RESEARCH ARTICLE

CHANGE MANAGEMENT

Context matters in curriculum reform: An analysis of change in surgical training

Adarsh P. Shah[1] ⓘ | Kim A. Walker[1] ⓘ | Kenneth G. Walker[2] ⓘ | Jennifer Cleland[3] ⓘ

[1]Centre for Healthcare Education Research and Innovation (CHERI), University of Aberdeen, Aberdeen, UK

[2]NHS Education for Scotland, Centre for Health Science, Inverness, UK

[3]Lee Kong Chian School of Medicine, Nanyang Technological University Singapore, Singapore

Correspondence
Jennifer Cleland, Lee Kong Chian School of Medicine, Nanyang Technological University Singapore, Singapore.
Email: jennifer.cleland@ntu.edu.sg

Abstract

Introduction: Education and training reforms are typically devised by accreditation bodies and rolled out nationally. This top-down approach is positioned as contextually independent, yet context is highly influential in shaping the impact of change. Given this, it is critical to consider how curriculum reform plays out as it meets local settings. We have therefore used a national-level curriculum reform process of surgical training, Improving Surgical Training (IST), to examine the influence of context in IST implementation across two UK countries.

Methods: Adopting a case study approach, we used document data for contextualisation purposes and semi-structured interviews with key stakeholders across multiple organisations (n = 17, plus four follow-up interviews) as our main source of data. Initial data coding and analysis were inductive. We followed this with a secondary analysis using Engeström's second-generation activity theory nested within an overarching framework of complexity theory to help tease out some key elements of IST development and implementation.

Results: The introduction of IST into the surgical training system was historically situated within a landscape of previous reforms. IST's aims collided with existing practices and rules, thus creating tensions. In one country, the systems of IST and surgical training came together to some extent, mostly due to processes of social networks, negotiation and leverage nested in a relatively cohesive setting. These processes were not apparent in the other country, and instead of transformative change, the system contracted. Change was not integrated, and the reform was halted.

Conclusions: Our use of a case study approach and complexity theory deepens understanding of how history, systems and contexts interact to facilitate or inhibit change within one area of medical education. Our study paves the way for further empirical work examining the influence of context in curriculum reform, and thus determining how best to bring about change in practice.

1 | INTRODUCTION

Medical education and training depend upon standardised systems to ensure uniformity in the quality of learning experiences and minimise diverse outcomes when delivering health care.[1] Postgraduate training curricula, standards and reforms are typically devised by accreditation bodies and rolled out nationally in a "top-down" approach. These aim to ensure that, for example, a surgical trainee's (resident's) experience of training in one location should, broadly speaking, be similar to that of another trainee at the same stage of the same training programme in another department, hospital and region.

This "top-down" approach can be described as contextually independent, yet context is highly influential in purposefully or unintentionally shaping outcomes of curricula and/or curriculum reforms.[2–5] It is useful to pause here and consider what we mean by context. Context is what forms the setting, encompassing factors including location (e.g., country, institution and department), culture (e.g., how things are done around here and cultural norms), what is experienced and what people bring to bear on their surroundings (social and relational).[6] Context is dynamic, ever-changing and unpredictable because of the interaction between these different components.[7]

Some authors have acknowledged the implicit role of context in curriculum reform,[5] but context has rarely been examined in curriculum reform processes. The few studies that have been carried out suggest that differences in affordances and resources (contextual factors) impact on the implementation of change[2] and the divergence between the intended curriculum reform prescribed by top-down policy makers and that which is actually carried out/implemented can be attributed to context.[8,9]

Given this, it is critical to look at how curriculum reform plays out as it meets "the local context of resources and policies and affordances during implementation."[1(p20)] Only by doing so can we start to understand why curriculum reform often results in repetition of sameness with little actual change.[10–12]

Moreover, curricular policy enactment is not usually accompanied by explicit guidance on how it can be enacted in local settings.[13] Instead, those tasked with implementing curricula "on the ground" are left to identify opportunities and negotiate challenges.[14,15] This is no easy task, particularly in the postgraduate sphere given the well-recognised tensions and plurality of voices in organisations that are simultaneously responsible for health care delivery as well as the education/training of future generations of health care professionals.[2,16]

Thus, and to address recent calls in the literature to examine how standards are implemented and operationalised in different contexts,[1,6] our focus is to examine the enactment of a national level surgical training curriculum across different settings. Specifically, and informed by Ellaway et al.'s[2] analysis of the impact of a national competency-based medical education initiative in family medicine, our aim was to examine what local enablers and inhibitors seemed to be influential in how reform was enacted in different settings. In doing so, we position this paper within the wider conversation in the literature about health professions education curriculum reform.[14,17–23]

We sought inspiration from empirical studies using theoretical frameworks to understand the role of context in curriculum reform.[11,24–26]

We used a case study approach[27,28] to draw attention to the interaction between the phenomenon under study, in this case the implementation of the Improving Surgical Training (IST) curriculum across the United Kingdom, and the diverse settings in which IST was enacted. Drawing on Bates and Ellaway,[6] our interest was in the interaction between the following contexts: (Surgical) education; the structures and processes, culture and values of the health care institutions in which IST was rolled out; and the influence of physical, or more precisely, geographical context.

Our specific research questions were as follows: What is the influence of context in the implementation of a curriculum reform of surgical training, and how were any enablers and inhibitors within contexts negotiated to achieve curricular goals? By producing a theoretically framed and rich description of the complex contextual influences involved in an example national level curriculum reform, we hope to stimulate reflection of ongoing or planned reforms in any context, to extend knowledge and encourage a new focus of empirical research on this topic.

2 | METHODS

This research is nested in a wider explanatory, qualitative case study examining a national-level curricular reform of surgical training—IST—launched in 2018. We took a case study approach to enable us to carry out an in-depth investigation of the implementation of IST, to understand and acknowledge the influence of context while being of general value.[28]

The study was underpinned by social constructionism, acknowledging that reality is produced through interchanges between people and objects and shared activities, with knowledge and the individual embedded within history, context, culture, language and experience.[29] This position aligns with Merriam's[27] approach to case study methodology.

We drew on publicly available documents to inform the research focus and to contextualise the interview data.[30] The documents helped us understand the historical context of surgical and medical education and training reforms,[31–33] to appreciate the scale of the problems within UK surgical training,[30,34,35] and to orientate us to the IST recommendations.[30] We then used semi-structured interviews to examine the views of key stakeholders—individuals with specific knowledge and understanding of the reform plan and implementation strategy—regarding the processes of the reform over time, and how this may have differed between two countries within the United Kingdom.

2.1 | Setting

Our context was UK surgical training (residency), specifically the first 2 years of postgraduate surgical training which follow the 2-year generic Foundation Programme, which in turn follows medical school.

This initial stage of surgical training, known as Core Surgical Training (CST), aims to give trainees a broad exposure across different surgical specialties.

IST was developed as a UK-wide initiative to improve the quality of CST via emphasis on daytime training over service, improved supervision and trainee–trainer relationships, wider use of simulation as an adjunct to clinical training and the use of allied health professionals to reduce the clinical service burden on trainees. IST was first funded on a pilot basis, and this opportunity to pilot was taken up by Scotland (where CST is managed at a countrywide level) and various sites in England. Evaluations of the Scottish and English pilots were commissioned separately. The rationale for, and history of, IST and who is involved in the management and oversight of surgical training in the United Kingdom are considered more in depth in relation to the data within the results section of this paper.

