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Just-in-time interprofessional training: lessons from the NHS Nightingale London

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EDUCATION AND TRAINING

Just-in-time interprofessional training: lessons from the NHS Nightingale London

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ABSTRACT

The Coronavirus 2019 (COVID-19) pandemic placed significant pressure on healthcare systems across the globe, with many clinicians redeployed in unfamiliar specialties or disciplines. In England, a just-in-time interprofessional training and education programme was rapidly established to upskill nearly 2,500 people who volunteered to work at the NHS Nightingale London Hospital. Of the 488 respondents in our evaluation, representing a 20% response rate, most felt confident and safe to start work in NHS Nightingale London. Key findings were: streaming of learners should be driven by predicted shared roles in the workplace and previous experience; *in situ* training to experience how teams work together in the real clinical setting was well received; and online learning should be focused on essential learning. A just-in-time interprofessional training programme can be effective in upskilling and redeploying healthcare staff in emergency situations, and can be useful for supporting staff redeployment or upskilling across the NHS more widely.

KEYWORDS: just-in-time, interprofessional, simulation

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Introduction

This paper reports the findings from mixed methods research into the NHS Nightingale London Education and Training Programme, an unprecedented interprofessional, just-in-time programme designed to induct and upskill 2,500 professionals from health and non-healthcare backgrounds who volunteered to work at the NHS Nightingale London during the Coronavirus 2019 (COVID-19) pandemic. We describe the background to the programme, the key underpinning educational theory (interprofessional learning and

just-in-time training) and the research methods and findings, and conclude with a discussion and recommendations for other rapid response or redeployment-oriented interprofessional education and training programmes, which are likely to be required in the face of future public health emergencies or workforce pressures.

Background

The NHS Nightingale London hospital opened in early April 2020 in response to the anticipated demand for a significant increase in critical care services as a result of COVID-19. With a potential capacity of nearly 4,000 beds, the hospital urgently needed thousands of staff; in order not to deplete the already-stretched intensive care workforce in the NHS, it needed to recruit and upskill a range of professionals with little or no intensive care experience.¹ A core faculty team was put together and, 7 days later, the first volunteers started their training at the ExCel Centre, later moving to the O2 arena (Fig 1). The initial core faculty team comprised ~20 interprofessional experts from a range of backgrounds, including educational leadership, healthcare education (including in intensive care units; ICUs), simulation training, e-learning, project management and human resources. Over the duration of the project, this number expanded by a further 200, including nurses, doctors and allied health professionals from critical care and other backgrounds, clinical education fellows, simulation technicians, volunteers and NHS staff shielding from front-line work because of underlying medical conditions. Approximately 2,500 learners were trained over a period of 44 days before the hospital was put on standby in May 2020 when no new patients with COVID were expected to be admitted.¹

Educational approach and theoretical framework

Two key educational philosophies (just-in-time training and interprofessional learning) drove the design of the programme and, thus, formed the theoretical backdrop for our research.

Just-in-time training originated in the manufacturing industry² and can be defined as training conducted immediately before a potential intervention.³ Based on the just-in-time approach to creating efficiency in manufacturing supply chains,^{2,4} just-in-time training is conceptually distinct from capacity building in organisations and, as such, represents an efficient way to train staff.

In healthcare, just-in-time training is a well-established concept among disaster and humanitarian responders and is intended to rapidly address 'disaster-specific information, tasks, skills, and knowledge' just before deployment to a stricken location.⁵ It has

