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Evaluating the co-production of specialist online education: A comparative case study of interventional radiology and cardiac catheter laboratory practice

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ABSTRACT

Introduction: Accredited continuing professional development opportunities for healthcare professionals working in Interventional Radiology and Cardiac Catheter Laboratory settings are limited. To address this gap, a Higher Education Institution, in partnership with clinical stakeholders, co-developed bespoke online distance-learning modules for nurses, radiographers, and cardiac physiologists. This study explores the development, implementation, and perceived value of these modules.

Methods: A comparative case study explored the development, delivery, and early outcomes of two co-produced online continuing professional development modules. Delivered over twelve weeks, each module comprised six multidisciplinary learning blocks with a shared curriculum for nurses, radiographers, and cardiac physiologists. Participants included ten clinical, managerial, and educational stakeholders and twenty post-registration healthcare professionals. Data were collected through semi-structured interviews, questionnaires, and document analysis. Data were analysed using Braun and Clarke's thematic analysis, with triangulation enhancing credibility.

Results: Findings from interviews, questionnaires, and document analysis were consistent, showing that both modules supported interprofessional learning, specialist knowledge development, and workforce flexibility. Co-production between the Higher Education Institution and clinical stakeholders enhanced curriculum authenticity by aligning learning with real-world service needs. Clinician-led delivery increased credibility and subject expertise but presented sustainability and succession planning challenges.

Conclusion: Co-production between Higher Education Institutions and clinical stakeholders can meaningfully support workforce development at local, national, and international levels. However, within a market-driven higher education context, such initiatives represent high-risk investments and require strategic planning to ensure long-term sustainability.

Implications for practice: Partnerships between Higher Education Institutions and clinical stakeholders can strengthen specialist workforce development through relevant accredited continuing professional development. Sustaining provision requires succession planning, educator capacity, and long-term investment to reduce reliance on individual clinical champions and maintain workforce flexibility.

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Introduction

A responsive, well-prepared healthcare workforce is essential to meet evolving service demands locally, nationally, and globally.[1,2] For radiography and radiology services, this need is particularly important as technological innovation and demand for services continue to expand.[3–5] Developing a workforce that is digitally competent, clinically specialised, and adaptable requires curricula that embed digital health capabilities and are co-designed with clinical stakeholders.[6–8] Increasing demand for continuing professional development (CPD) has encouraged the growth of online distance learning.[9–11] Distance learning typically combines synchronous (live, scheduled sessions) with asynchronous learning (self-paced engagement), offering flexibility and accessibility for healthcare professionals balancing work, travel, and personal commitments.[7,12]

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Within this context, this paper examines the co-production of two online CPD modules developed through a partnership between a Higher Education Institution (HEI) and clinical stakeholders. This included representatives from the local Imaging Academy and staff from the Interventional Radiography (IR) and Cardiac Catheter Laboratory (CCL) departments at a large teaching hospital to deliver specialist education for IR and CCL healthcare professionals in England. The initiative was developed in response to workforce development, recruitment and retention challenges within these highly specialised services and the limited availability of university-accredited educational provision tailored to non-medical roles.[13,14] While specialist workforce development in IR and CCL has traditionally been supported through workplace-based training, professional body education, NHS academy programmes and specialist conferences, dedicated academic programmes focused specifically on these areas remain uncommon.

Within this context, this paper examines the co-production of two online CPD modules developed in partnership between a Higher Education Institution (HEI) and clinical stakeholders, including representatives from the local Imaging Academy and staff from the Interventional Radiography (IR) and Cardiac Catheter Laboratory (CCL) departments at a large teaching hospital, to deliver specialist education for IR and CCL healthcare professionals in England. Educational preparation for IR and CCL practice remains inconsistent across the UK and Europe.[13] Opportunities to develop specialist knowledge at undergraduate level are limited, while university-accredited postgraduate provision remains scarce. As a result, pathways to competence vary considerably between institutions and countries, with implications for workforce preparedness, mobility, and service development.[13] The initiative was developed in response to these educational gaps, alongside workforce development, recruitment and retention challenges within these highly specialised services.[14,15] While specialist workforce development in IR and CCL has traditionally been supported through workplace-based training, professional body education, NHS academy programmes and specialist conferences, university-accredited pathways remain limited and variable in scope and availability.

