understanding of DA amongst radiography managers and apprenticeship development groups known as Trailblazers^{1,2}. Employer awareness of this new educational model is important to facilitate the successful integration and mentorship of apprentices in the workplace. This study explores the perceptions and expectations of radiography managers regarding DA to identify potential challenges and solutions.

Literature review

Given that these programmes are new, the literature revealed a paucity of research around radiography degree apprenticeships. It was, however, suggested that DA can grow the radiography workforce² which needs to increase in size by 45% by 2027 to meet anticipated demands³⁻⁶. Diversity and inclusivity into the profession can be further widened through DA as applicants from varied socio-economic and ethnic backgrounds⁷ apply as school leavers or existing healthcare support staff wishing to enter the profession but for whom the university fee-paying route is not feasible⁸. Providing apprentices with the chance to 'earn as they learn' without the need to relocate can encourage mature students to join the programme bringing valuable life experiences with them^{9,10}. This increased equity of access can assist with tackling some of the challenges related to youth poverty, unemployment, and crime¹¹.

The impact on workforce development has not yet been reported for radiography-related professions, however DA have been successful in addressing skill shortages and facilitating professionalisation in other professions¹². DA have illustrated substantial effects on economic growth¹³ and return on investment¹⁴; DA in radiography-related professions could be a worthy investment.

However, several barriers to implementation have been reported¹⁵ compounded by a potential for qualified staff and practice educator shortages¹⁶. Although funding can be accessed through the apprenticeship levy, apprentices' salary and financing off-the-job learning^{17,18} are additional costs and challenges to be considered. The COVID-19 pandemic constituted another significant challenge for health-related apprenticeships as staff were redeployed to support the pandemic recovery effort affecting the learning opportunities for apprentices¹⁶. This difficult context requires effective partnership between stakeholders to create a sustainable yet flexible structure for radiography DA training which meet the needs of apprentices, employers and the workforce¹⁹. Paramount to success is the continued training for apprentices and maintaining good

retention to apprenticeship programmes; this has been a challenge for managers in other disciplines with attrition rates of 30%²⁰. Although admission and completion rates for radiography DA cannot be currently estimated, it is imperative to understand the perspectives of managers as they are pivotal in the success of these innovative programmes. This research explores how radiography managers perceive DA to determine any challenges and barriers to implementation during the pandemic and in a post-viral future, and to make recommendations to support the delivery of future apprenticeship programmes.

Methods

A pragmatic, non-experimental study design was used to guide the development of an online questionnaire survey to capture a representative sample of radiography (diagnostic, therapeutic and ultrasound) employer perceptions. Participants were radiography managers recruited via professional networks, social media and advertisements in professional journals and websites rather than as NHS Trust employees. Participants provided consent through the Qualtrics survey platform (Qualtrics© Provo, UT, version May 2020). Ethical approval for the study was obtained from [removed for anonymity during peer review].

The questionnaire was informed by relevant literature including themes emerging from a previous qualitative study of radiography apprenticeship trailblazer groups¹. The survey consisted of 17 forced-choice questions (multiple choice and Likert scales) and 8 open-ended questions to gain both numerical and qualitative data related to the potential barriers, facilitators, and benefits of DA. The questionnaire was piloted with nurse managers and minor amendments made. Data collection occurred over a period of 3 months from May-August 2020.

Quantitative analysis in the form of descriptive statistics was conducted using Microsoft Excel. Framework analysis was used to analyse the qualitative data following the guidelines outlined by Ritchie and Spencer²¹. This enabled the development of themes that captured participants' views in systematic stages and cross comparisons between comments ensured the generated themes represented the full breadth of participants' opinions. Independent peer review of the analysis by the research team enhanced the rigour, credibility, and trustworthiness.

Results

Seventeen respondents completed the questionnaire with most (n= 16, 94.11%) employed as either head of radiography, service improvement lead and radiography service manager. One participant was an Ultrasound manager, and one did not specify their role. The majority (n=13, 76.47%) were employed at Band 8a or above and the mean time employed in the same post was 3 years. They represented different

geographical locations with 58.82% (n=10) working in the East and Southwest of England, and their average age ranged between 45-54 years.

Sixteen participants (94.11%) reported that they were aware of DA training for health professions. Five participants (29.41%) had included DA in their current business plans. Ten participants (58.82%) expected that DA would be included in the department's future business plan with 1-3 apprenticeship expected; they were collaborating with academic partners to implement the programme within 12-24 months. Prior radiography experience was not considered a determinant admission criterion.