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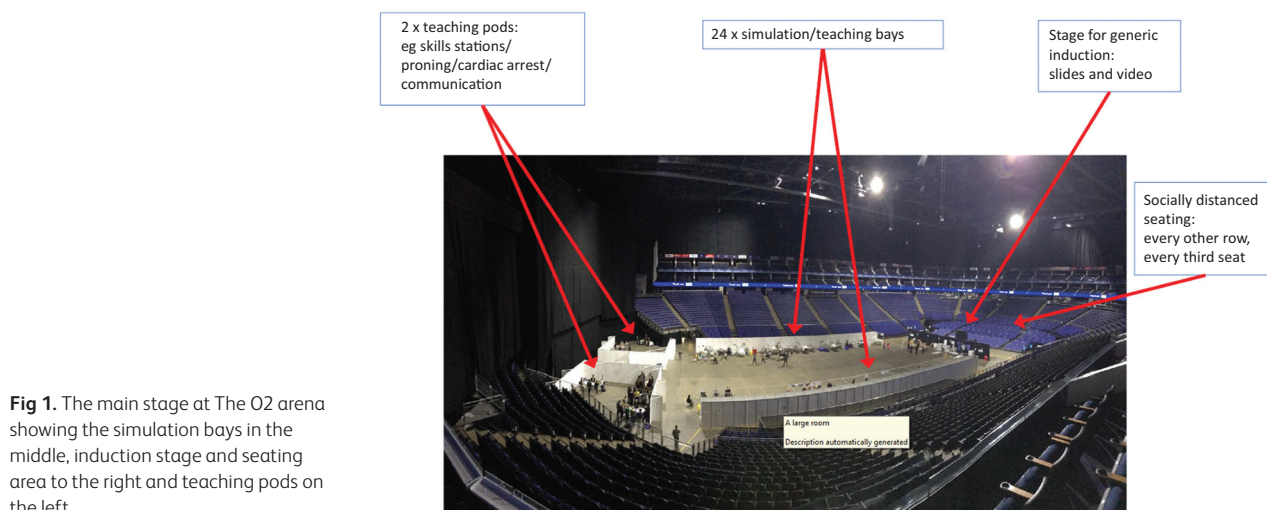


Fig 1. The main stage at The O2 arena showing the simulation bays in the middle, induction stage and seating area to the right and teaching pods on the left.

also been shown to enhance clinicians' confidence in performing procedural skills in acute settings with limited access to training opportunities^{6–9} and to reinforce previously learned procedural skills.^{10,11} However, to date, there is no evidence for the approach being used as the central organising principle for a curriculum supporting the large-scale, rapid upskilling and redeployment of a multiprofessional clinical and non-clinical workforce.

Just-in-time training is often now delivered via online resources and/or practical skills-based sessions,¹² underpinned by experiential and practice-learning methodologies.^{13,14} The Nightingale Education and Training Programme adopted these key elements of just-in-time training: training delivered rapidly and often only days before starting work; training delivered via online modalities and face-to-face experiential learning through simulation; and, for some participants, training delivered via *in situ* simulation in the hospital itself.

Interprofessional education (IPE), defined as professionals learning 'with, from and about each other',¹⁵ has the potential to break down silo working and to promote collaborative and non-hierarchical relationships in effective teams.¹⁶ IPE also has the capacity to promote a cohesive sense of community among a diverse array of colleagues, such as the NHS Nightingale volunteer and redeployment community. Thus, IPE provided a salient analytical lens for our research.

Programme design

A major challenge was to design and deliver training for a hospital that was not yet open, and for roles that were not yet clearly defined. In response, the education team and the hospital developed close links to allow regular two-way feedback via multiple sources, including clinical incident reporting and liaison teams. A key aim was to nurture a shallow hierarchy and interprofessional working via daily 'huddles'. Underpinned by this dynamic relationship, the education programme constantly evolved over the 44 days.¹

Multiprofessional faculty delivered training to diverse groups of interprofessional learners, including clinicians such as ICU doctors, nurses and GPs, and non-clinicians, such as airline crew and other lay volunteers. Learners were allocated to streams depending on

their previous experience and their likely role in the hospital, and their training was tailored accordingly (Box 1).

The streaming of learners into groups was constantly under review to ensure the most effective learning experience for all participants. The final iteration of streaming had doctors, nurses and allied health professionals taught together in small groups, broadly arranged by previous experience of healthcare and intensive care.

