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Mechanisms of Attainment Gaps in UK Surgical Training: A National Qualitative Study of Trainee Experiences

Nicholas Uren

n.uren@sheffield.ac.uk

University of Sheffield

Gayatri Tadikamalla

University Hospital Southampton NHS Foundation Trust

Ahmad Elmansouri

University Hospital Southampton NHS Foundation Trust

Benjamin Preston

Cardiff and Vale University Health Board

Judith Cave

University Hospital Southampton NHS Foundation Trust

Sally Curtis

University of Southampton

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Abstract

Background:

The attainment gap in surgical training is increasingly recognised, including disparities associated with protected characteristics and socioeconomic factors. Evidence suggests that the type of undergraduate medical course may also be associated with gaps in postgraduate attainment. However, the understanding of the mechanisms driving attainment gaps is limited, particularly concerning course type. This study explored trainees' experiences of surgical training to identify the mechanisms through which access to social, financial, and cultural resources may influence participation.

Methods:

This qualitative study used semi-structured interviews with UK core surgical trainees. Purposive sampling sought representation of graduates from standard entry medicine, graduate entry medicine, and gateway courses. Interviews were transcribed and analysed using reflexive thematic analysis.

Results

Fourteen core surgical trainees from eight UK deaneries participated. Three interrelated mechanisms shaping participation in surgical training were identified: the organisation and delivery of training; external pressures and material constraints on engagement; and social navigation and inclusion within the training culture. Although organisational barriers were described across the cohort, some trainees, particularly those identifying as female, from ethnically minoritised backgrounds, and those from gateway pathways, reported additional barriers, including financial pressures, limited access to informal networks, reduced access to social capital, and inequitable treatment. These factors compounded the difficulties posed by the organisational structure and appeared to shape access to opportunities for progression.

Conclusion:

The attainment gap in surgical training may arise from constraints on trainees' ability to participate, propagated by the interaction between the training organisation and unequal access to social, financial, and cultural capital. Addressing attainment gaps, therefore, may require structural reform alongside targeted financial, mentoring, and pastoral support to ensure that widening participation in undergraduate medical education translates into equitable progression within postgraduate surgical training

Introduction

In the UK, candidates for medicine follow four possible routes. These are standard five-year entry courses, six-year courses with a compulsory intercalation year, four-year graduate-entry courses (GEM) for students who already hold a degree, and gateway courses (GY), which include an additional

foundation year of study. Upon completing medical school in the UK, all graduates enter a two-year Foundation Programme before applying for speciality or general practice training.

The term attainment gap is used to describe variation in academic and professional outcomes among groups of learners, attributed to differences in learning experiences rather than in candidate ability (1). There is international evidence that attainment gaps occur across all stages of medical education and are related to ethnicity, age, gender, disability, and socioeconomic factors, including deprivation (2–6). There is increasing evidence of attainment gaps by course type in the UK, showing that doctors from non-standard (GY and GEM) courses take longer to sit their postgraduate exams (7), are less likely to pass these exams (3), and are less likely to be selected for competitive specialities (1). These non-standard courses were introduced to address systemic inequalities in medical education; if they are not achieving this, it is important to evaluate why.

Furthermore, while attainment gaps in postgraduate surgical education are well documented, the mechanisms through which they arise remain poorly understood, and there have been explicit calls for qualitative research to understand the underlying causes (9). In the UK, surgical postgraduate training comprises core and higher training leading to completion of clinical training. This process is guided by the Intercollegiate Surgical Curriculum Programme (ISCP). The surgical training environment can be understood as a community of practice whereby individuals accumulate knowledge, skills, and professional identity through participation in the shared surgical community (1,2,10). Trainees who successfully secure a position in a core training programme progress through legitimate peripheral participation (LPP), from the margins to the centre, in preparation for higher surgical training. There have been multiple initiatives aimed at improving training structure and quality over the last decade; however, national survey data indicate declining trainee satisfaction(11–13).

We present a national qualitative study examining trainees' perceptions of the mechanisms underlying attainment gaps in UK surgical training with purposive sampling by medical school course type.