2.2 | Participants

We used the publicly available IST proposal document[30] and team knowledge to identify senior representatives of the various IST stakeholder groups (Table 1), including but not limited to the statutory health care education and training bodies in Scotland and England, the surgical Royal Colleges and the UK-wide surgical trainee associations. The main researcher directly contacted prospective participants who were purposely recruited through email invitations sent between June 2020 and March 2022. We also asked participants to assist us in identifying other potential informants, snowball sampling.[36] Two email reminders about the study were sent.

2.3 | Data collection

We developed a semi-structured interview schedule[37] informed by the IST document and associated publications,[30,38,39] the wider literature on surgical training, informal discussions with those involved in planning and implementing IST and data we had collected from trainees and trainers as part of the wider programme of study.[40] Interview questions were designed to explore participants' perceptions of the IST curriculum and its implementation across the United Kingdom (see Appendix S1). The interview schedule ensured consistency, but interviews were iterative and continued until the individual participant felt that they had shared their experiences sufficiently. AS conducted all interviews virtually via the Microsoft Teams platform.

The first round of interviews (n = 17) was carried out between June 2020 and May 2021. Participants had been involved with various stages of IST (both planning and implementation [n = 8], planning only [n = 5], implementation only [n = 4]), and they represented a total of 11 organisations involved in CST nationally or at a country-specific level. Most participants were men (n = 15), reflecting the well-documented gender imbalance at senior levels of UK surgical education.[41] Table 1 provides an overview of the participants.

Following the announcements in 2022 that England ceased recruitment into IST and that Scotland intended to continue IST as business-as-usual, we conducted follow-up interviews with some of the key stakeholders who had already participated in the first round of interviews (n = 4). Two participants each from Scotland and England were purposively selected on the basis of their senior roles within surgical training in the respective countries, as well as their UK-wide perspective with regards to IST. The follow-up interviews took place in March–April 2022.

TABLE 1 Participant demographics.

Participant	Gender	Clinician grade at time of involvement with IST	Remit of role within surgical training	Stage(s) of involvement with IST
SH01	M	Trainee	UK	Planning
SH02	M	Consultant	UK	Planning + implementation
SH03	M	Consultant	UK	Planning
SH04	M	Consultant	Scotland (UK)	Planning + implementation
SH05	M	Consultant	UK	Implementation
SH06	M	Consultant	UK	Planning
SH07	F	Consultant	Scotland	Planning + implementation
SH08	M	Consultant	England	Planning
SH09	M	Consultant	Scotland	Planning + implementation
SH10	M	Consultant	Scotland	Planning + implementation
SH11	M	Consultant	Scotland	Planning + implementation
SH12	F	Trainee	UK	Planning
SH13	M	Consultant	England (UK)	Implementation
SH14	M	Consultant	Scotland	Planning + implementation
SH15	M	Consultant	Scotland	Implementation
SH16	M	Consultant	England	Planning + implementation
SH17	M	Consultant	England	Implementation

2.4 | Data analysis

Interviews were digitally audio-recorded for later transcription, providing 634 minutes of interview data (median interview duration: 40 minutes, range: 25–56 minutes). Participants were anonymised during the transcription process. Transcripts were entered into the qualitative data analysis software NVivo v12.0 (QRS International Pty Ltd, Doncaster, Victoria, Australia) to facilitate data management and coding. Initial analysis was inductive and iterative, to identify patterns in the data.[42]

We were struck by the many references to context (e.g., the health service in which surgical training is delivered and specific local structures) and the history of medical/surgical education in the data. Given this, we then used the theoretical resources of Engeström[43–45] nested within an overarching framework of complexity theory[46–48] to help us tease out some of the key elements of IST development and implementation.

Complexity theory has many interpretations.[48–50] However, in essence, all complexity approaches attempt to understand the dynamics of systems where the whole is more than the sum of the parts, a result of the interactions over time of players, key events and actions, the system and the variability of local conditions. Seeing curriculum reform through a complexity framework provides an epistemology for understanding the interactions between structures and people. It opens the door to considering uncertainty, interaction, unpredictability and non-linearity and how things adapt (self-organise) and evolve (emerge) over time.[46,47]

Bearing in mind that complexity theory is general and abstract,[51] we used it as a conceptual framework to focus our attention on examining interactions, adaptations and unexpected events in the process of IST implementation. We then used cultural-historical activity theory (AT), specifically Engeström's second generation AT to operationalise complexity theory.[43,44] AT has previously been used to understand tensions and outcomes amongst multiple stakeholders after curricular reform implementation.[24] However, we know of no other research where AT has been used as a framework for understanding the complexity and dynamism of national-level curriculum development and implementation processes.

In the AT framework, the system (in this case core surgical training and not the individual) is the unit of analysis. The system is multivoiced, with different positions within the system for different participants; surgical training involves trainees (residents), trainers (consultant surgeons) and many different organisations, such as the Surgical Royal Colleges and health care organisations. All these participants and the system itself carry histories and rules such as memories of previous reforms and constraints in implementing change. Where networks of different systems exist, for example, the numerous bodies and organisations involved in surgical training in the United Kingdom,[52] the voices are multiplied. Systems can only be understood against their own history and context, and contradictions or tensions within an activity system can lead to change and development. Finally, contradictions can come together and enable systems to transform (expansive learning) or to collaboratively problem-solve challenges (knot-working).[53,54]

We had confidence in this combination of complexity theory and AT as it has been used in other studies of change processes in medical education, for example, surgical simulation,[52] peer assisted learning[55] and cross-cultural application of problem-based learning.[45]

2.5 | Reflexivity and rigour

Qualitative research is dependent on the relationship between the researcher and the research process.[56,57] We considered our positions and relationships with the data continually and critically in view of our different interdisciplinary backgrounds (psychology, pharmacology and medicine [surgery]), different levels of knowledge and experience of education, training and research. For example, as a surgical trainee from another UK country who took time out of training to do a PhD, AS was both an insider ("emic") and an outsider ("etic"), external to Scotland's health care system but an insider in terms of being a surgical trainee and having knowledge of training within the NHS.

AS undertook all the interviews to ensure continuity. The research team continually reviewed and discussed the patterns that emerged during the inductive data analysis. Credibility was ensured through triangulation of data sources (stakeholder interview data, document data and comparison with data from the wider case study involving trainees and trainers[40,58] in which the current work was nested).[29] The study protocol was adhered to throughout with regards to participant recruitment and data collection and data management.

2.6 | Findings

We focus on providing a rich description of the influence of context in implementing IST. To do so, we have drawn on publicly available documents describing the organisation of surgical training in the United Kingdom, and then brought in the interview data to illustrate particular aspects of context. In AT terms, these can be broadly described as historical context, multiple overlapping systems, contradictions and change (or not as the case may be).

2.6.1 | Historical context

IST was not the first reform of UK postgraduate medical education in recent history. Those interviewed referred back to earlier reforms, particularly the shift from apprentice-style learning to structured training ("Calmanisation"),[31] and the Modernising Medical Careers (MMC)[59] reforms that ushered in national selection and competency-focused, time-based training programmes.[60,61] Both the Calman and MMC reforms were applied across all specialties in postgraduate medical training in a "top down" approach led by the General Medical Council (GMC). The implementation of MMC was still remembered, not favourably, by participants: "... go back to 2007-2008 time when MMC came along, where it all went down like a lead balloon" (SH16).