There were three main elements to the training programme: online learning, face-to-face teaching and *in situ* simulation (Fig 2). The *in-situ* training at the Nightingale Hospital was included toward the end of the programme, as a 'Day Zero'. Day Zero mimicked key aspects of a typical work shift and was developed in response to early feedback that this orientation would facilitate the transition to the unique hospital environment at the NHS Nightingale London.

Rationale and research question

Given the innovative, emergent nature of the programme, it was unknown whether the interprofessional, just-in-time

Box 1. Streams for training

Green

For those working in an intensive care unit (ICU) role in NHS Nightingale London that was the same as their current NHS role.

Amber

For those registered healthcare professionals who were working in an NHS Nightingale London role, different to their current role and requiring some additional critical care training.

Red

For those who were working in an NHS Nightingale London role that was significantly different to their current role. Significant additional training, including completion of the Care Certificate.

Purple

For those who were undertaking a specialist role in NHS Nightingale London that was the same as their current NHS role.

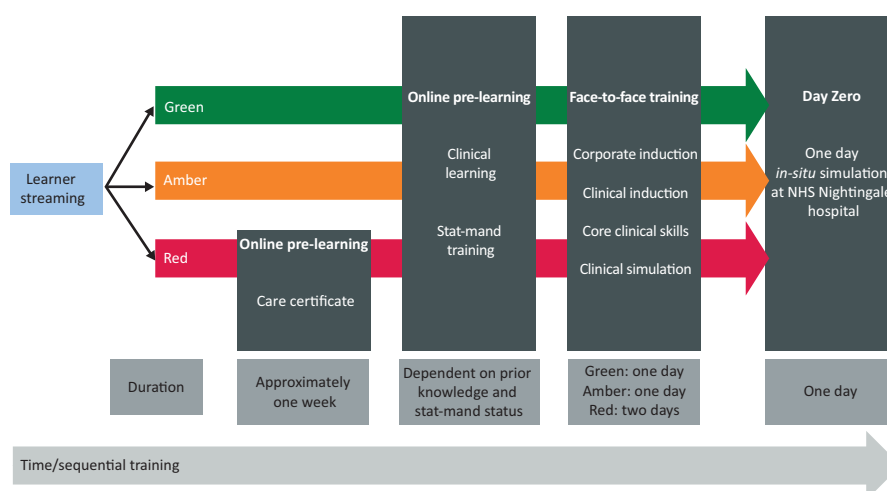


Fig 2. The main elements of the training programme. Stat-mand = statutory and mandatory.

training model would fit with the requirements of NHS Nightingale London. Furthermore, the education team were keen to learn lessons from the first iteration of the programme in anticipation of further COVID-19 surges requiring a similar rapid response.

The core aim of the training was to develop staff who were confident and able to practise safely in their allocated roles within NHS Nightingale London. Therefore, our main research question was: to what extent did participants perceive that an interprofessional, just-in-time training programme supported them to feel confident and able to practise safely in their allocated roles?

Methods

A survey comprising 58 quantitative and qualitative questions was emailed via the workforce administration team to ~2,500 volunteers who attended the training. Responses were anonymised.

The survey included key demographic items (eg professional role, years of experience, date of training and training stream assigned); some quantitative questions (mainly Likert scale responses on effectiveness of different elements of the training, ranging from 'not at all' to 'extremely', and confidence- and safety-related rating scales); and free-text elements to explore suggestions for improvement or change.

The survey included a statement to the effect that completing and returning the questionnaire conferred consent for publication.

Data analysis

Quantitative data on participants' perceptions were analysed descriptively.