Similar workforce development challenges are not unique to IR and CCL practice and have been reported across a range of specialist healthcare professions. Across the EU, more than one-third of physicians and one-quarter of nurses are expected to retire within the next decade, highlighting the need for sustained investment in postgraduate education, upskilling and workforce development, particularly in specialist clinical areas.[16,17] Within radiography and wider healthcare professions, collaborative partnerships between higher education institutions and clinical providers have increasingly been advocated as a means of ensuring educational provision remains responsive to workforce and service needs.[14,18,19] This paper evaluates the benefits of the modules for recruitment and professional development within the specialties and explores the challenges associated with their development and long-term sustainability for both the Higher Education Institution and its clinical partners.

Background

IR and CCL are technologically advanced specialties delivering increasingly complex therapeutic interventions.[20,21] Rising service demand and the drive to enhance patient outcomes require sustained investment in workforce education and specialist training.[5,22,23] However, the development of structured, accredited educational pathways for these highly specialised areas remains uneven, with workforce learning often dependent on local, employer-led provision.[13,14]

In 2022, Health Education England agreed to fund the development of a regional training package for IR nurses and radiographers in partnership with the Regional Imaging Academy. During early development, the project evolved into a broader collaborative co-production initiative involving Academy staff, the IR Matron, and a local HEI Post-Qualifying Programmes team, to design and deliver an accredited qualification. This shift reflected a shared approach to curriculum development and delivery across clinical and academic partners. Concurrently, the CCL team partnered with the HEI to develop a similar bespoke accredited qualification.

Steering committees were established to define the curriculum content, assessment strategy, and governance arrangements for both programmes. Membership included IR consultants, the Imaging Academy Manager, IR Matron, CCL Manager, representatives from radiography, nursing and cardiac physiology practitioner staff, the Head of Post-Qualifying Programmes, the Post-Qualifying Programmes Manager, and HEI module organisers, ensuring broad stakeholder engagement throughout programme development.

Two 20-credit modules (offered at Levels 6 and 7) were designed for qualified healthcare professionals, including nurses, radiographers, and cardiac physiologists working in IR and CCL settings.[24,25] Delivered online via the HEI virtual learning environment (Blackboard) over twelve weeks, the modules comprised six two-week blocks of synchronous and asynchronous learning (Table 1). While the clinical content differed, both modules were developed and delivered using a common pedagogical model, drawing on shared educational design, learning, and assessment principles. Learners completed a case-based discussion and practice assessment document to demonstrate the application of specialist knowledge and clinical competence within their clinical environment, with assessments double-marked by a senior IR/CCL clinician and an academic.[26] Supported by Health Education England development funding, both modules launched in April 2024.

Despite growing interest in co-produced, digitally enabled CPD models, there remains limited empirical evidence examining how such partnerships are implemented, how stakeholders experience the co-production process, and what factors influence sustainability within specialist healthcare education.[15–17] From an implementation science perspective, understanding these mechanisms is critical to ensuring that educational innovations are not only effective in principle, but also feasible, acceptable, and sustainable within complex healthcare systems.[27] The aim of this study was therefore to evaluate the implementation, co-production process, and outcomes of bespoke online distance-learning modules for IR and CCL healthcare professionals developed through HEI-clinical partnerships.

Methods

A comparative case study design was used to explore the development, implementation, and early outcomes of two

Table 1
IR and CCL module block content.

Block	IR	CCL
1	Introduction to IR	Key concepts
2	Principles of arterial intervention	Assessment and planning
3	Principles of venous intervention	Medical management
4	Perioperative care and sepsis	Radiation
5	Managing the bleeding and acutely unwell patient in IR	Procedures and techniques
6	Tumours and non-vascular procedures	Complications and emergencies

co-produced online CPD modules for IR and CCL healthcare professionals. Case study methodology is well suited to examining complex, real-world educational interventions where outcomes are shaped by contextual and organisational factors, and where understanding implementation processes is as important as outcomes.[28–30] A comparative approach enables systematic examination of two related cases to identify shared mechanisms and context-specific differences in implementation.