Methods

Ethical approval and consent to participate

Ethical approval for this study was granted by the University of Southampton Faculty of Medicine Ethics Committee (ERGO Reference: 66739.A3). The study was conducted in accordance with the principles of the Declaration of Helsinki.

All participants received a participant information sheet and provided written informed consent prior to participation. Written consent was obtained for participation, audio-recording of interviews, and the use of anonymised quotations in publications arising from this research.

Participants

Current core surgical trainees (CTs) were included. International medical graduates were excluded to maintain an analytic focus on UK training pathways, given that training and lived experiences can differ substantially across regions. To minimise psychological distress, given potentially sensitive discussions relating to training experiences and personal identity, doctors flagged on the General Medical Council (GMC) database as vulnerable were also excluded on the advice of the ethics committee.

Recruitment

Current trainees listed on the General Medical Council (GMC) register as CTs who met the inclusion criteria were contacted via an email distributed by the GMC on behalf of the research team. Trainees were invited to participate and provided with full study details by the lead investigator. Purposive sampling was used to ensure representation from standard-entry, graduate-entry, and gateway medical programmes. This enabled the inclusion of trainees from different educational backgrounds and facilitated the exploration of similarities and differences in experiences across pathways, rather than formal comparisons between groups. Demographic characteristics, including gender and ethnicity, were recorded and considered during analysis to explore patterns of variation in trainees' experiences. Recruitment continued until no substantially new themes were identified, indicating thematic saturation.

Data collection

A semi-structured interview framework (supplementary file) was developed and piloted before formal interviews and used across all interviews to ensure standardisation of data collection. Interviews were conducted by three academic trainees (NU, AE, GT) via Microsoft Teams and typically lasted around 60 minutes. Demographic data on training location and ethnicity were recorded. All interviews were recorded, auto-transcribed, and manually reviewed to ensure verbatim transcripts.

Data analysis

Reflexive thematic analysis was conducted as described by Braun and Clarke (14). The analysis was theoretically informed by a Community of Practice framework, particularly the concepts of legitimate peripheral participation and progression from peripheral to fuller participation within a professional community. This framework was used to inform the interpretation of participants' descriptions of access to opportunities, relationships, and a sense of belonging within surgical training.

Initial coding was undertaken by an academic trainee (NU), who started at the end of an academic foundation programme and continued during a surgical academic clinical fellowship, with contextual familiarity of the surgical training environment. This positionality provided insight into the training context but may also have shaped how participants' accounts were interpreted. Reflexive discussions were therefore undertaken throughout coding and theme development to examine assumptions and refine interpretations. To enhance interpretive depth, three transcripts were independently coded by a

second researcher (SC) without direct contextual familiarity with surgical training. All coding was manual to support analytical immersion.

Results

Interviews with 14 surgical trainees (5 SEM, 5 GEM, 4 GY) from 8 deaneries in the UK were included in the analysis (Table 1). Three interrelated themes shaping trainees' participation in surgical training were identified: 1) Organisation and delivery of training, 2) Financial and personal pressures, and 3) Social navigation and inclusion within the training environment (Fig. 1). While many experiences were shared across the cohort, participants described important differences in access to opportunities, networks, mentorship, and financial resources.

Table 1

Gender distribution and self-reported ethnicity of participants from graduate entrance (GEM), standard entrance (SEM) and gateway entrance (GY) programmes included in this study. Ethnicity was not further disaggregated due to small subgroup sizes and the risk of deductive disclosure.

Group	Total participants	Gender		Self-reported Ethnicity	
		Male	Female	White	Ethnically minoritised backgrounds
SEM	5	2	3	2	3
GEM	5	3	2	5	0
GY	4	1	3	1	3

Overarching theme 1 – Structural constraints on legitimate participation

The design, organisation, and delivery of core surgical training shaped trainees' opportunities for legitimate participation within the surgical community of practice. Within this theme, there were two subthemes of 'unequal access' and 'competition'.

I. Unequal access to training opportunities

Training experience varied by geographical location. Rotas limited access to operative experience in high-service-demand areas, and participants working in highly specialised posts had fewer appropriate training opportunities. Participants described variable access to mentorship, with departmental variation in the prioritisation of training needs. Participants also widely commented on the geographical variability in the perceived interpretation and reinforcement of ARCP criteria. Multiple participants reported frustration that their ARCP requirements were not consistently recognised or supported by the wider surgical team, particularly with respect to the procedural numbers performed under supervision.

