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Enhancing Medical Students' Clinical Confidence Through Near-Peer Online Teaching: Evaluation of a Foundation Doctor-Delivered Programme Across Nine Institutions in Three Countries

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Abstract

Background

Some institutions offer students far more structured near-peer teaching than others. Many medical students in their early clinical years report low confidence in core clinical skills. Published evaluations of online near-peer teaching have mostly looked at single-institution programmes delivered during the COVID-19 pandemic. We evaluated the Get Ahead Teaching Series, an online near-peer clinical teaching programme. It was designed and delivered by a single foundation doctor to students from nine institutions in three countries.

Methods

The programme consisted of six live online sessions, delivered fortnightly between September and December 2025. Cardiology, respiratory, and gastroenterology/general surgery each formed a two-session block. In each block, one session combined history taking with single-best-answer questions. The other covered clinical examination and data interpretation using electrocardiograms, chest radiographs, and arterial blood gases, respectively. After each session, students completed routine feedback with four satisfaction items and retrospective five-point ratings of their confidence before and after the teaching. Data were anonymised and then analysed using the Wilcoxon signed-rank test to compare paired confidence ratings.

Results

A total of 336 responses were received from students at nine institutions across the United Kingdom, Malaysia, and Hong Kong, with 50% of responses from NUMed, a transnational branch campus. Confidence increased from 2.49 ± 0.82 to 3.86 ± 0.69 (median 3 to 4; mean gain + 1.37; $p < 0.001$; $r = 0.84$), with 90% reporting improvement and consistent effects across blocks ($r = 0.84–0.86$), session formats, year groups, and countries. Satisfaction was also high across all four areas, with 85–90% of respondents rating content, delivery, contribution to learning and overall quality 4 or 5 out of 5.

Conclusions

Across the six online sessions, students from nine institutions in three countries reported higher self-rated confidence and high satisfaction with the teaching. A junior doctor led the programme, which required no funding. It could complement existing clinical curricula and provide structured teaching to geographically dispersed and transnational student groups.

Background

By the time they qualify, doctors are expected to take a structured history, perform clinical examinations, and interpret common investigations [1]. Medical students in the early clinical years often report low confidence in doing these skills. Some institutions and placements offer much more structured, small-group clinical teaching than others. Medical schools quickly moved much of their teaching online during the COVID-19 pandemic. Online teaching is now an accepted part of undergraduate courses. A meta-analysis found that students taught online did at least as well as those taught offline on knowledge outcomes [2].

Near-peer teaching involves tutors who are one or more stages ahead of the students they teach, with support from both theory and previous research [3]. Near-peer tutors are cognitively and socially close to their learners. Having recently acquired the knowledge and skills themselves, they may still remember some of the difficulties involved in learning them. Tutors being only a little further ahead may also make it easier for students to ask questions and learn through mistakes [4]. This has also been described through theories of learning by participation. Near-peer teaching can act as a transitional community of practice, as learners move from being a student towards becoming a practising doctor [4, 5]. The "journeyman" stage within cognitive apprenticeship describes individuals teaching skills they have recently acquired while still developing their own expertise [3, 6]. Teaching can also help tutors develop the educator role expected of doctors [7].

Most published evaluations of online near-peer teaching for medical students have involved programmes at a single institution, for example examination-focused revision series at one medical school [8, 9]. Reports of larger online programmes include a careers-focused webinar series for students from 35 universities in one country [10] and a large specialty teaching course [11]. These programmes did not provide clinical-skills teaching to students from identified partner institutions, and most date from the COVID-19 pandemic. There has been little research on sustained near-peer clinical teaching across national borders since the pandemic. To our knowledge, no comparable programme has previously been developed and delivered by a single foundation-year doctor.

The Get Ahead Teaching Series is an online near-peer teaching programme run by a foundation doctor for students from nine institutions in three countries. We evaluated the programme mainly to find out whether students' self-reported confidence in the clinical skills taught changed. Secondary aims were to describe student satisfaction and participation across institutions and countries. Free-text feedback and changes made to the programme in response to this feedback are reported separately.

Methods

Programme description

The Get Ahead Teaching Series was designed and delivered by a foundation year two doctor under the supervision of a consultant. We delivered six live online sessions fortnightly between 27 September and 13 December 2025 via Zoom (Zoom Video Communications, San Jose, CA), with each session lasting approximately 60 minutes. The three system-based blocks were cardiology, respiratory medicine, and

gastroenterology/general surgery. Each block comprised two sessions: a history-taking session incorporating high-yield single-best-answer (SBA) questions, followed by a clinical examination session incorporating structured data interpretation (electrocardiogram, chest radiograph, and arterial blood gas interpretation, respectively).