The IR and CCL modules each constitute a bounded case. While both were developed through a shared HEI-clinical partnership model and similar co-production principles, they were delivered to healthcare professional groups working within specialist clinical environments with differing workforce structures and service demands, enabling meaningful comparison of implementation processes and stakeholder experiences.

Participants included clinical, managerial, and educational stakeholders involved in module design, delivery, and governance, as well as post-registration healthcare professionals enrolled on the modules (students). Data were collected across two sequential student intakes for each module during the initial delivery phase. These intakes represent consecutive deliveries of the same modules rather than separate study populations, allowing exploration of early implementation and iterative development over time.

Data collection

Consistent with case study methodology, multiple sources of evidence were used to develop rich case descriptions and facilitate methodological triangulation.[29] Triangulation was achieved through the integration of interview, questionnaire, and documentary data, enabling comparison of perspectives across stakeholder groups and corroboration of emerging findings.[30–32]

Document analysis was undertaken first to provide contextual information regarding module design and implementation. Materials reviewed included steering committee minutes, virtual learning environment content, module specifications, learning resources, assessment documentation, and promotional materials.

Semi-structured interviews were selected to facilitate in-depth exploration of stakeholder experiences and perceptions of module development, implementation, and sustainability. Purposive sampling was used to recruit individuals directly involved in module design, governance, delivery, and assessment, including managers, academics, and clinical staff from the IR and CCL specialties (Fig. 1, Table 2). All interview participants were asked the same core questions relating to the rationale for module development, perceived benefits, educational design, implementation challenges, assessment strategy, and future sustainability. Interviews were conducted via MS Teams over a six-month period, lasted between 30 and 60 min, and were audio-recorded and transcribed verbatim. Transcripts were returned to participants for member checking prior to analysis.

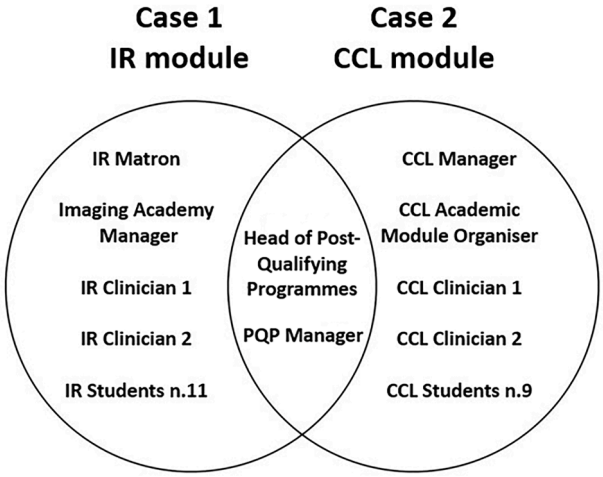

Figure 1. Case 1 and 2.

Questionnaires were distributed using Microsoft Forms to capture student experiences and perceived impact on clinical practice and continuing professional development. All students enrolled on the first two deliveries of the IR and CCL modules ($n = 66$) were invited by e-mail to participate following module completion, with 20 responses received (30% response rate). The same questionnaire was administered to both student groups and explored motivations for enrolment, perceived benefits to practice and CPD, experiences of learning and assessment, and anticipated impact on service delivery.

Participants were selected on the basis of their direct involvement in module development, delivery, or participation. No formal exclusion criteria were applied; however, participation was limited to individuals available and willing to contribute alongside their clinical and professional responsibilities.

Data analysis

Data were analysed using Braun and Clarke's six-phase thematic analysis framework.[33] Interview transcripts, questionnaire responses, and documentary data were analysed within a common framework to facilitate within- and cross-case comparison. Two HEI researchers independently familiarised themselves with the data and generated initial codes to enhance analytical rigour. Codes were reviewed and refined through iterative discussion until a shared coding framework was agreed and no substantially new concepts emerged.[34] Any differences in interpretation were resolved through discussion and reference to the original data.