The qualitative data, comprising free text elements, were analysed (by GE, MP, MR and SN) to find common and recurring themes using an approach based on the reflexive thematic analysis method originally described by Braun and Clarke.^{17,18} Each researcher initially analysed a specified subset of the free-text data, familiarising themselves with the data through

multiple rounds of re-reading.¹⁷ Initial codes were then generated using open coding,^{19,20} assigning a label to salient elements of the data that offered the potential to generate themes.²¹ The codes were then aggregated to create tentative themes,²¹ which were then discussed and agreed among the analysts. The coding process was iterative, with several coding cycles being used to ensure that coding had been applied consistently and that no themes were being systematically excluded.¹⁷ We did not look for theoretical saturation, because this concept is aligned with a different research approach, namely grounded theory.²² However, we did find evidence of data saturation,^{23,24} in the form of significant informational redundancy²⁵ (ie there were multiple instances of each of our themes within the data).²⁶ Therefore, we were satisfied that our analysis was appropriately rigorous.

Results

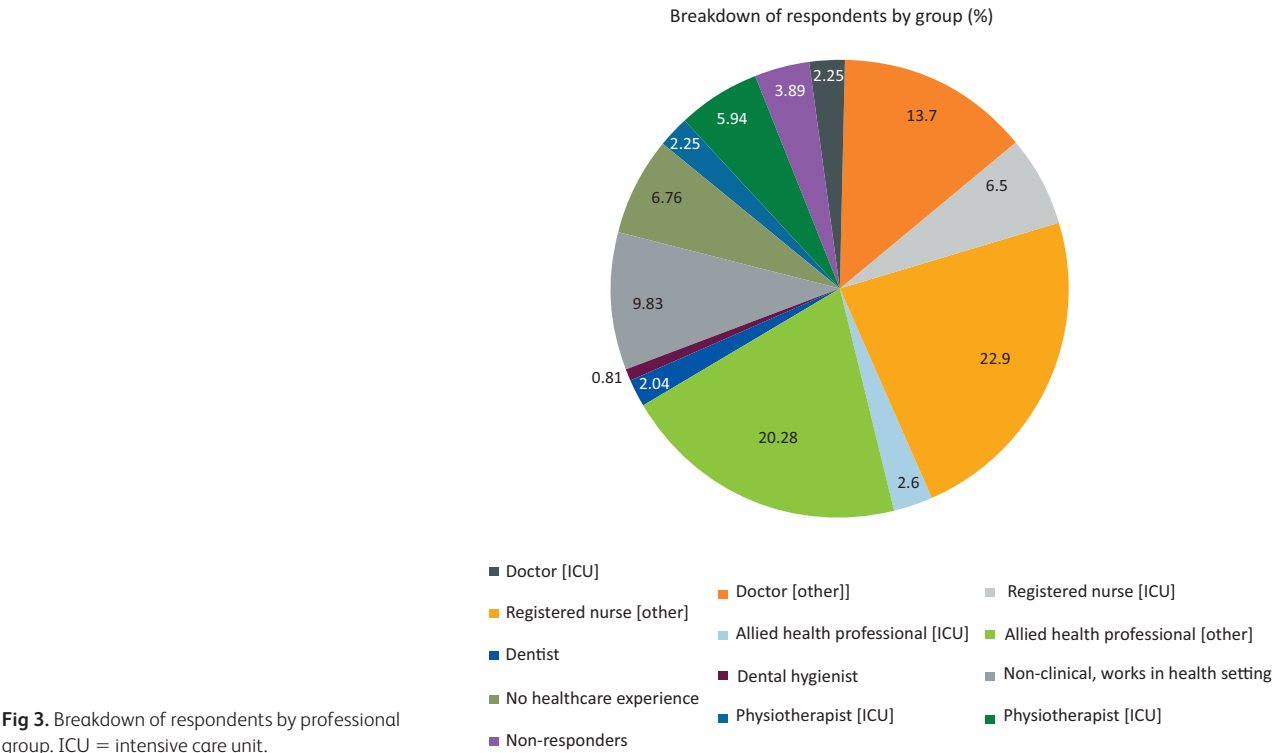
There were 488 responses (an ~20% response rate) and most respondents (83%) were clinical (registered nurses, physiotherapists, other allied health professionals or doctors). Of the non-clinical respondents (17%), ~60% (49) worked in a healthcare setting and 40% (34) had no healthcare experience (Fig 3). Of survey respondents, 67% attended the first half of the programme and 33% attended the second half of the programme (Fig 4).