Both MMC and the European Working Time Directive led to changes in surgical training hours and organisation of training delivery that resulted in shift working and loss of the surgical "firm" or team[62] and reduced operative exposure.[63,64] The move to shift working was also considered to have contributed to poorer trainee-trainer relationships and widespread dissatisfaction amongst surgical trainees,[65,66] particularly in the first 2 years of surgical training:

> They weren't getting training opportunities ... the 2014 GMC [General Medical Council] survey clearly showed that a) the surgical trainees were the most unhappy, b) those in core were the most unhappy ... it was this inflexibility in training, it was the fact that early years' trainees were being used and abused inappropriately. (SH15)

Together, these factors contributed to declining competition ratios for surgical training posts.[67] Thus, there was increasing concern amongst those charged with assuring and delivering surgical training in respect of how best to rebalance service-training tensions, and best support the surgical workforce of the future.

IST was a surgical-led response to both these issues and to the Shape of Training report recommendations.[30,38] This report recommended that the initial period of (all) specialty training was to be broad based, with interconnected themes between specialties set out by common clinical objectives.[33] IST contained 26 recommendations aimed at improving the quality of training experience, including adapting rotas to enhance training delivery during daytime hours and providing trainers with dedicated time to deliver training.

Although IST was led from within surgery, the key programme stakeholders were wary of negative reactions from the surgical community towards any curriculum reform proposals because "MMC was a big bang; all change on the same day approach, and surgery was allergic to that approach" (SH08). Thus, they took a more cautious approach to implementation, emphasising the need for early engagement with health care providers, trainers and trainees: "... to drive sustainable change in training, you need engagement ... If people don't understand what they're trying to do, they're not going to do it, and you're certainly not going to drive any sort of real sustainable change" (SH17).

2.6.2 | The multivoiced systems of surgical education and training

There were many different organisations involved in surgical education and training in the United Kingdom (see Section 2.1 and Figure 1). Additionally, training is organised differently between the different UK countries (Figure 1 and Table 2). Although publicly available information gives an overview of these structures, it is necessary to understand the context(s) of IST implementation. For example, the GMC regulates the continuum of medical education and training across the four UK countries of Scotland, England, Northern Ireland and Wales. The surgical Royal Colleges (of which there are four, viz., England, Edinburgh, Glasgow and Ireland) set the surgical curricula and provide support to workplace-based surgical education. Surgical curricula are decided upon by each (Surgical) Specialty Advisory Committee (SAC) within the Joint Committee on Surgical Training (JCST, an advisory body to the four Royal Colleges of Surgeons in the United Kingdom and Ireland), with input from specialty-specific surgical associations. However, the delivery and governance (meeting the quality standards) of surgical training is devolved to other organisations—NHS Education for Scotland (NES) and Health Education England (HEE) (Figure 1 and Table 2).

Contractual partnerships between NES/HEE and health care education providers in the NHS (Health Boards in Scotland and Trusts in England) dictate delivery of curricular requirements by the latter. The Surgical Specialties Training Board (SSTB) within NES and the

FIGURE 1 Illustration demonstrating the complexity of reforming surgical curricula within the health care settings of Scotland and England. The large blue circle denotes Scotland while the large red circle denotes England. GMC, General Medical Council; HEE, Health Education England; IST, Improving Surgical Training; JCST, Joint Committee on Surgical Training; NES, NHS Education for Scotland; NHS, National Health Service; SSTB, Scottish Surgical Training Board. [Color figure can be viewed at wileyonlinelibrary.com]
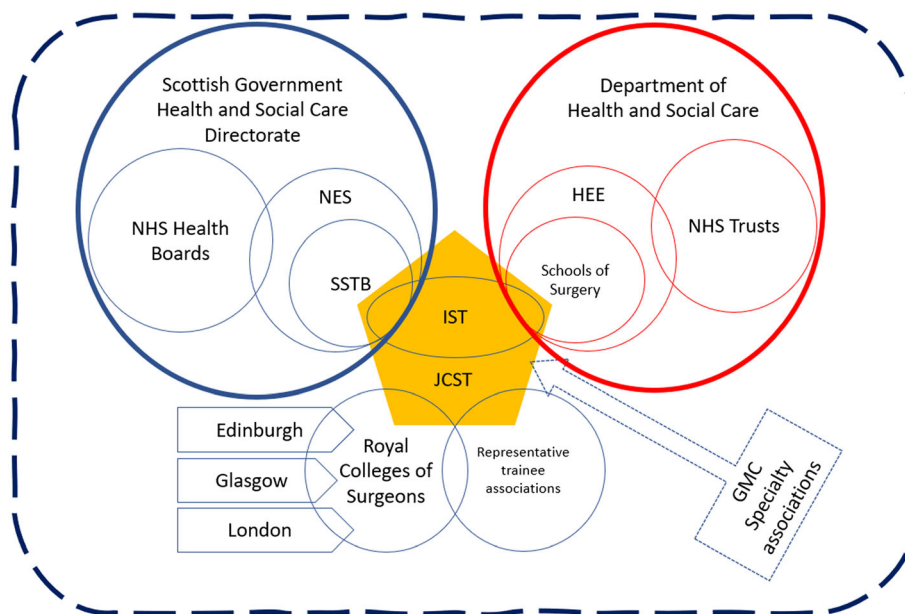
TABLE 2 Summary of the similarities and differences in the Core Surgical Training programmes in Scotland and England.

	Scotland	England
Statutory body overseeing CST	NHS Education for Scotland (NES), accountable to Scottish Government	Health Education England (HEE), accountable to the Department of Health and Social Care
Number of regional programmes	2; East of Scotland and West of Scotland	16 (also referred to as Deaneries or Schools of Surgery)
Approximate annual intake (no. of trainees)	47–54	498–515
Chain of command within the training programme	1. Postgraduate Dean 2. Chair of the Surgical Training Board 3. Training Programme Director (TPD) 4. Deputy Training Programme Director	1. Postgraduate Dean 2. Head of School of Surgery 3. Training Programme Director (TPD) 4. Deputy Training Programme Director

16 regional Postgraduate Schools of Surgery within HEE are each specifically tasked to ensure that the regional Health Boards and the regional hospital Trusts respectively deliver the expected surgical training standards. A specialty-specific Training Programme Director (TPD) is responsible for all trainees in their region. The TPD is accountable to the Chair of the SSTB in Scotland or the Head of School of Surgery in England. AT provides a framework for understanding this complexity (Box 1 and Figure 2).

IST was to be implemented across these myriad systems:

> All these different people, different regulators, statutory education bodies, colleges, all these different bodies, everyone with stakes but all differently responsible for different parts of it … it's really difficult, especially to drive change when it's needed. (SH17)

And it was implemented differently in each. Scotland opted for a nationwide approach involving all CST posts while England recruited specific hospitals as pilot sites.[68] One reason for this was the number of trainees in each country: "… [Scotland] do not have the same volume of trainees that England does … so trying to do it in a piecemeal fashion in Scotland was bonkers … so that's why we decided actually it's just better to try and do it pan-Scotland" (SH15).