Perceived barriers to the implementation of DA in the participant's department are seen in Figure 1. Responses were divided on whether employing apprentices would affect placement capacity for fee-paying students (n=5, 29.41% agreed). Eight participants (47.05%) felt that there was little or no preparation for the introduction of DA and only 4 participants (23.52%) thought that the workforce was prepared for this change. Salary costs were considered moderately challenging by 8 participants (47.05%). Minimal resistance to accept apprentices within the workforce was expected (n=11, 64.70%). None of the participants identified extreme challenges to the implementation of radiography DA.

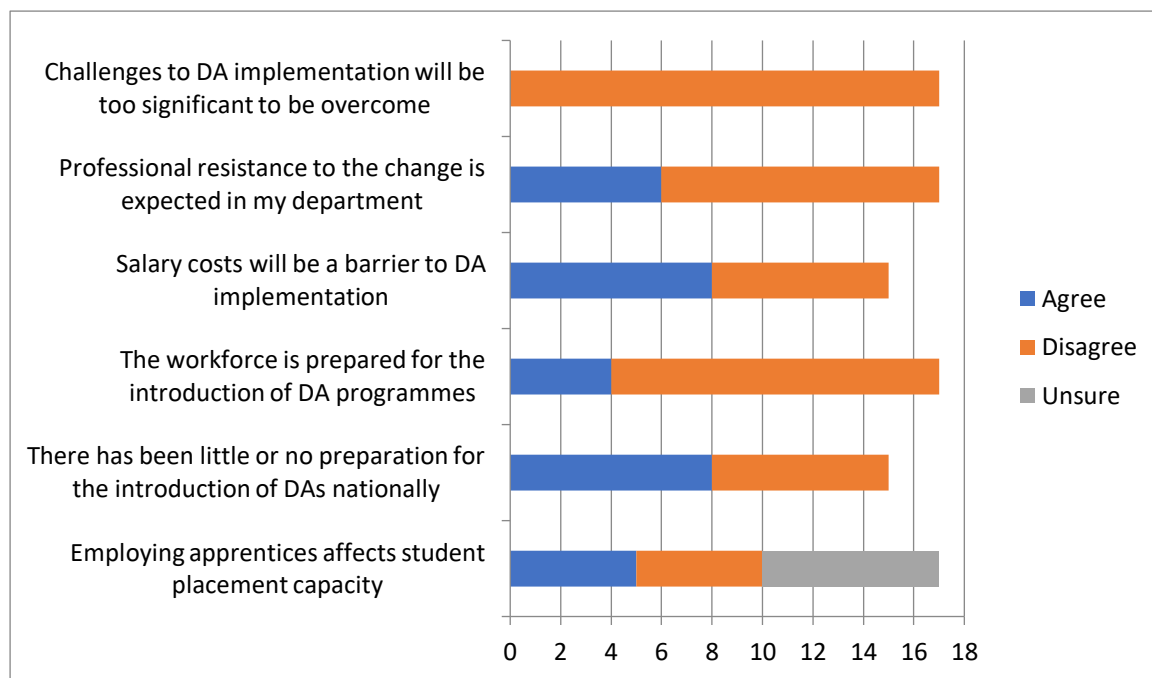


Figure 1 Perceived barriers to the implementation of Degree Apprentices (DA) in the participant's department

Three main themes were created as summarised in Table 1.

Themes created from open responses	Exemplar quotations

<p>1. Barriers and facilitators to employing apprentices</p>	<p>"Potential for sonographer apprentices to be disadvantaged and "set up to fail" without HCPC support" (8).</p> <p>"Number of apprentices a small department could support at any one-time... extent of clinical techniques, dependant on techniques used by individual providers may be limiting" (2).</p> <p>"They would need to be funded in addition to current establishment, with no guarantee of a job at the end of it" (3).</p> <p>"The HEI could provide ready-made e-learning that could be delivered by the employing Trust to ensure parity" (7).</p> <p>"More information around the end point assessments for the apprentice group and how this differs from the current undergrad/post grad routes" (9).</p> <p>"Would need backfill for the time the staff need to mentor the apprentices" (15).</p>
<p>2. Impact of apprentices on the local workforce</p>	<p>"The apprentices definitely have better clinical skills upon qualifying and are more confident within the department as they have been a valued member of staff over the duration of their training which is 80% hands on clinical practice" (10).</p> <p>"Because the emphasis is clinical, they become very skilled very quickly, which means that they are ready to take on their new role immediately upon qualifying" (10).</p> <p>"[Apprentices] won't necessarily have had the rounded experience gained from working in other centres and may have limited knowledge on any procedures not used within the department" (15).</p> <p>"Hopefully, they [apprentices] will stay where they have trained and have some competencies signed off while training. This should ease pressure on the current workforce" (6).</p>
<p>3. Impact of apprentices on the wider radiographer /sonographer workforce</p>	<p>"It may turn out that apprenticeships become the only way to train, and fee-paying courses may cease - why would you pay to train when you can get paid for training?! It makes no sense to me" (3)</p> <p>"Make the professions and training attractive to young people. More grass roots promotions in schools to engage prospective students at an earlier age" (9).</p> <p>"Key points that I have taken away is that it is vital to build a good working relationship with the HEI... We have learnt together and have relied heavily on effective partnership working and open communication and two-way feedback" (10).</p> <p>"What is the differentiation between an undergraduate level apprentice sonographer graduate vs a PgDip sonographer? Will they be expected to</p>