We also estimate that only 62/488 (13%) of respondents had attended the Day Zero training, which was introduced toward the end of the project. Many trainees were aware that the programme evolved in response to the regular feedback huddles, and recognised that their experience might not have reflected that of later participants:

While I may have been critical in my responses it sounds like training drastically improved as the weeks went on and although there were things to improve on my training, I think pulling what they did together was seriously impressive

Another commented:

I was one of the first cohorts to begin and understand that the training programme became more refined and newer



nurses were more prepared than I was going into that environment

Qualitative and quantitative data were analysed according to key themes. A summary of the main themes and subthemes is presented in Box 2.

The teaching streams and interprofessional learning

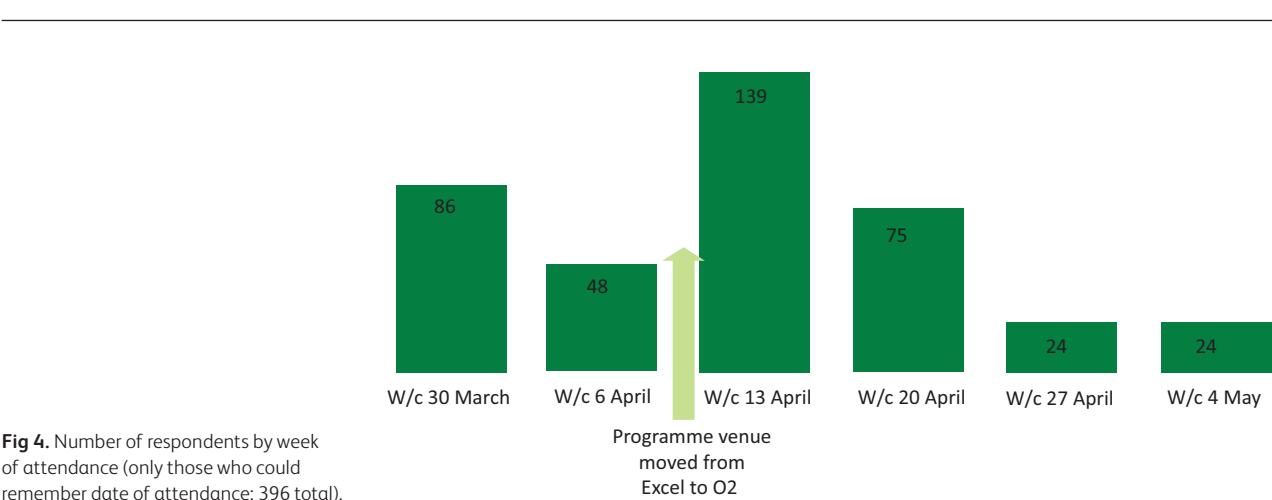
Streaming according to experience was a cause of dissatisfaction for many during the early stages of the programme. Suggestions from these early participants included streaming according to professional background and implementing a more detailed learning needs assessment, leading to more tailored training:

I understand that some others found it frustrating that the level of training was aimed too low for their knowledge, i.e. within training groups we were not separated according to our clinical background.

Put Drs, nurses, healthcare assistants, physios etc etc all in different groups. Do not mix them.

Although beneficial to have range of clinical groups mixed together, would perhaps benefit from more sessions split into just non ICU doctors for more specific training.