If the differences were due solely to the number of trainees, then it would be simple. However, there was more to it than that. The health system in Scotland appeared to be more cohesive and manageable than that in England: "[Scotland] are a unified health system in that all the pieces of the machinery move in concert … whereas down south [in England] … ** was having to negotiate with individual trusts … I don't know how many hundreds of individual trusts there are [in England], but I mean that's a horrendously challenging ask" (SH04).

Moreover, there was a sense of more linkages between systems and across boundaries in Scotland. For example, NES convened an IST working group in 2017 comprising consultant surgeons with extensive experience of delivering CST across Scotland. Tasked with delivering and monitoring the initial 3 years of the pilot and facilitating faculty development, members of the working group felt "inclusive in the whole process … it's like your own baby project" (SH09). That the group membership remained unchanged for 5 years was seen to provide IST with credibility that promoted buy-in from providers, trainers and trainees:


BOX 1   AT as a framework for understanding surgical training

The object of Core Surgical Training (CST) is to deliver the set curricular competencies to trainees (the subjects), to produce competent surgeons (the outcome). The CST community comprises the stakeholders outlined earlier (trainees, trainers, those involved in the various surgical and medical education organisation). The CST system is governed by rules (e.g., curricular standards from the GMC and the Gold guide [https://www.copmed.org.uk/gold-guide]). Delivery of the various components of training (e.g., curriculum delivery, recruitment and assessment) is delegated to groups within the community (division of labour). The activity of CST is mediated by tools (e.g., portfolios, logbooks and resources used in simulation-based teaching and learning) which are used to achieve the desired outcome (competent surgeons). In short, there are many systems involved in surgical training with myriad layers and actors. Although different, these systems are closely networked and connected: Some systems are nested within others, others overlap in terms of their remit and many people active in one system are also active in other systems (e.g., having a role on the SSTB and being a consultant surgeon).

> The key thing that made things happen in Scotland were the commitments of the IST working group, to have all the core trainees [into IST posts], and to have a champion and lead for the programme to work with the TPDs, the medical directors … that I think helped to win the hearts and minds argument. (SH10)

This contrasted with the situation in England where the complex organisational structure of HEE was reported to be a source of "a huge amount of frustration" (SH04). There was also a distant working

FIGURE 2 Core surgical training as an activity system. ARCP, Annual Review of Competency Progression; CST, Core Surgical Training; GMC, General Medical Council; HEE, Health Education England; JCST, Joint Committee on Surgical Training; NES, NHS Education for Scotland; TPD, Training Programme Director.
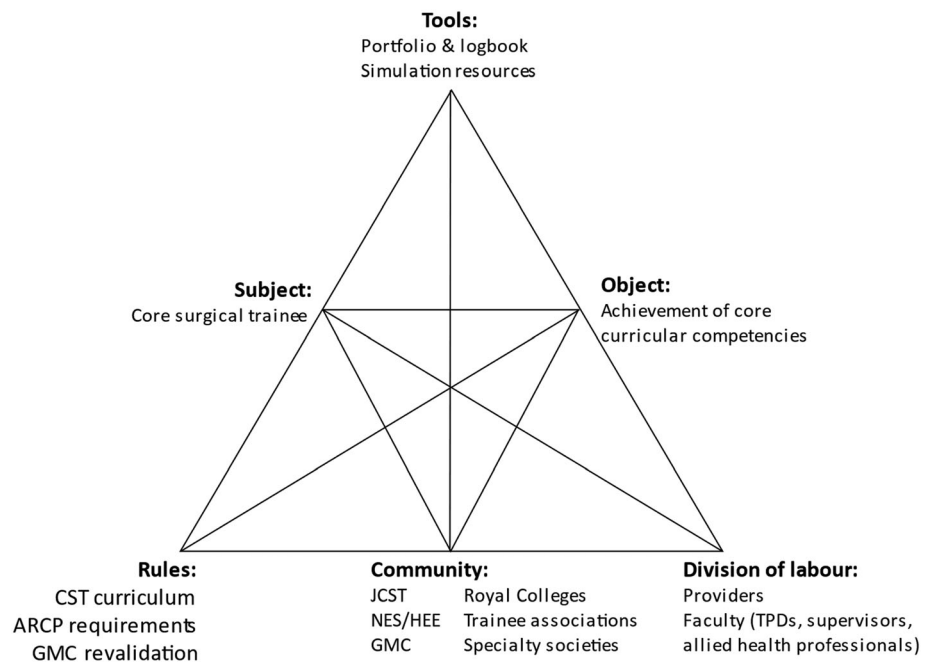
relationship between HEE and the Heads of School of Surgery—employees who are the regional effector arms for implementing HEE's strategies (in this case IST): "there wasn't really engagement with the Heads of School of Surgery when the IST project was initially conceived" (SH13).

2.6.3 | Systems within systems

A consequence of the previous reforms led to one of the big considerations in IST—aligning two separate but overlapping systems of different training pathways within surgery; those of "uncoupled" and "run-through" training posts (see Ribeiro[69] for more information on the rationale behind these separate systems). Trainees in uncoupled posts (denoted by CT1/CT2) undergo competitive recruitment for entry into the Higher Specialty surgical training programme of their chosen career specialty upon successful completion of the 2-year CST programme. Meanwhile, trainees in "run through" posts (denoted by ST1/ST2) do not apply for higher specialty training; they are recruited directly into a 7- or 8-year training programme of their chosen surgical specialty.

This historic arrangement "created a lot of animosity between the IST steering group and the various SAC [Specialty Advisory Committees]" (SH06). Concerns were reported about run through training perceived to be "a sort of back door route" (SH12) into higher specialty training. As "the criteria from the GMC to make sure the quality of what was coming out [of IST] was the same, if not better" (SH16), participants reported the need to enhance the performance review process, commonly known as the Annual Review of Competency Progression (ARCP), for all IST trainees. However, "you cannot put in place an enhanced ARCP process for one cohort of trainees even in the context of the pilot" (SH04). This contradiction consequently led

to implementation of a standardised benchmarking process during application for higher specialty training recruitment:

> There was anxiety about ensuring the standard of trainees on this programme [IST], which was believed to be untried and untested … [we] needed to have some form of assessment before they were allowed to progress. (SH16)

Benchmarking required run-through trainees to undertake the same competitive recruitment process as uncoupled trainees simply for quality assurance purposes. As the former had already secured a training post in their higher specialty training programme, subject to satisfactory annual review, there was naturally an associated concern about possible "consequence bias," whereby benchmarking run through trainees might not approach the process with the same rigour as uncoupled trainees for whom it was critical to career progression.

2.6.4 | Contradictions

Although IST made 26 recommendations for improving surgical training: "a lot of the things IST asked them [healthcare education providers] to give were things that core trainees were already meant to be receiving" (SH01). There was thus a sense that IST had reinvented the wheel or represented what was necessary to ensure delivery of good surgical training. Yet this was necessary because of the tensions between service and training in an overloaded health care system where trainees/residents are central to service delivery and education takes second place to service.[70] The challenge was how to do so without stretching the system further and asking trainers and local systems "to do more and deliver more [education] without [resourcing]

more" (SH01)? The "Extended Surgical Team (EST)" was proposed as a sustainable model "to reduce the 'service' component of junior doctor's work"[30(p19)]; "by reducing commitments to shift working there will be more time spent learning and being trained during daylight hours."[30(p16)] However, there was an issue: Not all localities had a well-provided EST, and NES and HEE were not committed financially to further developing EST. Thus, health care organisations were reluctant to engage with this core IST recommendation "because it's perceived as being an extra expense in order to free up surgical trainees" (SH13).