II. Competition for training opportunities

Participants described the environment as “cutthroat” (GEM Participant 2), requiring assertiveness to compete for limited training opportunities. The growing difficulties of higher surgical training applications contributed to competing priorities. Opportunities to perform index procedures for higher surgical training applications necessitated additional work outside contracted hours. Participants described that perceived demands for research, audit, and postgraduate qualifications affected their ability to immerse themselves in core surgical training. Participants described hurdles in navigating a hierarchical training ladder, including the reallocation of opportunities to prioritise “unconfident junior registrars” (GEM Participant 4), and the belief that “training starts when you are a registrar” (GEM Participant 4).

Overarching Theme 2 – External pressures and material constraints on engagement

Financial and personal pressures affecting trainees’ capacity to thrive in the surgical training environment emerged as a prominent theme.

I. Financial constraints limit professional development

Participants universally reported spending their own money on essential professional development activities. Several participants from SEM and GEM courses also described a willingness to invest financially in their career progression, including paying for courses and examination preparation at an earlier stage of training. Some participants from GY courses described limited financial flexibility, which affected access to conferences, exam preparation, and specialist training courses, as well as additional pressures from the financial risk of resits.

II. Personal responsibilities and hierarchical tensions

Across the cohort, participants expressed that life challenges intensify the pressures of surgical training and that “you need to hope that nothing goes wrong in your life” (SEM Participant 2). Several participants described conflict between home responsibilities and the cultural norms of surgical training, including long hours devoted to exams, portfolios, and index procedures. Several participants described the impact of parenthood on their training experience, and conflicts with home ownership were also raised by several GEM participants. Some participants from GEM courses also described that “additional life maturity” (GEM Participant 5) could create tension within hierarchical structures, with frustration over perceived disrespect and diminished authority. Several GY participants described difficulties balancing family responsibilities and the demands of surgical training: “I’m so tired after a two-and-a-half-hour drive back from my family home where I needed to be for the weekend ” (GY Participant 3).

Overarching Theme 3 - Social navigation and belonging within the surgical community

While competition is structurally embedded within training, the trainees' ability to navigate the training environment, including expressing themselves and accessing networks, emerged as a key determinant of professional development.

I. Relationships and informal networks facilitate training access

Across the cohort, participants described sustained relationships with trainers as essential for building trust and expanding training opportunities. However, these relationships were often hindered by the demands of service provision and inconsistent interactions between trainees and trainers, with one participant explaining that "you move around so you don't get to know the teams, so you get less familiarity with the consultants" (GEM 1). Participants therefore highlighted the value of longer placements in facilitating relationship-building, with "six-month rotations" (SEM 3) viewed as the minimum period required.

Multiple participants from GEM and SEM courses emphasised the importance of recognising unspoken expectations to maximise learning opportunities, such as arriving early and preparing patients. However, this was less frequently described by GY participants. The ability to form and utilise informal networks appears to vary between participants. Several participants from SEM and GEM courses regularly described benefits from peer advice, whereas several participants from GY courses reported limited professional networks and hesitation to engage in development activities due to a lack of awareness. Interpersonal relationships also differed in some accounts, with GY participants describing unsupportive interactions and "horribly unhelpful" comments (GY Participant 3) and noting that "limited common ground" (GY Participant 3) could hinder rapport and access to opportunities.

II. Gender and ethnicity shape inclusion and progression

Female participants across the cohort expressed that "it is more difficult to progress in surgery as a woman" (SEM Participant 1), including experiences perceived as discrediting. These participants described a lack of access to training opportunities and projects, which was "really demotivating" (GEM Participant 2). Male participants also reflected that progression appeared more difficult for women, with one reporting witnessing sexual harassment (GY Participant 4). Female participants described socially conditioned responses, such as being "more cautious and less obtuse" (GEM Participant 1), that may contribute to missed opportunities. Although female participants across the cohort acknowledged the influence of gender on surgical training experiences, reports of marginalisation and discrimination in our cohort were most prominent among ethnically minoritised female participants, particularly those from gateway pathways.