	<p><i>undertake the exact same workload and responsibility? Is it expected that they will undertake more routine based referrals under strict reporting protocols with complex cases and in patients being left to post-grad sonographers?" (8).</i></p> <p><i>"I think there will be likely conflict between fee paying students and apprentices." (3)</i></p> <p><i>"My concern is dumbing down of ultrasound with direct entry." (3)</i></p>
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Table 1 Survey themes from coding of open text comments

Theme 1: Barriers and facilitators to employing apprentices

Recruitment of apprentices was highlighted as a potential challenge which centred around the educational level of apprenticeship routes and ability of candidates to cope with degree-level study. For sonography, the challenge was linked to the lack of professional registration creating obstacles for career progression and employment.

Other barriers related to the limited number of apprentices that a department could support at any one time, particularly pertinent to smaller departments. Concerns were raised that the learning experience of apprentices could be compromised as university academic input was reduced and reliance on practice educators increased. Potential variance in practice educator expertise and techniques between departments created challenges in standardising the training of DA across the NHS. Training for clinical mentors was essential with a few participants advocating contemporary learning tools and materials should be made available for mentors to support academic delivery ensuring parity between apprenticeship and university routes. The importance of work-based mentors having an in-depth knowledge of DA programme structure, assessment and expected apprentice level of knowledge and technical competencies for each stage of the course was emphasised.

There were real concerns around the time commitment required for academic and practical training by practice educators to be able to support apprentices alongside university students. Participants wanted to be better informed and sought further clarify on the role of mentors.

Some participants expressed apprehension of using Agenda for Change Band 5 radiographer vacancy monies to employ apprentices; short staffing may result in staff becoming overwhelmed with mentorship responsibilities, which could negatively affect service provision. Assistance with securing funding for DA backfill would expedite DA implementation. Offering full-time employment post-qualification in the training department was not considered necessary to attract candidates.

Theme 2: Impact of apprentices on the local workforce

Participants suggested that DA could rapidly contribute to the scope, professionalism, and competence of the workforce, but recognised that the standards of apprentices' training must be comparable to university education to produce equally skilled practitioners.

The greater focus on clinical practice in DA than in their university counterparts was considered advantageous, leading to enhanced skills and better integration into the departments for apprentices. It was mostly agreed that apprentices' clinical expertise and confidence could be higher than their fee-paying peers, facilitating a smoother transition into the workforce on graduating. However, negative case analysis revealed that two participants indicated that apprentice graduates could be less knowledgeable than university graduates as apprentices' experience would be limited to the working practices within one department. This potentially creates a less agile workforce.

It was acknowledged that apprentices could contribute to improving service provision by undertaking some clinical duties while training. Increased staff retention was expected post-qualification as apprentices are likely to become loyal to the training department and improve staff shortages.

Theme 3: Impact of apprentices on the wider radiographer/sonographer workforce

Some participants were concerned about the combined training capacity for both apprentices and university students and recommended the professional body advise on the overall training numbers from both routes to ensure equity of access to excellent mentorship.

Some participants suggested applicants may prefer the apprenticeship route due to the paid employment status whilst studying. They questioned whether DA would gradually replace university courses and therefore no sizeable increase of the workforce would be achievable in the long term. The promotion of DA needed to be better targeted to appeal to school leavers and mature students from different backgrounds. Collaboration between clinical departments and higher education institutions was essential for the success of apprenticeships.