2.6.5 | Systems contracting rather than transforming

IST attracted political attention such that "the politicians made a big song and dance … they trumpeted that they were financially supporting this exciting opportunity to improve surgical training" (SH04). Consequently, "a lot of centres [local healthcare providers] said they could deliver certain rotas, certain elective daytime training … some places are doing it, [but] a lot of places over-promised because they were under political pressure" (SH08).

To address this, health care management and the relevant government authorities worked together to put forward two ways they could ensure health care education providers fulfilled their commitments. The first was through amendment of the contractual agreement:

> … there's a new one just come out which is slightly more punchy … it clearly demonstrates the obligation to make sure that there is time for educational and clinical supervisors to oversee trainees. (SH16)

The second was through provision of monetary incentives: "it all comes down to money to fund the stuff" (SH16). In Scotland, government funding was specifically assigned to alter educational supervisors' job plans, so they had more time to meet with and supervise their trainees. Participants felt this initiative was "laudable, but in practical terms, it's difficult to see that translate [into] those consultants' job plans" (SH14) due to the tensions between service and training ("the educational supervisors are also trying to deliver cancer waiting time targets and large outpatient waiting lists …" [SH04]) and the priorities of local health care education providers ("their mindset is often that'll take them [the supervisors] away from service and service delivery" [SH10]). In Scotland, NES approached the Directors of Medical Education in the Health Boards "and pretty much told them it was an instruction because the Scottish Government had put the money there and told us to get on with it" (SH04). However, the reality was that job plans were not changed, and supervisors had no more time to spend with their trainees than before the IST pilot. Consequently, as of 2022, the additional funding made available for educational supervision in consultants' job plans was scrapped.

2.6.6 | Destructive rather than generative change

The political attention given to the Shape of Training report and IST placed stakeholders in surgical training "under some pressure to get on with it" (SH16). However, in October 2021, 3 years into the pilot and following an independent evaluation by a commercial consultancy,[71] England announced they would cease recruitment into IST as of 2022 while Scotland decided to continue with IST as business-as-usual. Although participants noted that Scotland's geography and organisational structures were better suited to implementing the IST pilot, other systems factors seemed to contribute to England's decision to stop IST.

One of these factors was the relationship between "the people that are responsible for delivering education and training in the workplace … *de facto* the Heads of School of Surgery" (SH13) and the organisation charged with delivery and governance of surgical training in England (HEE) (Table 2). Although HEE had signed up to IST, participants questioned whether this engagement extended to those on the ground. There was a perception of "lack of engagement forethought at the beginning" (SH13), leading to "a lack of trust between the Heads of Schools of Surgery and HEE" (SH04). Retrospective efforts to address this were not wholly successful: "HEE have realised that and are trying to bring them [the Heads of School of Surgery] more firmly into the centre [but] that tension has remained" (SH04).

As the proposal stage progressed to the implementation stages, participants reported a difference in the working groups between Scotland and England:

> [Scotland] kept the IST working group quite tight, and I think at most maybe a dozen members, whereas the group in England had upwards of 20 to 25 members, and it just became a little bit turgid. (SH04)

Leadership of the working group in England changed twice during its 3-year lifespan, and change leaders were reported to have "struggled quite a lot for a year or two getting political engagement" (SH08) because "there was pushback from some Heads of Schools because they weren't convinced it was going to make any difference" (SH16). Participants reported the irony of this resistance from the Heads of School of Surgery given the description above of events between HEE and the Heads of Schools of Surgery in the paragraph above.

England's pilot approach to IST implementation was also reported to attract a lot of "blanket negatives before evaluation has occurred" (SH16). "People want to get this up and running and a success … *(claps hands as if dusting off)* … jobs a good'un" (SH01). IST in England was not thought to be "a quality improvement project … an iterative process to see what we can learn from the pilot" (SH10) but rather "we have a solution; we will now make everything fit [around it]" (SH01). Thus, tensions within the system(s) led to the loss of engagement with change implementation.

3 | DISCUSSION

We set out to contribute to the understanding of change following a national-level curricular reform by investigating how this reform was enacted on the ground in two of the four UK countries (Scotland and England). Applying AT, and assuming all elements within the system are interconnected,[72] we identified that the introduction of IST into the surgical training system collided with existing practices and rules, thus creating tensions requiring the surgical training system to transform.[73,74] Conflicts and tensions in and around educational systems are inevitable and can be an impetus for improvement and renewal. However, they can also inhibit change. In one country, the systems of IST and surgical training came together to some extent, mostly due to processes of social networks, negotiation and leverage nested in a relatively cohesive context. These processes were not apparent in the other country, and instead of transformative change, the system contracted. Change was not integrated, and the reform was halted. The one example of expansive learning we observed—benchmarking for run through trainees—constituted one point of equilibrium. However, it was not an endpoint and, in itself, did not lead to transformation.

The data also illustrated that curriculum reforms do not take place in isolation; they are historically situated within a landscape of reforms that shape current systems and contexts. The antecedents of IST such as Calmanisation and MMC coloured attitudes towards IST. While this history may not have actively inhibited change per se, it did influence how IST was initially received, bringing in tensions from the outset—tensions which arguably were not adequately addressed in one of the two contexts.

As Engeström[75] points out, change and development imported from outside and implemented from above fail due to resistance from people and the systems themselves. In the framework of AT, those on the ground in the Scottish context engaged with IST, taking the initiative and "knot-working" to try to shape IST into their current work practices (e.g., via the IST Working Group and additional payments for educational supervisors). On the other hand, the "potential for agency, for intentional collective and individual actions aimed at transforming the activity"[76(p4)] was not apparent in the English setting. Instead, there was resistance from many training providers—a different manifestation of agency.

Other findings from this paper resonate with previous research identifying that curricular reforms are plagued with differences in implementation across different contexts.[2] This may be due to poor stakeholder involvement,[77] tensions between service and training stemming from different stakeholder positions,[2] organisational cultures inherent to individual organisations and/or financial constraints.[78,79] The current study made use of natural opportunity to directly compare contexts to demonstrate how differing systems within one country can influence outcomes.[6]

The historical context of recurring curriculum reforms within UK surgical training suggests the system is "captive on the carousel."[10] Traditional apprenticeship training fostered generalism.[80] Subsequent reforms (Calman in 1999 and MMC in 2003) promoted specialism.

However, within a decade of MMC, there were renewed calls for generalism.[33] This "flip flopping" between curricular aims has been observed in other contexts.[12]

Within the medical education literature, curriculum reform evaluations typically employ linear models of change,[81,82] report single stakeholder views,[5] or are merely descriptive rather than evaluative.[83–85] On the other hand, our study focuses on understanding and representing complexity,[86] thus moving reports of curriculum reform away from judgements of the merit or worth of a particular reform[7] to an illumination of the iterative process.

The aim of this study was to explore the perceptions of key stakeholders in the early years of curricular reform implementation. Given contexts are prone to dynamic, non-linear change[6] and complex adaptive systems such as surgical training evolve and self-organise in response to change,[49] longer term follow up is needed to assess how far IST has evolved (or adapted) from the original proposal. For example, we noted that the one example of expansive learning we observed—benchmarking for run through trainees—did not lead to transformation. Given time, this change may well have an observable impact.