III. Exclusion, scrutiny and impostor experience

Multiple participants described actively adapting their behaviour to navigate the training environment, including seeking out opportunities, building relationships with trainers, and developing strategies to maximise exposure despite structural constraints. However, for some trainees, particularly some trainees from GY courses, and those identifying as female or from ethnically minoritised backgrounds, experiences of marginalisation limited their ability to do so. These participants described challenges to their authority, scrutiny of behaviour, being labelled as “angry” (GY Participant 1), and “bullying behaviours” (GY Participant 1). They described feeling more closely scrutinised: “I noticed a difference between myself as a GY compared to the average person” (GY Participant 1). This marginalisation appeared to shape how participants perceived their position and behaviour, including becoming “more passive” when accessing opportunities (GY participant 3). These participants reported lower confidence, fewer self-nominations, and feelings that they “don’t deserve the opportunity” (GY Participant 3), as well as impostor syndrome. These participants explain how these experiences affected exams, interviews, and learning opportunities, with tasks experienced as high-stakes and requiring significant emotional investment.

IV. Intersectionality of protected characteristics

There was evidence of intersectionality in the transcripts, with gender, ethnicity, and socioeconomic status intersecting across the cohort. This was seen most clearly in accounts from some participants from GY courses. Two main patterns were observed: I. Overlapping effects of ethnicity and gender: “(There is) something related to being black or being a woman […] my authority is challenged way more than the average core surgical trainee” (GY Participant 1). II. Compounding socioeconomic barriers and utilising informal information networks: “I didn’t really know much that they existed… realistically, would I have paid the extortionate fee to go on them?” (GY Participant 2).

Interpretive synthesis: engagement in the surgical community of practice

Our data can be interpreted in the context of trainees advancing in surgical training through engagement within their communities of practice, and our findings suggest that the organisation and delivery of current training structures can impede participation (Fig. 2). Access to meaningful training appears highly dependent on local rota design, placement context, and trainer engagement, resulting in inconsistent opportunities. This may require trainees to compensate to access equivalent opportunities, creating a baseline structural constraint in training. This baseline constraint appears to be the basis on which additional personal, social, and financial challenges may disproportionately accumulate for some trainees. Attainment gaps may therefore not be solely the product of a single factor but may emerge from interactions between training systems and unequal access to these forms of capital, which shape participation and progression.

Discussion

This study demonstrates that attainment gaps may result from unequal access to participation, shaped by variations in access to necessary capital within a constrained training system. Organisational barriers to participating in the surgical community of practice include rota inconsistencies, variable mentorship, and competition for opportunities. These organisational factors are mediated by interactions with access to capital and identity-related factors. Our data also suggest cumulative effects of ethnicity, gender, and socioeconomic status, highlighting the intersectional nature of these barriers. While there were differences in how participants characterised their legitimate peripheral participation across undergraduate course types, these findings remain hypothesis-generating and warrant further evaluation to support continued efforts to increase diversity in the medical workforce.

The challenges regarding the organisation and delivery of training are consistent with the published literature (9,15–22). The importance of socioeconomic capital in navigating surgical training has previously been highlighted (23,24), and the role of social, economic, and cultural capital in the progression of gateway students during medical school is well established (25). While structural and social factors shaped participation, some trainees described actively developing strategies to navigate these challenges. Conversely, for others, particularly some trainees from GY courses, and those identifying as female or from ethnically minoritised backgrounds, experiences of marginalisation and more limited access to social, economic, and cultural capital appeared to constrain their ability to do so. Disadvantage also did not appear to be associated with individual characteristics in isolation, and appeared to be pronounced where multiple identities intersected. These include gateway backgrounds, female gender, and ethnically minoritised status. These patterns, consistent with intersectionality, emerged inductively from the data, with overlapping identities shaping trainees' experiences of surgical training. Again, these findings are hypothesis-generating and warrant further evaluation.