Students answered SBA questions in the chat, worked through clinical cases and had opportunities to practise history-taking. Student peer representatives helped organise recruitment. VZRN helped with outreach across UK institutions and Hong Kong. At Newcastle University Medicine Malaysia, SSS coordinated recruitment. We shared information about the programme through posters and student messaging networks. The sessions were open to all medical students, although the content and outreach focused mainly on those in the early clinical years. Students received a certificate of participation after attending and completing the post-session feedback.

Feedback instrument and data collection

Post-session feedback was collected using the programme's routine evaluation form (Google Forms, Google LLC, Mountain View, CA), which consisted of 14 items: year of study; institution; self-rated confidence in the session topic before and after attending ("How confident were you about this topic before/after attending the session?"), with both rated on a five-point scale [12]; four further five-point items on content and relevance, delivery, contribution to learning, and the overall session; three free-text questions; and two acknowledgement items (Table 1). Students gave both confidence ratings after the session in a retrospective post-then-pre format to reduce response-shift bias. Students may rate how much they knew before the session differently after learning more about the topic [13, 14].

Table 1
Post-session feedback instrument (self-designed; identical across all six sessions).

Item	Question	Response format
1	Year in medical school	Free text
2	Medical school	Free text
3	How confident were you about this topic before attending the session?	5-point scale
4	How confident were you about this topic after attending the session?	5-point scale
5	How would you rate the session/discussion: content and relevance to your learning	5-point scale
6	How would you rate the session/discussion: delivery of the teaching	5-point scale
7	How does this session/discussion contribute to your learning?	5-point scale
8	How would you rate the overall session/discussion?	5-point scale
9	What did the tutor do well in? What did you find most useful/like about the session?	Free text
10	What improvement could be made to the teaching session?	Free text
11	Any other comments/queries? (optional)	Free text
12	Acknowledgement: slides, recordings, and certificates are issued only to students who attend and submit feedback	Checkbox
13	Acknowledgement: consent for data to be processed by the programme team	Checkbox

Submission timestamps were recorded automatically. Free-text items (9–11) are analysed in a separate report.

In order to receive a certificate, students were required to complete feedback forms, which were left open between sessions. Based on free-text responses and submission timestamps, some students may have filled in the form for the other session in the same system block. We analysed the quantitative data at system-block and pooled-cohort level. Any crossover between sessions within a block would not affect these results.

Data handling and analysis

Before analysing the data, we removed names, email addresses and other identifiers. Students entered their institutions as free text, which we standardised by institution and country. In the Kirkpatrick framework, we considered self-reported confidence an indirect learner-level indicator related to Level 2 (learning) [15]. We compared the paired pre- and post-intervention confidence ratings using the Wilcoxon signed-rank test, and calculated effect size as $r = Z/\sqrt{N}$. We also counted the respondents who reported

increased confidence after the intervention. For subgroup comparisons of confidence gain, we used the Mann-Whitney U test. Satisfaction was considered a Level 1 (reaction) outcome in the same framework. For each satisfaction item, we report the mean score and the percentage of respondents who gave a rating of 4 or 5. Analyses were run in Python 3.12 with SciPy.

Ethical considerations

The programme was not part of any institutional curriculum. We assessed the evaluation with the Health Research Authority (HRA) and Medical Research Council 'Is my study research?' decision tool. The tool classified it as a service evaluation, not research [16]. According to the UK Policy Framework for Health and Social Care Research and the HRA's Defining Research table, service evaluation does not require NHS Research Ethics Committee review [17, 18]. We did not submit the project to an ethics committee or institutional review board, as formal research ethics approval was not required. Throughout the evaluation, we followed the principles of the Declaration of Helsinki. We did not randomise participants or change the teaching for the evaluation. We used routine programme feedback for the analysis after anonymisation. All students gave consent through the routine evaluation form for the programme team to process their feedback data. We did not seek separate written consent to participate because the national guidance above does not require it for the analysis of anonymised routine feedback from a service evaluation [17, 18]. The results are reported only in aggregate, so individual participants cannot be identified.

Results

Participation and reach

We received 336 feedback responses across the six sessions: 161 for cardiology, 94 for respiratory medicine and 81 for gastroenterology/surgery. Students received the presentation slides, recording and certificate after completing the feedback form, regardless of whether they had attended live or accessed the recording. We did not formally record live attendance. We know how many students engaged with the programme, but not how many attended the sessions live.

There were eight Year 4 respondents (2%), 224 in Year 2 (67%) and 104 in Year 3 (31%). The nine medical schools represented were Newcastle University Medicine Malaysia (NUMed; n = 168), University of Southampton (n = 65), City St George's, University of London (n = 62), University of Sheffield (n = 13), University College London (n = 12), the University of Manchester (n = 8), the University of Oxford (n = 3), Barts and The London (n = 3), and the University of Hong Kong (n = 2). These were across three countries. Of the 336 responses, 166 (49%) came from United Kingdom institutions, 168 (50%) from Malaysia, and 2 (1%) from Hong Kong. All 168 responses from Malaysia came from NUMed, a single transnational branch campus, making up approximately half the total response cohort.