Our case study approach,[27,28] gathering data from multiple stakeholders' views[24,87] and formal documents, allowed us to explore the complexity of rolling out a curriculum reform across different contexts and systems. We appreciate that knowing who is "speaking" in the results section might have assisted the reader in making sense of what is being argued and the position of the different participants. However, as the surgical community in the United Kingdom is small, giving some of these details would make the participants identifiable. Our use of complexity and AT helped with conceptual generalisability, but of course any one (or two) theoretical lens(es) will shine light only on certain aspects of the data.[88] A criticism of AT is that it is descriptive, lacking explanatory power, which restricts theory development.[89] This may be the case, but its value lies in focussing on illuminating context issues, understanding dynamic forces and conflicts.[45]

We chose to paint a broad picture rather than reducing the data to themes. Our rationale for this was twofold. First, to encourage reflection, we urge readers to reflect on how context can influence reform efforts, both purposely and unexpectedly, within their own activity systems. Second, this approach helped show that curriculum reform does not occur in historical or contextual isolation.

Moreover, our study provides empirical evidence for the three ways in which context works, as conceptualised by Bates and Ellaway[6] (see Section 1): (i) The top-down approach to IST implementation assumed equivalence between institutions (context as coincidence), (ii) persistent tensions between service and training impacting on the implementation of job plans, additional supervisor funding (context as mechanism) and (iii) the differences in outcome upon implementation between Scotland and England (context as outcome). Exploring context using a theoretically informed systems approach allows those tasked with undertaking reform to see the "bigger picture."

IST was implemented in 2018 and our main data collection took place in 2020–2021, in the midst of the COVID-19 pandemic, with

only the follow-up interviews carried out post-pandemic. Perhaps the phenomena described in this paper would have been different at another time: we have no way of knowing. What we do know is that systems adapted rapidly in response to the uncertainty.[40] However, the short-term and long-term impact of the COVID-19 pandemic on the IST curriculum reform may be worthy of further evaluation.

Finally, although our context was the United Kingdom, curriculum reform in postgraduate medical education and training happens globally. Every educational change will be set within its own history and systems, structures and processes, and culture and values. While there may be some specific practical lessons from our results for those involved in curriculum reform in other contexts—for example, keeping the working group to a manageable size and preserving continuity of leadership, or promoting the change as iterative—we conclude the deeper and farther reaching lesson is the need to consider change in all its complexity, and report on this rather than simple evaluations of satisfaction with change.

4 | CONCLUSION

This case study responds to calls in the literature to examine how educational standards are enacted in local contexts.[1] Our use of a case study approach and complexity theory deepens our understanding of how history, systems and contexts interact to facilitate or inhibit change within one area of medical education. Our study paves the way for further empirical work examining the influence of the "dark matter of context"[6] in curriculum reform, and thus determining how best to bring about change in practice.

AUTHOR CONTRIBUTIONS

Adarsh P Shah: Conceptualization; data curation; formal analysis; investigation; methodology; writing—original draft; writing—review and editing. **Kim A. Walker:** Formal analysis; investigation; project administration; supervision; validation; writing—review and editing. **Kenneth G Walker:** Conceptualization; methodology; resources; validation; writing—review and editing. **Jennifer Cleland:** Conceptualization; formal analysis; funding acquisition; methodology; project administration; supervision; validation; writing—original draft; writing—review and editing.

CONFLICT OF INTEREST STATEMENT
KGW was an Associate Postgraduate Dean and Simulation Lead for Scottish Core Surgical Training, and a member of the Scottish Improving Surgical Training Working Group, during the period of the study.

ETHICS STATEMENT
The host University's Research Governance team and the host NHS provider's Quality Improvement and Assurance Team classified this study as a National Evaluation Audit (project number 4945), thus exempting it from ethical approval. However, we followed core ethical principles: Obtaining written, informed consent from potential research participants that their (anonymised) responses could be used for research purposes, that participation was voluntary and that participants had the right to withdraw at any time.

ORCID
Adarsh P. Shah https://orcid.org/0000-0002-7004-1751
Kim A. Walker https://orcid.org/0000-0001-8873-2270
Kenneth G. Walker https://orcid.org/0000-0002-4017-6516
Jennifer Cleland https://orcid.org/0000-0003-1433-9323

REFERENCES

1. Bates J, Schrewe B, Ellaway RH, Teunissen PW, Watling C. Embracing standardisation and contextualisation in medical education. *Med Educ*. 2019;53(1):15-24. doi:10.1111/medu.13740
2. Ellaway RH, Palacios Mackay M, Lee S, et al. The impact of a national competency-based medical education initiative in family medicine. *Acad Med*. 2018 Dec;93(12):1850-1857. doi:10.1097/ACM.0000000000002387
3. McKimm J, Jones PK. Twelve tips for applying change models to curriculum design, development and delivery. *Med Teach*. 2018;40(5):520-526. doi:10.1080/0142159X.2017.1391377
4. Dorsey JK, Beason AM, Verhulst SJ. Relationships matter: enhancing trainee development with a (simple) clerkship curriculum reform. *Teach Learn Med*. 2019;31(1):76-86. doi:10.1080/10401334.2018.1479264
5. Fischel JE, Olvet DM, Iuli RJ, Lu WH, Chandran L. Curriculum reform and evolution: innovative content and processes at one US medical school. *Med Teach*. 2019;41(1):99-106. doi:10.1080/0142159X.2018.1444268
6. Bates J, Ellaway RH. Mapping the dark matter of context: a conceptual scoping review. *Med Educ*. 2016;50(8):807-816. doi:10.1111/medu.13034
7. Haji F, Morin-Paule M, Parker K. Rethinking programme evaluation in health professions education: beyond 'did it work?'. *Med Educ*. 2013;47(4):342-351. doi:10.1111/medu.12091
8. Prendergast M, Treacy P. Curriculum reform in Irish secondary schools—a focus on algebra. *J Curric Stud*. 2018;50(1):126-143. doi:10.1080/00220272.2017.1313315
9. Kim S. Culture matters in educational policy transfer: the case of curricular reforms in the two Koreas during the Soviet and US military occupation. *J Educ Policy*. 2017;32(3):372-385. doi:10.1080/02680939.2016.1266034
10. Whitehead CR, Hodges BD, Austin Z. Captive on a carousel: discourses of "new" in medical education 1910-2010. *Adv Heal Sci Educ*. 2013;18(4):755-768. doi:10.1007/s10459-012-9414-8
11. Hawick L, Cleland J, Kitto S. Getting off the carousel: exploring the wicked problem of curriculum reform. *Perspect Med Educ*. 2017;6(5):337-343. doi:10.1007/S40037-017-0371-Z
12. Schwartz CC, Ajjarapu AS, Stamy CD, Schwinn DA. Comprehensive history of 3-year and accelerated US medical school programs: a century in review. *Med Educ Online*. 2018;23(1):1530557. doi:10.1080/10872981.2018.1530557
13. Ball SJ. Education reform: a critical and post-structural approach. *Br J Educ Stud*. 1995;43(2):221. doi:10.2307/3121942
14. Velthuis F, Varpio L, Helmich E, Dekker H, Jaarsma ADC. Navigating the complexities of undergraduate medical curriculum change: change leaders' perspectives. *Acad Med*. 2018;93(10):1503-1510. doi:10.1097/ACM.0000000000002165
15. Bank L, Jippes M, Van Rossum TR, Den Rooyen C, Scherpbier AJJA, Scheele F. How clinical teaching teams deal with educational change:

"we just do it.". *BMC Med Educ*. 2019;19(1):1-8. doi:10.1186/s12909-019-1815-4

16. Cleland J, Durning SJ. Education and service: how theories can help in understanding tensions. *Med Educ*. 2019;53(1):42-55. doi:10.1111/medu.13738

17. Bloom SW. Reform without change? Look beyond the curriculum. *Am J Public Health*. 1995;85(7):907-908. doi:10.2105/AJPH.85.7.907

18. Ludmerer KM, Johns MME. Reforming graduate medical education. *Jama*. 2005;294(9):1083-1087. doi:10.1001/jama.294.9.1083

19. Sachdeva AK, Bell RHJ, Britt LD, Tarpley JL, Blair PG, Tarpley MJ. National efforts to reform residency education in surgery. *Acad Med*. 2007;82(12):1200-1210. doi:10.1097/ACM.0b013e318159e052

20. MacCarrick G. Curriculum reform: a narrated journey. *Med Educ*. 2009;43(10):979-988. doi:10.1111/j.1365-2923.2009.03457.x

21. Pershing S, Fuchs VR. Restructuring medical education to meet current and future health care needs. *Acad Med*. 2013;88(12):1798-1801. doi:10.1097/ACM.0000000000000020

22. Nousiainen MT, Mironova P, Hynes M, et al. Eight-year outcomes of a competency-based residency training program in orthopedic surgery. *Med Teach*. 2018;40(10):1042-1054. doi:10.1080/0142159X.2017.1421751

23. Wartman SA. The empirical challenge of 21st-century medical education. *Acad Med*. United States. 2019;94(10):1412-1415. doi:10.1097/ACM.0000000000002866

24. Law M, Veinot P, Mylopoulos M, Bryden P, Brydges R. Applying activity theory to undergraduate medical curriculum reform: lessons in contradictions from multiple stakeholders' perspectives. *Med Teach*. 2022;44(7):800-811. doi:10.1080/0142159X.2022.2041190

25. Plsek PE, Greenhalgh T. The challenge of complexity in health care. *Br Med J*. 2001;323(7313):625-628. doi:10.1136/bmj.323.7313.625

26. Jippes M, Driessen EW, Majoor GD, Gijselaers WH, Muijtjens AMM, Van Der Vleuten CPM. Impact of national context and culture on curriculum change: a case study. *Med Teach*. 2013;35(8):661-670. doi:10.3109/0142159X.2013.785629

27. Merriam SB. *Qualitative Research and Case Study Applications in Education. Revised and Expanded from "Case Study Research in Education."*. 2nd ed. Jossey-Bass; 1988.

28. Cleland J, MacLeod A, Ellaway RH. The curious case of case study research. *Med Educ*. 2021;55:1131-1141.

29. Savin-Baden M, Major C. *Qualitative Research: The Essential Guide to Theory and Practice*. Routledge; 2013:53-67.

30. Royal College of Surgeons of England. Improving surgical training: Proposal for a pilot surgical training programme. 2015.

31. Calman KC, Temple JG, Naysmith R, Cairncross RG, Bennett SJ. Reforming higher specialist training in the United Kingdom—a step along the continuum of medical education. *Med Educ*. 1999;33(1):28-33. doi:10.1046/j.1365-2923.1999.00356.x

32. Tooke J. Final Report of the Independent Inquiry Into Modernising Medical Careers. 2008.

33. Greenaway D. Shape of Training: Securing the Future of Excellent Patient Care. General Medical Council. 2013;1–57.

34. General Medical Council. *National Training Survey 2014: Key findings*. General Medical Council; 2014.

35. General Medical Council. *National Training Survey 2016: Key Findings*. General Medical Council; 2016.

36. Parker C, Scott S, Geddes A. Snowball sampling. In: Atkinson P, ed. *SAGE Research Methods Foundations*. SAGE Publications Ltd; 2019.

37. DiCicco-Bloom B, Crabtree BF. The qualitative research interview. *Med Educ*. 2006;40(4):314-321. doi:10.1111/j.1365-2929.2006.02418.x

38. Harries RL, Williams AP, Ferguson HJM, Mohan HM, Beamish AJ, Gokani VJ. The future of surgical training in the context of the 'Shape of Training' review: consensus recommendations by the Association of Surgeons in Training. *Int J Surg*. 2016;36:S5-S9. doi:10.1016/j.ijsu.2016.08.238

39. Allum W. Improving surgical training. *Surgery*. 2020;38(10):596-600. doi:10.1016/j.mpsur.2020.07.015

40. Shah AP, Walker KA, Hawick L, Walker KG, Cleland J. "It's making me think outside the box at times": a qualitative study of dynamic capabilities in surgical training. *Adv Heal Sci Educ*. 2022;1-20. doi:10.1007/s10459-022-10170-2

41. Kennedy H. The Royal College—our professional home: An independent review on diversity and inclusion for the Royal College of Surgeons of England. London, UK; 2021.

42. Ritchie J, Lewis J. *Qualitative Research Practice. A Guide for Social Science Students and Researchers*. 2nd ed. SAGE; 2013.

43. Engeström Y. Expansive learning at work: toward an activity theoretical reconceptualization. *J Educ Work*. 2001;14(1):133-156. doi:10.1080/13639080020028747

44. Johnston J, Dornan T. Activity theory: Mediating research in medical education. In: Cleland J, Durning SJ, eds. *Researching Medical Education*. Wiley; 2015:93-103. doi:10.1002/9781118838983.ch9

45. Frambach JM, Driessen EW, van der Vleuten CPM. Using activity theory to study cultural complexity in medical education. *Perspect Med Educ*. 2014;3(3):190-203. doi:10.1007/S40037-014-0114-3

46. Bleakley A, Cleland J. Sticking with messy realities: how 'thinking with complexity' can inform healthcare education research. In: Cleland J, Durning S, eds. *Researching Medical Education*. 1st ed. London; 2015:81-92. doi:10.1002/9781118838983.ch8

47. Mennin S. Self-organisation, integration and curriculum in the complex world of medical education. *Med Educ*. 2010;44(1):20-30. doi:10.1111/j.1365-2923.2009.03548.x

48. Cristancho S, Field E, Lingard L. What is the state of complexity science in medical education research? *Med Educ*. 2019;53(1):95-104. doi:10.1111/medu.13651

49. Mennin S. Complexity and health professions education: editorial. *J Eval Clin Pract*. 2010;16(4):835-837. doi:10.1111/j.1365-2753.2010.01502.x

50. Woodruff JN. Accounting for complexity in medical education: a model of adaptive behaviour in medicine. *Med Educ*. 2019;53(9):861-873. doi:10.1111/medu.13905

51. Greenhalgh T. Complexity theory and family medicine: a new symbiosis. *PrimaryCare*. 2010;10(02):19.

52. Cleland J, Walker KG, Gale M, Nicol LG. Simulation-based education: understanding the socio-cultural complexity of a surgical training 'boot camp.'. *Med Educ*. 2016;50(8):829-841. doi:10.1111/medu.13064

53. Engeström Y, Engeström R, Vähäaho T. When the center does not hold: the importance of knotworking. In: Chaiklin S, Hedegaard M, Jensen UJ, eds. *Activity Theory and Social Practice: Cultural-Historical Approaches*. Aarhus: Aarhus University Press; 1999:345-374.