Changes made to the streaming approach as a result of participant feedback meant that, overall, streaming was perceived



Box 2. Main themes and subthemes arising from qualitative thematic analysis of participant comments

Experiential learning in small groups

- > Practical (hands-on) training
- > Facilitating questions and feedback
- > Authentic/high-fidelity simulation
- > Day Zero training

Differentiation via teaching streams

- > Streaming perceived to be effective
- > Streaming perceived to be ineffective

Interprofessional learning

- > Multiprofessional faculty
- > Multiprofessional learner groups
- > Role modelling flat hierarchy
- > Clarity about future roles

Focus on improving confidence and safety

- > Safe working
- > Raising concerns
- > Increased confidence
- > Face-to-face training

Online learning

- > Effective preparation
- > Useful refresher
- > Duplication/redundancy

by 75% of respondents to be a moderately, very or extremely effective approach to differentiating training.

Many participants praised the interprofessional nature of the training, both the interprofessional faculty and the mixed professional backgrounds of the learner groups:

Flat hierarchy—consultants were being taught stuff by nurses, medical students.

I felt part of the team, even though only a volunteer in a non-clinical role. Felt the positive approach of staff at the Nightingale, immediately.

Improving confidence and safety

Of respondents, 81% felt confident (extremely/very/moderately) that they could practice safely in their role following the training, with only 6% feeling 'not at all confident'. Breaking this down further, for non-ICU nurses who answered this question ($n=68$), 63% felt confident (extremely/very/moderately) working in their allocated role, whereas 83% of ICU nurses ($n=18$) felt this way according to the same measure of confidence.

Of non-ICU doctors who answered this question ($n=40$), 80% felt confident (extremely/very/moderately) working in their allocated role, whereas 70% of ICU doctors ($n=10$) felt (extremely/moderately) confident, although this was for a particularly small sample.

Of those who went on to work at NHS Nightingale London, 72% felt very or extremely confident about raising concerns about

patient care/patient safety, and fewer than 1% felt 'not at all confident'. Confidence was primarily associated with face-to-face training, rather than online learning:

I felt that all the elements of the face-to-face training were excellent over the two days. Although I am a registered nurse I have no experience of working in an ICU but once I had completed the training I felt that I could at least be of help to ICU staff.

Before attending the training I felt nervous about the work involved but the training definitely left me feeling confident that I could work as part of the team.

Although there was clear evidence that training included how to raise concerns, several participants reported that they remained unclear about the process.

Online learning

The online training was thought to be an effective refresher and learners particularly liked the videos, with 69% of those for whom it was applicable believing the online preparatory training was moderately, very or extremely effective in preparing them for their role. Some respondents mentioned that the volume of online training was overwhelming and that they would have liked clearer signposting of relevant content, potentially with the option to allow staff to provide certification that could show they were already up to date with standards:

I was up to date with the large majority of certificates required with my own trust and could have provided proof; there was no opportunity to provide this.

Experiential learning in small groups

When those who responded 'not applicable' are excluded, 63% of participants felt the face to face training was either very or extremely effective (Fig 5). Participants highly rated the hands-on practical skills training, especially the simulations, and appreciated the knowledge, passion and skill of the trainers. Participants particularly appreciated learning in small groups:

The groups were appropriately sized so it was possible to ask questions and have specific feedback or clarification—for example in practical stations.

Many felt the use of simulated scenarios and role plays allowed them to get a flavour of the tasks and processes they could expect at the NHS Nightingale London:

Good practical workshops: focused on roles and systems in use. Interactive. No "death by PowerPoint."

The scenarios of mock-up situations with the patients. eg suction, turning, catheter use, ventilator use

Brought the reality of where I would be working clearer. The fact that they created a similar environment was good. [Author note: this was a direct reference to the Nightingale Hospital style ward set up which is very different to a regular contemporary NHS Intensive Care Unit.]