Following coding, data were organised into categories and candidate themes. Methodological triangulation was achieved by comparing findings across interviews, questionnaires, and documentary evidence, while data source triangulation enabled comparison of perspectives from managers, clinicians, academics, and students. Convergence and divergence across datasets were examined to enhance the credibility and trustworthiness of interpretations.[35] Themes were subsequently refined through iterative review of coded extracts and the complete dataset to ensure they accurately reflected participants' experiences across both cases.[36]

This process facilitated identification of recurring patterns, contrasts, and contextual influences across the IR and CCL modules, enabling comparison of implementation experiences and outcomes. The resulting themes and associated sub-themes are presented in the Results section (Table 3).

Ethics

This study received ethical approval from the University Of East Anglia Ethics Committee on 05/02/2025 (ETH2425-1070). All participants received study information and provided informed written consent prior to participation. Participation was voluntary, with the right to withdraw at any stage without consequence. Given the small number of stakeholders involved in module development and delivery, particular attention was paid to confidentiality and anonymisation. Data were anonymised prior to analysis and stored securely in accordance with institutional data protection policies.

Table 2
Interview and questionnaire participants.

	Higher education institute managers/ academic n.3	Imaging academy manager n.1	IR manager/ clinicians n.3	CCL manager/ clinicians n.3	CCL students n.9 (7 + 2)	IR students n.11 (4 + 7)
Interview	Head of post qualifying programmes (PQP) PQP manager CCL academic module organiser	Imaging academy manager	IR matron IR clinician 1 IR clinician 2	CCL manager CCL clinician 1 CCL clinician 2		
Questionnaire					CCL student intake 1 = CLsi1 Students = a/b/c/d/e/f/g CCL student intake 2 = CLsi2 Students = a/b	IR student intake 1 = IRsi1 Students = a/b/c/d IR student intake 2 = IRsi2 Students = a/b/c/d/e/f/g

Participants represented a range of stakeholder groups, including managers, academics, clinicians, and students, each bringing different perspectives to the study. Reflexivity was maintained throughout the research process. The lead investigator, who was also the IR module organiser, was excluded as a participant, while independent coding, researcher discussion, member checking, and data triangulation were used to enhance the credibility and trustworthiness of the findings.

Results

Analysis of the interview, questionnaire and documentary data identified four overarching themes relating to the development and implementation of the IR and CCL modules (Table 3). These themes were: (1) Motivation, reflecting the drivers underpinning module development; (2) Process, describing the collaborative approaches used to design and deliver the programmes; (3) Product, representing the perceived educational and workforce outcomes arising from implementation; and (4) Challenges, relating to factors affecting longer-term sustainability. Supporting illustrative quotations are presented in Table 3.

Theme 1. motivation

Participants consistently described both modules as a response to unmet educational and workforce needs within specialist practice. Three interrelated motivations were identified: addressing the absence of accredited specialist education, legitimising specialist knowledge through formal academic recognition, and strengthening workforce capability to support service sustainability. Participants viewed the modules as an opportunity to improve consistency of practice, raise the professional profile of IR and CCL practitioners, and develop a workforce better equipped to respond to increasing service demand (Table 3).

Theme 2. process

Participants described module development as a collaborative process requiring close partnership between the HEI and clinical services. Four sub-themes were identified: partnership and co-production, stakeholder engagement, the importance of clinical leadership and credibility, and the organisational resources required to support implementation. Across both modules, participants emphasised that educational quality depended on combining academic expertise with specialist clinical knowledge, whilst recognising that development required considerable investment of funding, time and professional goodwill (Table 3).

Theme 3. product

Participants described the completed modules as generating benefits for individuals, organisations and the wider workforce. Three sub-themes were identified: strengthening multidisciplinary practice, supporting workforce development and organisational capability, and providing a pathway towards advanced practice. Students reported greater understanding of multidisciplinary roles, increased confidence in practice and recognition of organisational commitment to career development, while stakeholders viewed the modules as supporting recruitment, retention and future workforce development (Table 3).