The UK-wide data and diversity of training locations and ethnicities are strengths of this study. While this study does not directly measure attainment outcomes, it explores trainees' perceptions of the factors they believe influence progression and is consistent with existing qualitative literature (26). Although the sample size is small, this is consistent with qualitative methodology, where depth of insight and thematic sufficiency are prioritised. Therefore, these findings do not aim to be generalisable to all trainees but rather to provide in-depth insight into underlying mechanisms. The small subgroup sizes limit the interpretation of differences between course types, and the observed variation may reflect underlying disparities in socioeconomic background and access to capital rather than in course type itself. Therefore, findings should be interpreted as exploratory. Recruitment aimed to achieve equal representation across SEM, GEM, and GY trainees. Fewer GY trainees were recruited, likely reflecting the smaller number of GY graduates. Self-selection may also have resulted in a sample supplemented with trainees who held strong views.

Implications for practice and future research

This study has implications at the local, regional, and national levels. Efforts to modernise surgical training should consider structural reform whilst addressing the social and cultural dynamics that shape

participation. Continuity of supervision should be prioritised in rotation design, with longer placements and consistent trainer-trainee pairings to support relationship-building and progression. Departments with CTs require ongoing encouragement and monitoring to ensure opportunities are available to meet the standardised ARCP requirement. Rotas need to be designed to provide trainees with protected access to operative experience at the appropriate training level, including opportunities to perform index procedures for higher-level surgical training. Financial barriers to professional development should continue to be addressed, with the ease of access to financial support considered as important as the availability of funding itself, particularly for those from lower socioeconomic backgrounds. Further work into recognising and mitigating the impact of informal hierarchies, implicit expectations, and differential access to networks is also essential.

These findings also build upon the growing discourse on broadening participation in medical education, including previous quantitative work published in this journal that examines the challenges faced by graduates of widening-participation courses (3). Without addressing both the structural and personal factors that shape participation and progression, initiatives to widen access to medicine, including gateway pathways, may not translate into equitable progression in postgraduate training. Failure to address these disparities risks undermining efforts to build a sustainable and representative surgical workforce. Future research should explore whether these findings are transferable across higher surgical training and postgraduate training environments.

Conclusion

This study provides insight into the interaction between structural constraints and an individual's access to capital that shape surgical career progression. We suggest that attainment gaps may stem from unequal access to mentorship, training networks, and learning opportunities within competitive, structurally constrained training environments. The degree of participation is shaped by social, financial, and identity-related factors. Medical school course type may contribute to this variation; however, it may also serve as a proxy for differences in social capital and related characteristics, and it requires further evaluation. In summary, our study highlights the need for structural and cultural changes to enable equitable access to opportunities and participation within postgraduate training.

Abbreviations

ARCP
Annual Review of Competence Progression
CTs
Core Surgical Trainee
CST
Core Surgical Training
GEM
Graduate Entry Medicine

GY
Gateway Medicine
SEM
Standard Entry Medicine
GMC
General Medical Council
ISCP
Intercollegiate Surgical Curriculum Programme
LPP
Legitimate Peripheral Participation

Declarations

Ethics approval and consent to participate: Ethical approval was granted by the University of Southampton Faculty of Medicine Ethics Committee (ERGO Reference: 66739.A3). The study was conducted in accordance with the Declaration of Helsinki, and all participants provided written informed consent prior to participation.

Consent for publication: All participants provided written informed consent for the use of anonymised quotations in publications arising from this research.

Availability of data and materials: The datasets generated and analysed during the current study are not publicly available due to the potentially identifiable nature of qualitative interview data and the need to protect participant confidentiality. Anonymised data may be available from the corresponding author on reasonable request, subject to appropriate ethical and data governance approvals.

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Authors' contributions:

Author A (NU) conceived and designed the study, developed the methodology, coordinated recruitment, conducted interviews, analysed and interpreted the data, drafted the manuscript, and led manuscript revisions.

Author B (AA) contributed to study conceptualisation, conducted interviews, transcribed interview recordings, critically reviewed the analysis, and revised the manuscript.

Author C (GT) contributed to study conceptualisation, conducted interviews, transcribed interview recordings, critically reviewed the analysis, and revised the manuscript.

Author D (BP) contributed to study conceptualisation, critically reviewed the analysis, and revised the manuscript.

Author E (JC) provided senior supervision, contributed to study conceptualisation, supported development of the analytical framework and interpretation of the findings and critically revised the manuscript.