Some participants felt that the training should be even more closely aligned to the real NHS Nightingale London experience:

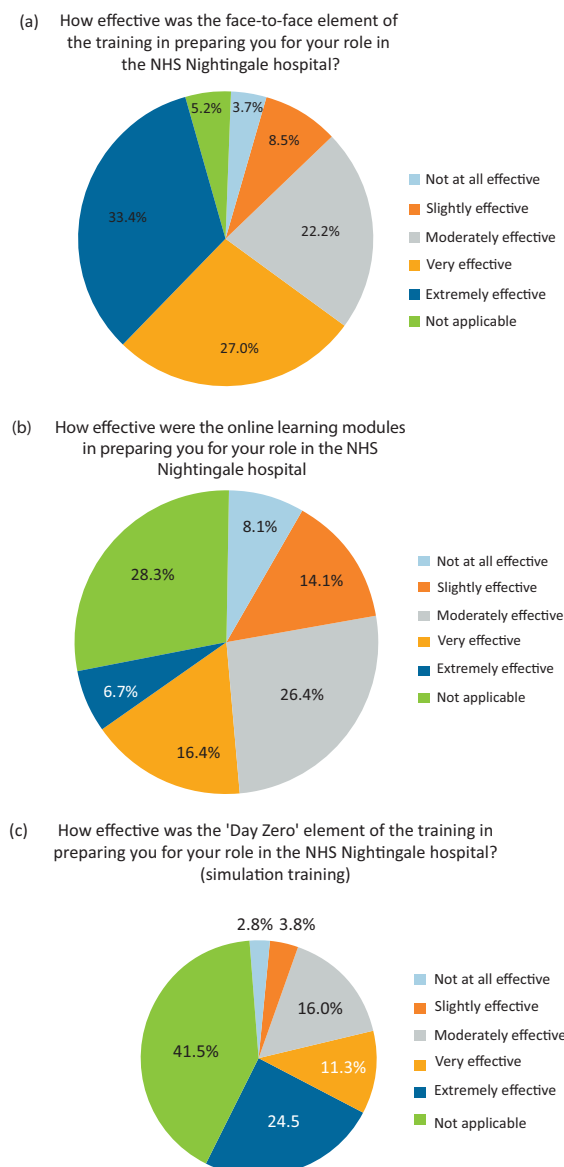


Fig 5. Self-rated effectiveness of (a) face-to-face training, (b) online training and (c) Day Zero training.

I think that they could have structured the training around a typical day at the Nightingale rather than slightly disjointed individual parts

This was addressed to some extent in the Day Zero training, which was introduced later during the life cycle of the programme. For the 12% of respondents who had undertaken Day Zero training, it was clear that they valued the opportunity to familiarise themselves with the working environment at NHS Nightingale London:

Simply being aware of where to go to obtain scrubs and change and getting to grips with the size and orientation of the place lessened my anxiety of starting my first shift without knowing where to go and what to do.

Discussion

The just-in-time model appears to be an appropriate approach to respond to the extraordinary need for thousands of staff to be trained in a very short time. Based on our 20% sample, training was generally perceived to be effective in developing staff who felt confident and able to practise safely in their roles. Although our analysis suggested that ICU-trained nurses felt more confident compared with non-ICU trained nurses, ICU-trained doctors felt less confident compared with their non-ICU trained counterparts. Differences in self-reported confidence are challenging to interpret because of the differing demands of participants' allocated roles at NHS Nightingale London.

Respondents appreciated the clear focus on specific, relevant skills, with some of the training delivered via online modules at their own time and pace. Despite a strong emphasis on patient safety in the training, with several respondents unclear about when and how to raise safety concerns, this suggested a need to emphasise repeatedly and explicitly the process(es) for raising safety concerns at the NHS Nightingale London. Although streaming according to experience and the lack of Day Zero 'in situ' training was a cause of dissatisfaction for many who attended during the early stages of the programme, there was also clear acknowledgement in participants' responses that the training programme was constantly evolving and improving over time, including the addition of the Day Zero element. This supports the possibility that responses were skewed toward more critical ratings and remarks from the majority of respondents who attended earlier on during the programme.