Theme 4. challenges

Participants identified four interrelated challenges affecting longer-term sustainability: programme continuity, workforce capacity, financial viability and professional perceptions of role development. Concerns centred on reliance upon a small number of clinical champions, difficulties releasing staff for educational activities, the financial sustainability of specialist provision, and misconceptions surrounding role expansion. Collectively, these findings suggest that sustaining specialist CPD requires ongoing organisational commitment alongside educational innovation (Table 3).

Discussion

This study aimed to evaluate the implementation, co-production process, and outcomes of two bespoke online CPD modules for IR and CCL healthcare professionals developed through HEI-clinical partnerships. Overall, the findings indicate a high degree of similarity across both cases, suggesting that implementation success was primarily shaped by the co-production model and contextual workforce drivers rather than specialty-specific factors.

Both modules were developed in response to identified gaps in accredited specialist education[13–16] and were delivered using a shared clinician-led, work-based pedagogical approach with aligned assessment strategies. They also demonstrated comparable student engagement and were supported by similar funding and governance structures. Differences were largely confined to content focus and delivery configuration, reflecting the distinct procedural breadth of IR compared with the more standardised role structure within CCL practice.

A key finding was the central role of clinician-academic collaboration in ensuring relevance, credibility, and alignment with clinical practice. Co-production enabled curriculum design to be grounded in real-world service needs, reinforcing the perceived authenticity of learning.[19,37] This aligns with broader evidence that

Table 3
Results of thematic analysis.

Extracted theme	Sub-themes and codes	Illustrative quotes
1. Motivation	1.1 Addressing an educational deficit • Recognition of a gap in specialist educational provision • Lack of accredited CPD opportunities • Desire to expand access beyond local provision • Standardisation of knowledge and practice	*"The previous course closed … So, I wrote the CCL Practitioner job descriptions and we've made it work really well internally, but I wanted to be able to expand that nationally."* CCL manager *"What we really need to do is offer something accredited … each hospital does their own thing."* IR matron *"Locally, you give the practitioners more knowledge, more experience and allow them to work more safely. Regionally … you can take policies and routines from one place to the other."* IR clinician 2
	1.2 Professional legitimisation • Formalising specialist knowledge • Enhancing professional credibility • Raising the profile of the speciality • Recognition expertise	*"What radiology, nursing and IR actually need is something to show their profile and their experience and their knowledge."* IR matron
	1.3 Workforce development and service sustainability • Workforce pressures and service demands • Supporting role development • Improving patient care • Future workforce capability • Local, regional and national impact	*"Without that team … the situation won't happen and it affects patient care. It is a workforce issue … patient targets for imaging are going through the roof."* Imaging academy manager *"Improving and hopefully standardising best practice in Cath Labs across the country."* CCL manager
2. Process	2.1 Partnership and Co-production • Shared expertise • Team-based development • Clinician-academic collaboration	*"We could bring … academic underpinning and organisation of teaching and assessment … the clinical departments provided their networks and contacts."* CCL academic module organiser *"The module wouldn't have worked without a team approach … Had the University decided to do it on their own … I don't think they would have had the same level of engagement."* IR matron
	2.2 Stakeholder engagement and consensus building • Steering group activity • Diverse stakeholder representation • Maintaining engagement • Managing differing perspectives • Building consensus	*"The key thing with … steering group meetings was to keep momentum going … Trying to get busy clinicians together for regular meetings isn't the easiest thing."* Post-qualifying programmes manager *"The agenda got a bit confused in the initial steering groups when you have lots of people there … people kind of dropped off and left it to us to say OK, this is what we're going to do."* IR matron
	2.3 Networks, credibility and clinical leadership • Influence of key clinical champions • Existing professional networks • Clinical credibility • Expert-led teaching • Reputation and trust	*"The driving force was having … people that were well known within the region and part of that network. They opened the door for us."* Head of post-qualifying programmes *"It's a different type of beast the … postgraduate programme. You need very experienced clinicians."* Post-qualifying programmes manager
	2.4 Resource requirements • External funding • Time investment • Balancing development with clinical responsibilities • Organisational support	*"The lecture on the liver by [consultant B] was very useful. We do a lot of liver intervention but I didn't appreciate what goes into it until I attended the lecture."* IRsi1b "If we had not had that pot of money, it might have been a different situation whether we went ahead or not … It was well-timed." Post-qualifying programmes manager "I had to go to [manager] and say, I can't really do this on my day off. Can I deal with this while I'm on shift? … But I will have to pay those hours back in the future." IR clinician 2
3. Product	3.1 Strengthening multidisciplinary practice • Understanding scope of practice • Appreciating other professional roles • Improved MDT working • Shared learning • Reduced silo-working	*"Part of the practical assessment is looking to do things outside of your normal scope of practise … students get a better understanding of multidisciplinary working … to prevent silo-working."* CCL manager *"The module … explained the aspects of all three (nursing, radiographer and physiology) in detail. This cleared doubts I had with many complex procedures."* CLsi1c *"I am more confident in offering suggestions … [and] practicing more additional roles within the Cath Lab outside of radiography."* IRsi2c
	3.2: Workforce development and organisational benefit • Staff development • Workforce flexibility • Recruitment and retention • Investing in people • Feeling valued by employers	*"Locally, it's about development … Nationally, it's that whole reputational thing … people have asked about coming to work here off the back of the CCL course."* CCL clinician 1 *"This course showcases that management is interested in investing in staff education and career development."* IRsi1c
	3.3 Pathway to advanced practice • Development of specialist expertise	*"A stepping stone for people to go on to do a full advanced practice qualification … It's going to sow a seed for the*