Confidence

Across the pooled cohort, mean self-rated confidence increased from 2.49 ± 0.82 (median 3) before the sessions to 3.86 ± 0.69 (median 4) afterwards, corresponding to a mean gain of 1.37 points (Wilcoxon signed-rank $p < 0.001$; $r = 0.84$). Of the 336 respondents, 303 (90%) gave a higher confidence rating after the sessions. Ratings were unchanged for 31 (9%) and decreased for 2 (1%). The increase was observed across all three system blocks (Table 2; Fig. 1), with mean gains of 1.31 for cardiology ($r = 0.84$), 1.34 for respiratory medicine ($r = 0.84$), and 1.52 for gastroenterology/surgery ($r = 0.86$); all comparisons were statistically significant ($p < 0.001$).

Mean confidence gains were comparable between history-and-SBA sessions (+ 1.34) and examination-and-interpretation sessions (+ 1.43), as well as between Year 2 (+ 1.34) and Year 3 (+ 1.42) students. Respondents from UK institutions reported a greater mean increase than those from the Malaysian campus (+ 1.55 versus + 1.19; Mann-Whitney $p < 0.01$), reflecting a higher retrospective baseline among Malaysian respondents (2.64 versus 2.34), while post-session confidence was similar between the two groups (3.83 versus 3.89). Respondents with low baseline confidence (1–2; n = 166) gained a mean of 1.84 points, with 60% reaching a post-session confidence rating of 4 or 5. Among those with baseline ratings of 3 or above, the mean increase was 0.91 points. After the sessions, 88% of respondents rated their confidence as 4 or 5.

Table 2
Retrospective pre-post confidence by system block and pooled (n = 336).

Block	n	Before (mean ± SD)	After (mean ± SD)	Mean gain	% improved	p	r
Cardiology (history/SBA; examination/ECG)	161	2.43 ± 0.87	3.75 ± 0.66	+ 1.31	90%	< 0.001	0.84
Respiratory (history/SBA; examination/CXR)	94	2.63 ± 0.76	3.97 ± 0.69	+ 1.34	88%	< 0.001	0.84
Gastroenterology/Surgical (history/SBA; examination/ABG)	81	2.46 ± 0.78	3.98 ± 0.71	+ 1.52	93%	< 0.001	0.86
Pooled	336	2.49 ± 0.82	3.86 ± 0.69	+ 1.37	90%	< 0.001	0.84

Satisfaction

Satisfaction was high across all items: 85% rated content and relevance 4 or 5 (mean 4.35), 90% delivery (4.38), 90% contribution to learning (4.44), and 90% the overall session (4.39). Ratings were lowest in the first block and were numerically higher across all four items in later blocks. We made changes to the programme between sessions in response to feedback, as described separately in the report of the qualitative findings.

Free-text feedback

In the free-text feedback, students most often commented on the clear step-by-step explanations and the reasons given for why alternative answers were incorrect. The free-text feedback is analysed in more detail separately.

Discussion

Across the six sessions, self-rated confidence increased in 90% of responses after participation in the online near-peer teaching programme led by a foundation doctor. Students also reported high satisfaction. Confidence gains were seen across all three system-based blocks and among respondents from nine institutions in three countries. Effect sizes varied by only 0.02 between the three blocks ($r = 0.84$ to 0.86). The blocks differed in their content, delivery format and student populations. The similar effect sizes provided some limited internal replication of the observed effect.

Most published evaluations of online near-peer teaching have been within individual institutions [8, 9]. Larger multi-institution programmes taught careers content within one country [10], or reached a wide audience without structured partnerships between identified institutions [11]. A recent single-site simulation study reported high levels of confidence, but did not have a baseline measure [19]. In this programme, students completed the retrospective pre-session confidence rating at the same time as the post-session rating. This gave us paired ratings from a single feedback form after each session.

Responses came from seven UK institutions, one university in Hong Kong, and NUMed in Malaysia. About half of all responses came from NUMed, a single transnational branch campus. Transnational medical education partnerships may not offer all the informal learning opportunities of the home institution [20]. Structured online clinical teaching may be one way of reaching geographically dispersed or transnational student populations, as seen with participation in this programme. One reason for the high number of responses from NUMed may be the support of an on-campus peer coordinator. Students from NUMed continued to provide feedback across all six sessions, not just during the initial recruitment period. Their baseline confidence was higher than for respondents from other institutions, but post-session confidence was similar. This could be related to curricular timing, previous exposure to the material, or differences in how students interpreted and used the rating scale. The data do not tell us which of these explains the difference, and this needs further investigation.