Simulation and Day Zero training

The interactive and experiential elements of the programme, predominantly simulation and the *in situ* experiential learning (aka 'Day Zero'), were particularly highly rated. This aligns with previous research demonstrating the value of simulation as a just-in-time educational strategy.^{3,6,8,11} The simulation and Day Zero elements are supported theoretically by the work of Eraut,²⁷ who has identified the importance of 'mediating artefacts' in professional learning: items or objects encountered within the workplace that convey meaning and have the effect of both structuring or organising the work and facilitating conversations about work-related things. These can include artefacts that are intended to carry information in obvious ways, such as patient notes and charts; however, other artefacts can also carry meaning in less explicit ways; for example, critical care clinicians need to be able to interpret readings on equipment displays, determine whether any changes in these are significant or minor, and know how to respond accordingly. Importantly, as Eraut identifies,²⁷ it is not the artefacts themselves but the conversations that happen around and because of them, which support professional learning. Thus, the prominent role of simulation in the NHS Nightingale London curriculum, which featured a wide array of mediating artefacts in a range of authentic settings (Fig 1), was well aligned with this important feature of professional learning.

Interprofessional learning

Some respondents were dissatisfied with the streaming process during the early stages, which highlights persistent challenges

with interprofessional learning within healthcare.⁵ One of the challenges of interprofessional learning is the deeply entrenched tribalism that can exist between health professional specialties, with a tendency for specialisms to remain siloed, or even to compete with one another.¹⁶ True interprofessional learning appears to work better when professionals are not simply trained to carry out common tasks in mixed professional groups, but instead where they can understand other perspectives and see the value of learning and working collaboratively on complex work problems within a flat hierarchy.²⁸ Interestingly, driven by the dynamic feedback and daily multi-professional group huddles, as well as greater clarity of roles within the NHS Nightingale Hospital itself, the streaming process did evolve to reflect this more collaborative approach. By the end of the programme, groupings were based on previous experience and on the likely common tasks and complex problems learners would face together, rather than professional labels. The development of the Day Zero course also reflected this need to understand how the team worked collaboratively on the hospital floor, and how each professional would fit into the team, regardless of background.

Limitations of the study

The biggest potential for bias in questionnaire surveys is non-response bias. On analysing the respondents by the week they attended the programme, it was clear that most (66%) attended during the first half of the training programme. Given the evolving nature of the programme, this is likely to have had an impact on the nature of responses, particularly those relating to streaming and to Day Zero training, which was also only introduced later on.

Conclusions and future developments

Based on this analysis of the NHS Nightingale London Education and Training Programme, a just-in-time approach to healthcare training can work well. The flexibility of online modules, clearly signposted and pared down to the minimum necessary material, avoids the need to repeat previously certified learning. Simulated experiential learning should be focused on specific tasks in the workplace, and delivered in small groups. Streaming appeared to work effectively in the context of flat hierarchies, blurred boundaries between professions and a clear common goal. This has the potential to promote understanding of different professional roles and collaborative working to solve problems. Finally, the chance to have 'on site' training to experience how teams work together in the real clinical setting was felt to be particularly useful.

In the context of NHS workforce gaps and the potential for further COVID-19 surges to impact the delivery of healthcare, a just-in-time approach to training offers an effective approach to supporting staff redeployment and upskilling across the NHS. ■

Conflicts of interest

The research team (GE, MP, MR and SN) were all independent of the NHS Nightingale London faculty. Two of the researchers (SN and GE) had attended several days at the O2 arena and ExCel to observe the training and participate in some of the hospital/faculty liaison groups and faculty feedback huddles. LT was a member of the core team for the programme and advised on the design of the survey and provided context, but was not involved

in the analysis of the survey data. JC was lead of the Education and Training work stream at NHS Nightingale London, but was not involved in the analysis or interpretation of survey data.

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