(*continued on next page*)

Table 3 (*continued*)

Extracted theme	Sub-themes and codes	Illustrative quotes
	• Advanced practice preparation • Progression opportunities • Future professional growth	*future."* IR matron *"The foundation for further progression into advance practice in IR."* IRsi1a
4. Challenges	4.1 Sustainability and succession planning • Reliance on key individuals • Loss of specialist expertise • Vulnerability of the delivery model • Succession planning • Developing future educators	*"We are relying on our practise partners … there is no contract between us … it is just trust."* Post-qualifying programmes manager "[CCL manager is] *leaving the Trust. How does this programme move forward? I don't know … it's uncertain at the moment."* CCL clinician 2 *"We have a couple of associate teachers … I like to think that the module would be able continue going forwards."* CCL manager
	4.2 Workforce capacity and protected time • Clinical workload pressures • Releasing staff for study • Competing demands • Balancing educational and clinical commitments	*"We struggle with providing time to release staff … because of the pressures that everyone's under."* Imaging academy manager *"There's just not much time for each topic so you really have to pour in effort and time."* IRsi1b
	4.3 Financial viability and market demand • Niche nature of programmes • Student recruitment • Financial sustainability • Institutional risk	*"We will run it to break-even but we can't run at a loss … As we get through the people that really wanted to do the training … we are going to end up losing the module because we're not attracting enough people."* Head of post-qualifying programmes
	4.4: Professional boundaries and role concerns • Concerns about role encroachment • Scope of practice debates • Resistance from some professional groups • Anxiety regarding advanced practice roles	*"I think it highlights the anxiety amongst those* [doctors in] *training that they feel the development of advanced practise is going to push them out of the role and that's very much not what this course is designed to do. It's designed to support their practise."* IR matron

practitioner involvement strengthens situated learning and supports the development of communities of practice within healthcare education.[38–40]

However, implementation was heavily dependent on a small number of clinical champions, highlighting a structural vulnerability in delivery. While this reliance enhanced professional authenticity, it also raised concerns regarding scalability and sustainability, particularly given competing clinical workload demands. Similar challenges have been reported in other specialist areas of healthcare education where innovation relies on discretionary clinical input.[41–44]

The modules also demonstrated multi-level workforce benefits. For experienced practitioners undertaking the modules, they provided formal recognition and consolidation of expertise, while for less experienced staff they supported role development and upskilling. The student cohorts represented a broad spectrum of clinical experience, ranging from novice Band 5 practitioners to experienced Band 7 clinicians, enabling the modules to support learning needs across different stages of specialist practice. Importantly, reported benefits extended beyond individual competence to include improved interprofessional understanding and perceived enhancements in multidisciplinary working, suggesting broader service-level impact.[45,46]