54. Engeström Y, Pyörälä E. Using activity theory to transform medical work and learning. *Med Teach*. 2021;43(1):7-13. doi:10.1080/0142159X.2020.1795105

55. Bennett D, O'Flynn S, Kelly M. Peer assisted learning in the clinical setting: an activity systems analysis. *Adv Heal Sci Educ*. 2015;20(3):595-610. doi:10.1007/s10459-014-9557-x

56. McMillan W. Theory in healthcare education research: the importance of worldview. In: Cleland J, Durning SJ, eds. *Researching Medical Education*. 1st ed. John Wiley & Sons, Ltd; 2015:15-23. doi:10.1002/9781118838983.ch2

57. Lincoln Y, Guba E. *Naturalistic Enquiry*. Vol. 9. SAGE; 1985:438-439. doi:10.1016/0147-1767(85)90062-8

58. Shah AP, Walker KA, Hawick L, Walker KG, Cleland J. Scratching beneath the surface: how organisational culture influences curricular reform. *Med Educ*. 2022;57(7):668-678. doi:10.1111/medu.14994

59. House of Commons Health Committee. *HC 25-I Third Report of Session 2007–08*. Vol. 1. Modernising Medical Careers; 2008.

60. Parsell G. Senior house officer training: time for reform. *Med Educ*. 2001;35(2):92-93. doi:10.1046/j.1365-2923.2001.00886.x

61. Donaldson L. Proposals for reform of the Senior House Officer grade. Unfinished business: 2002.

62. Marriott JC, Purdie H, Millen A, Beard JD. The lost opportunities for surgical training in the NHS. *Bull R Coll Surg Engl*. 2011;93(6):202-206. doi:10.1308/147363511X575714

63. Chikwe J, de Souza AC, Pepper JR. No time to train the surgeons: more and more reforms result in less and less time for training. *BMJ*. 2004;328(7437):418-419. doi:10.1136/bmj.328.7437.418

64. Temple J. Resident duty hours around the globe: where are we now? *BMC Med Educ*. 2014;14(Suppl 1):S8.

65. General Medical Council. National training survey report 2014 [Internet]. 2014 National training surveys reports. [cited 2022 Apr 4]. https://www.gmc-uk.org/about/what-we-do-and-why/data-and-research/national-training-surveys-reports

66. General Medical Council. National training survey: key findings from the pilot survey of trainers [Internet]. 2015 Natl Training Surveys Rep [cited 2022 Apr 4]. https://www.gmc-uk.org/-/media/documents/NTS_2015_pilot_trainers_survey_report_61187899.pdf_62923708.pdf

67. Health Education England H. Competition ratios [Internet]. Competition Ratios. 2021 [cited 2022 Mar 28]. https://specialtytraining.hee.nhs.uk/competition-ratios

68. Royal College of Surgeons of England. IST Pilot Sites [Internet]. 2022 IST. [cited 2022 Jul 25]. https://www.rcseng.ac.uk/careers-in-surgery/trainees/ist/pilot-sites/

69. Ribeiro B. The Tooke report: implications for surgery. *Bull R Coll Surg Engl*. 2008;90(2):42-43. doi:10.1308/147363508X278079

70. Cleland J, Roberts R, Kitto S, Strand P, Johnston P. Using paradox theory to understand responses to tensions between service and training in general surgery. *Med Educ*. 2018;52(3):288-301. doi:10.1111/medu.13475

71. SQW. Improving Surgical Training pilot training programme - independent evaluation, Final evaluation report. Stockport; 2022.

72. Engeström Y. *Learning by Expanding: An Activity Theoretical Approach to Developmental Research*. Orienta-Konsultit; 1987.

73. Fenwick T. Organisational learning in the "knots.". *J Educ Adm*. 2007; 45(2):138-153. doi:10.1108/09578230710732934

74. Kerosuo H, Engeström Y. Boundary crossing and learning in creation of new work practice. *J Work Learn*. 2003;15(7/8):345-351. doi:10.1108/13665620310504837

75. Engeström Y. From individual action to collective activity and back: Developmental work research as an interventionist methodology. In: Luff P, Hindmarsh J, Heath C, eds. *Workplace Studies: Recovering Work Practice and Informing System Design*. Cambridge University Press; 2000. doi:10.1017/CBO9780511628122.008

76. Engeström Y. Development, movement and agency: breaking away from mycorrhizae activities. In: Yamazumi K, ed. *Building Activity Theory in Practice: Toward the Next Generation*. Kansai University; 2006.

77. Mortensen L, Malling B, Ringsted C, Rubak S. What is the impact of a national postgraduate medical specialist education reform on the daily clinical training 3.5 years after implementation? A questionnaire survey. *BMC Med Educ*. 2010;10(1):46. doi:10.1186/1472-6920-10-46

78. Malik MU, Diaz Voss Varela DA, Stewart CM, et al. Barriers to implementing the ACGME outcome project: a systematic review of program director surveys. *J Grad Med Educ*. 2012;4(4):425-433. doi:10.4300/JGME-D-11-00222.1

79. Sholl S, Ajjawi R, Allbutt H, et al. Balancing health care education and patient care in the UK workplace: a realist synthesis. *Med Educ*. 2017; 51(8):787-801. doi:10.1111/medu.13290

80. Huddle TS, Centor R, Heudebert GR. American internal medicine in the 21st century: can an Oslerian generalism survive? *J Gen Intern Med*. 2003;18(9):764-767. doi:10.1046/j.1525-1497.2003.20717.x

81. Kern DE. *Curriculum Development for Medical Education: A Six Step Approach*. 6th ed. Johns Hopkins University Press; 1998. doi:10.56021/9780801858444

82. Kotter J. *Leading Change*. 1st ed. Harvard Business School Press; 1996.

83. Elizondo-Montemayor L, Hernandez-Escobar C, Ayala-Aguirre F, Aguilar GM. Building a sense of ownership to facilitate change: the new curriculum. *Int J Leadersh Educ*. 2008;11(1):83-102. doi:10.1080/13603120701663486

84. Mejicano GC, Bumsted TN. Describing the journey and lessons learned implementing a competency-based, time-variable undergraduate medical education curriculum. *Acad Med*. 2018;93(3): S42-S48.

85. Boudjema K, Sulpice L. Reform in the training of digestive surgeons in France: a revolution for a renaissance! *Updates Surg*. 2019;71(2):197-199. doi:10.1007/s13304-019-00660-1

86. Regehr G. It's NOT rocket science: rethinking our metaphors for research in health professions education. *Med Educ*. 2010;44(1):31-39. doi:10.1111/j.1365-2923.2009.03418.x

87. Reis S. Curriculum reform: why? What? How? And how will we know it works? *Isr J Health Policy Res*. 2018;7(1):7-10.

88. Bordage G. Conceptual frameworks to illuminate and magnify. *Med Educ*. 2009;43(4):312-319. doi:10.1111/j.1365-2923.2009.03295.x

89. Patten M. *Qualitative Research and Evaluation Methods*. SAGE Publications; 2002.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.