Sonography managers raised specific concerns relating to how degree apprentices will be integrated into the workforce which is currently underpinned by postgraduate education. Questions were raised in relation to the role of apprenticeship graduates and specifically, whether they would perform routine tasks under supervision. The two levels of education for entry into sonography could inadvertently create two tiers of professionals who might compete over the same role, instead of complimenting each other. Participants recommended that the level of qualification and scope of practice associated with each route needed clarification to avoid intra-professional conflict. There were also concerns around potentially downgrading the professional status of sonographers. It was evident the role of an education level 6 sonographer graduate

remains unclear raising concerns around professional culture, working policies, and career pathways within departments in the future.

Discussion

An online questionnaire was employed to understand the perceptions of radiography managers regarding DA. The findings showed good acceptability of DA with the value recognised for apprentices, employers, and the profession. The potential for DA to increase the radiography workforce was questioned, although they widen access by offering alternative routes to practice. There was a deficit of knowledge including the course structure, type of assessments and the academic standards that apprentices would be expected to fulfil. The readiness of clinical departments for the introduction of apprentices depended upon the size of the department, placement capacity and the availability of skilled mentors.

The creation of successful and sustainable DA programmes is multifactorial. Although university-employer partnership was critical, this was not just about formulating curricula. A key component of this partnership was supporting clinical mentors to develop learning resources and pedagogical approaches that promote learning in the workplace, as identified in previous studies^{9,22}. The quality of mentorship and supervision will be imperative to apprentice development and maintaining high standards of training across departments ensuring parity with university routes.

Additional staff requirements were identified to ensure equal mentorship opportunities for apprentices and fee-paying students and a robust recruitment process that attracts both school leavers and mature candidates was essential. Defining clear responsibilities for apprentices was important to avoid placing excessive demands upon them that could impact on their learning. This was particularly pertinent for sonography where there remains confusion over apprentices' role, highlighting the importance of raising awareness amongst employers, managers, and clinical staff.

A few participants were concerned the sonography DA might be a 'step back' and could inadvertently downgrade the profession and compromise the quality of care. These concerns have been previously raised in sonography^{23,24} and have been articulated in relation to DA in general²⁵⁻²⁷. Stakeholder collaboration is therefore key in developing programmes that strike a balance between teaching theory and practical skills.

There were some concerns that paid apprenticeships could gradually substitute the university route, and thus staff shortages would continue to be a problem. This issue has not been raised previously and there is no radiography-specific data to evaluate the validity of these concerns, however, studies in other fields showed recruitment to DA was low²⁸. The real challenge appears to lie in increasing admissions to DA by creating opportunities for widening access and upskilling existing support staff through

these programmes². Embedding life-long learning resources within the structure of apprenticeships can attract applicants from new pools, including further education students and applicants from non-health backgrounds who are looking to change careers.

This research corroborated the benefits of DA for employers including increased local recruitment and retention through enhanced staff loyalty to improve service provision². This is pertinent for radiography considering staff retention challenges²⁹ and historical high course attrition rates³⁰. It is imperative apprentices do not become disengaged with their studies because of feeling isolated from university life³¹⁻³³. Peer support for apprentices through learning communities is recommended to create a sense of belonging and achievement.

It is also our recommendation that multi-level communities of practice are formed to promote peer mentorship and sharing. At departmental level, for practice educators, at regional level facilitated by integrated care system imaging networks and at national level through the forming of a Society of Radiographers special interest group.

Another key recommendation for the implementation of DA in radiography is to explore the transferability of workplace pedagogical models from other allied-health professions and to conduct further research to develop successful teaching and mentorship models tailored to the requirements of radiography apprentices. Finally, the experiences of stakeholders, including apprentices, needs to be investigated during and after the implementation of DA to identify areas for improvement.

Limitations

The main limitation of this survey was the low response rate, despite several measures to mitigate this including seeking support from professional bodies to facilitate recruitment. Nonetheless, this study provided significant contributions to the body knowledge on DA in radiography through practice and future research implications. Moreover, the findings were analysed in relation to the wider allied-health professions literature and were situated within the broader financial and policy contexts in the NHS which enabled the generation of meaningful recommendations.

Conclusion

There is potential in introducing work-based higher education for allied health professions that targets the development of subject knowledge, technical competencies, and employability skills. It is imperative that the expectations of managers are understood to provide the basis for fruitful partnerships between employers and universities to design curricula, set academic standards and co-create apprentice support mechanisms. Longitudinal studies are required post-implementation to identify emerging issues and solutions which would enable the development of best practice guidelines given the drive for DA in allied healthcare.

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