Sustainability emerged as the most significant challenge. Despite optimism from the IR Matron and CCL Manager regarding continued demand for specialist CPD, concerns were raised about succession planning, reliance on key individuals, and the financial viability of niche provision within a marketised higher education context.[47] These findings underscore the need for longer-term strategic planning within HEI-clinical partnerships to ensure continuity of specialist educational pathways.[13–15]

Taken together, these findings suggest that co-produced clinician-led educational models offer an effective mechanism for addressing specialist workforce development needs.[37,39,48] However, their long-term success depends on balancing professional authenticity with institutional structures capable of sustaining delivery at scale.

A further consideration emerging from the findings relates to evolving professional boundaries and role perceptions within the NHS. Evidence of informal resistance to the promotion of extended and advanced roles, as reflected in social media commentary following module promotion, highlights ongoing tensions around scope of practice and professional identity.[49,50] This suggests that the sustainability of such educational initiatives may also depend on how workforce transformation and role evolution are negotiated within and between professional groups.

Limitations

The first limitation relates to generalisability. This study examined two specialist online CPD modules developed for nurses, radiographers, and cardiac physiologists working in IR and CCL settings. Although the findings may inform the development of similar specialist CPD provision, they may not be transferable to other educational settings, healthcare specialties, or professional groups.

The second limitation relates to sample size. Although most academic and clinical staff involved in the development and delivery of the modules were interviewed, including additional specialist CPD programmes or institutions would have strengthened the transferability of the findings. Furthermore, the student questionnaire response rate across the two module cohorts was 30%, raising the possibility of non-response bias.

The third limitation concerns potential researcher bias, as one researcher was the academic module organiser for the IR module. To minimise subjectivity, this researcher was not interviewed, and the second researcher, who had no involvement in the development or delivery of either module, led the data analysis and interpretation.

Conclusion

This study demonstrates that co-produced partnerships between higher education institutions and clinical stakeholders can successfully develop and deliver specialist CPD for healthcare professionals working in highly specialised, technology-driven fields. Across both cases, clinician involvement was central to ensuring that educational provision was credible, relevant to contemporary practice, and responsive to workforce development needs.

The findings suggest that such models provide benefits at both individual and service levels, supporting professional development, role progression, and interprofessional collaboration. However, their long-term sustainability remains uncertain. Delivery was heavily reliant on a small number of clinical champions, while the financial viability of specialist educational provision was challenged by limited student numbers and competing institutional priorities.

These findings indicate that clinician-led, co-produced educational models represent an effective approach to addressing specialist workforce development needs. However, sustaining such provision requires more than clinical expertise alone. Long-term success depends on robust partnerships between higher education institutions and healthcare organisations, supported by succession planning, organisational commitment, and sufficient infrastructure to maintain delivery beyond individual contributors. Without these supporting structures, valuable specialist educational opportunities may be difficult to sustain despite continued workforce need.

Ethics approval and consent to participate

This study was approved by the University of East Anglia Ethics Committee on 05/02/2025 (ETH2425-1070). All participants provided informed written consent prior to participation. Participants were assured of confidentiality and their right to withdraw at any time without consequence. Data were anonymised prior to analysis and are stored securely in accordance with institutional data protection policies.

Availability of data

Due to the potentially sensitive nature of some the questions asked in this study, interview participants and questionnaire respondents were assured raw data would remain confidential and would not be shared.

Author contributions

DS: Conceptualization, Formal analysis, Methodology, Investigation, Writing - Original Draft, Writing - Review and Editing, Visualization, Project administration.

AR: Formal analysis, Methodology, Investigation, Writing - Original Draft, Writing - Review and Editing, Visualization.

Generative AI use

During the preparation of this work the authors used Chat GPT in order to improve the readability of the article. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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Conflict of interest statement

The authors declare no conflicts of interest.

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Appendix A. Supplementary data

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