Author F (SC) provided senior supervision, contributed to study conceptualisation, independently coded three transcripts to enhance analytical rigour, supported development of the analytical framework and interpretation of the findings, and critically revised the manuscript.

All authors read and approved the final manuscript.

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Figures

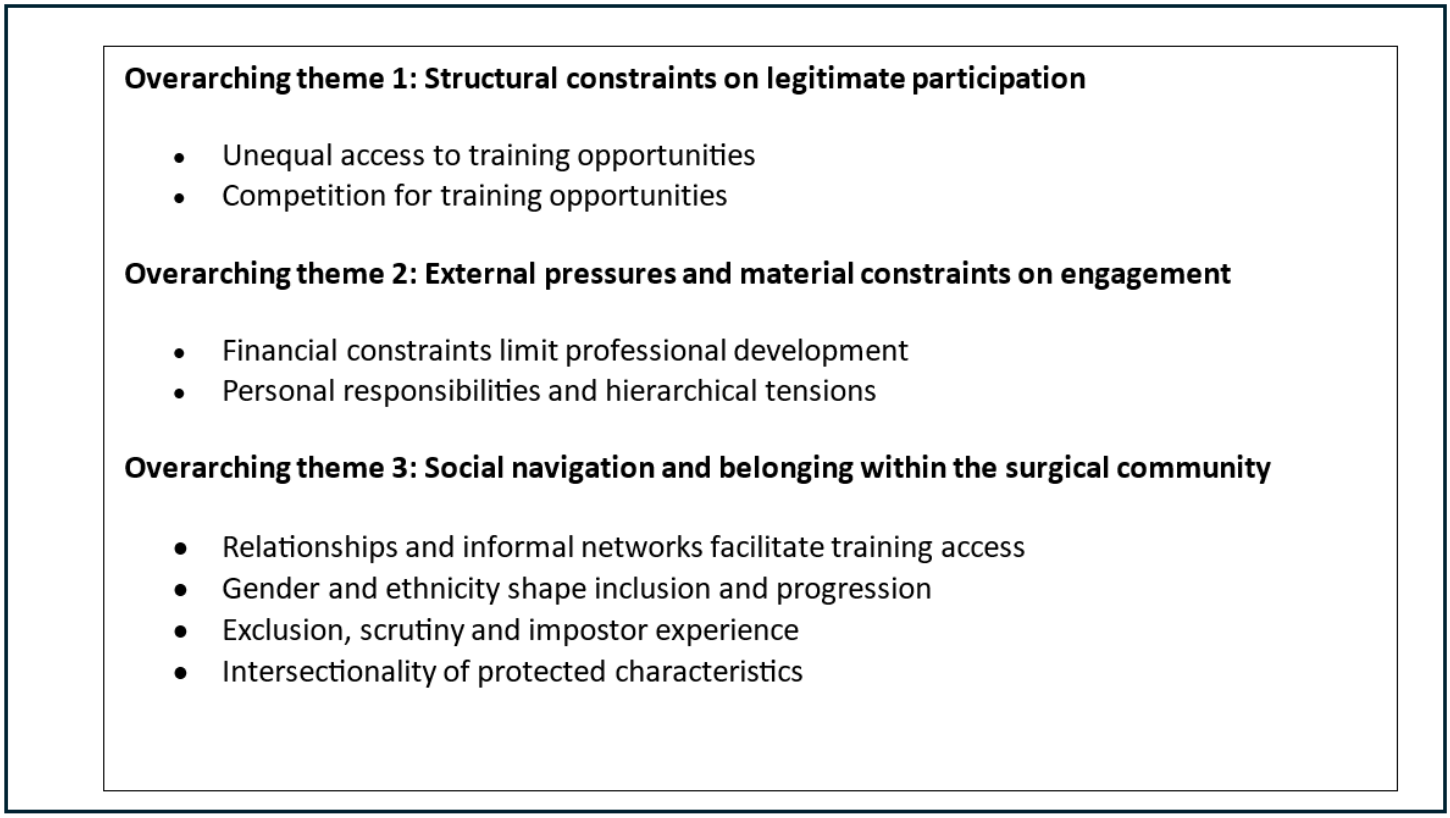


Figure 1

Organisational structure of overarching themes and associated themes identified through thematic analysis.

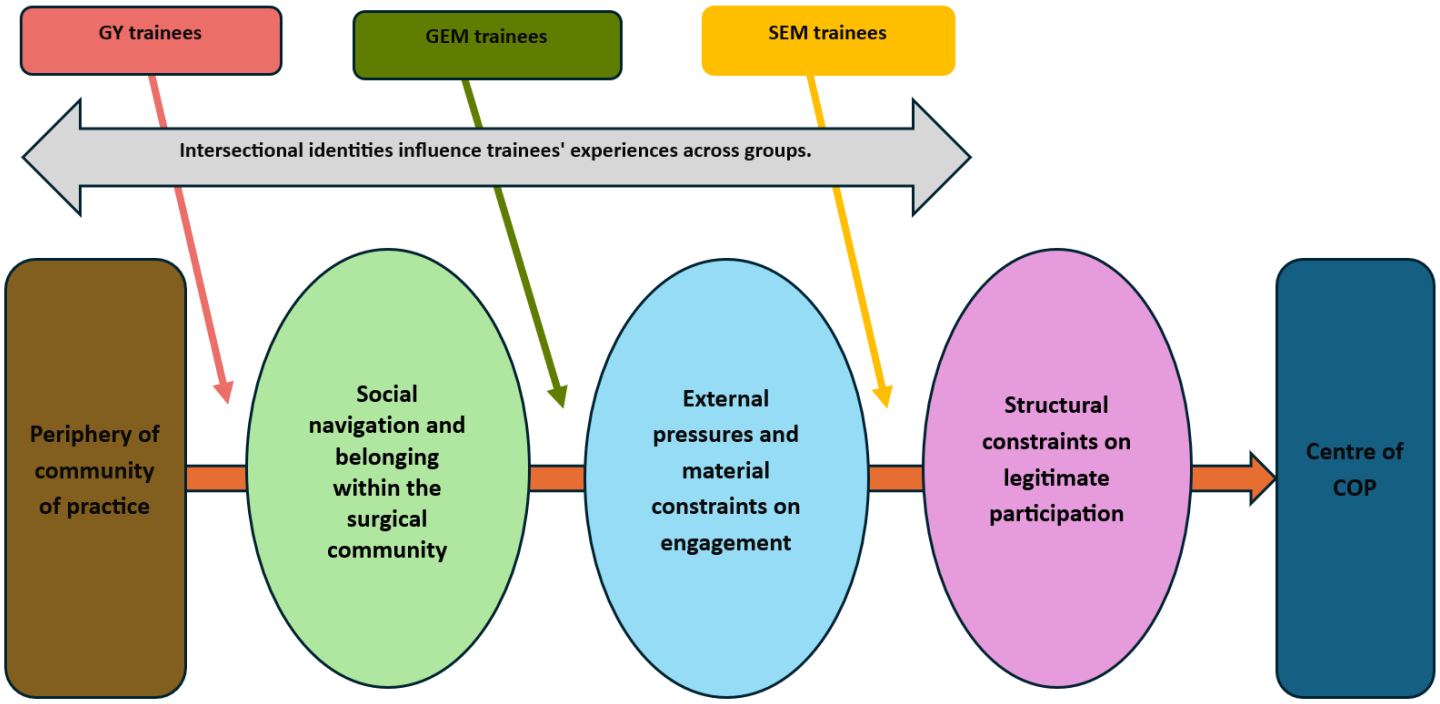


Figure 2

Theoretical model showing how trainees enter the surgical community of practice at the periphery and progress towards full participation through legitimate peripheral participation. Three domains of barriers are shown: (1) Social navigation and belonging within the surgical community, (2) External pressures and material constraints on engagement*, and (3) Structural constraints on legitimate participation. These barriers affect trainees to different extents, leading to uneven access to training opportunities, support, and a sense of belonging.*

An intersectional lens highlights that factors such as socioeconomic disadvantage, an ethnically minoritised background, and female gender may create additional barriers across domains. The model outlines how these factors interact to shape differential attainment, including through differences in access to training, ability to navigate the system, and access to social, financial, and cultural resources.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Interviewframework.docx