Proposed mechanisms of near-peer teaching may also help explain the findings [3, 4]. Students often mentioned the clear stepwise explanations in their free-text feedback, including why incorrect answer options were wrong (detailed analysis of these responses is reported separately). This may be linked to cognitive congruence. The tutor had recently experienced similar assessments. They may have remembered some of the difficulties students faced and explained the reasoning in a way they could follow [3, 4]. There is also literature on interactive questions and feedback in medical education [21]. Several students said they felt comfortable making mistakes during the sessions. The learning environment may have played a part as well. Communities of practice and cognitive apprenticeship

provide another way of looking at these sessions. Students had a relatively low-stakes setting to observe clinical reasoning, try it themselves and receive guidance from someone not far ahead in training [3, 5, 6].

Limitations

There are several limitations to these findings. First, we relied on self-reported outcomes assessed retrospectively after teaching, usually on the day of the session. Knowledge and clinical skills were not assessed objectively, and we did not measure retention. In the Kirkpatrick framework, students' reactions to the programme are Level 1 outcomes. We used self-reported confidence as a learner-reported indicator related to Level 2 (learning), but it does not directly measure learning or clinical competence [15]. Previous studies involving junior clinicians have found only a limited relationship between self-assessed confidence and observed clinical competence [22]. The increase in confidence seen here cannot be taken to mean that students' clinical skills or performance improved.

Second, we used a retrospective pre-post design to reduce response-shift bias [13, 14]. Recall and social desirability bias were still possible. To receive a certificate, students had to complete the feedback form. This may have increased the number of completed forms and could have encouraged acquiescence bias or more favourable responses than a fully optional survey. Students chose whether to participate, and recruitment relied on student networks. There was also a possibility of selection bias, as attendees may have differed from others in their year groups in motivation or perceived need for support. Our findings may not apply to students who did not participate.

Third, the two feedback forms for each system block were open at the same time, so some students may have completed the form for one session after attending the other. The results can be interpreted at system-block or pooled-programme level, but we cannot be certain that they relate to individual sessions. Students who took part in more than one session contributed a response each time, but anonymisation meant these responses could not be linked to the same individual. We had no record of live attendance and some students accessed recordings, leaving us unable to calculate a conventional response rate.

Finally, the same tutor designed and delivered all six sessions. The teaching and delivery were consistent across the sessions. We cannot say whether these findings would apply to programmes run by other tutors or in other settings.

Future directions

Future studies could include an objective assessment of clinical skills and follow students for longer to see whether changes in confidence are sustained. Further studies could compare online near-peer teaching with faculty-led or face-to-face teaching, and look at participation and baseline confidence among students in transnational cohorts.

Conclusions

Between September and December 2025, a foundation doctor designed and delivered six online near-peer sessions to students from nine institutions in three countries. Students reported consistent increases in confidence across the programme and high satisfaction. The programme required no funding and could potentially complement formal curricula for more students, particularly at transnational and geographically dispersed campuses. Incorporating two retrospective pre–post questions into routine feedback provided a low-burden method of evaluating changes in self-reported confidence. This approach could also be applied to evaluate the educational impact of other junior-doctor-led teaching programmes. Changes made in response to learner feedback are reported separately.

Declarations

Ethics approval and consent to participate

We carried out the project as a service evaluation of an anonymised educational activity. It was assessed with the Health Research Authority (HRA) and Medical Research Council 'Is my study research?' decision tool and classified as service evaluation, not research [16]. The UK Policy Framework for Health and Social Care Research and the HRA's Defining Research table (October 2022) state that service evaluation does not require NHS Research Ethics Committee review [17, 18]. We did not submit the project to an ethics committee or institutional review board, as formal research ethics approval was not required. The programme was not part of any institutional curriculum. We did not randomise participants or change the teaching for the purpose of evaluation. We followed the principles of the Declaration of Helsinki. On the feedback form, all participants gave informed consent for the programme team to process their data. Under the same national guidance, separate written informed consent to participate was not required because we analysed anonymised routine feedback [17, 18].

Consent for publication

Not applicable. No individual-level or identifiable data are reported.

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Author Contribution

S.I.S. designed the programme and the evaluation, analysed the data, prepared Figure 1 and Tables 1-2, and drafted the manuscript. Z.R.V.N. coordinated participant recruitment and programme delivery across United Kingdom institutions and Hong Kong. S.S.S. coordinated participant recruitment at Newcastle University Medicine Malaysia. R.V. supervised the programme. All authors critically revised the manuscript and read and approved the final version.

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Availability of data and materials

The corresponding author can provide the anonymised dataset analysed in this study on reasonable request.

Competing interests

The authors have no competing interests. For transparency, SIS designed and delivered the teaching programme evaluated. VZRN and SSS coordinated student recruitment at participating institutions, and RV supervised the programme.

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Figures

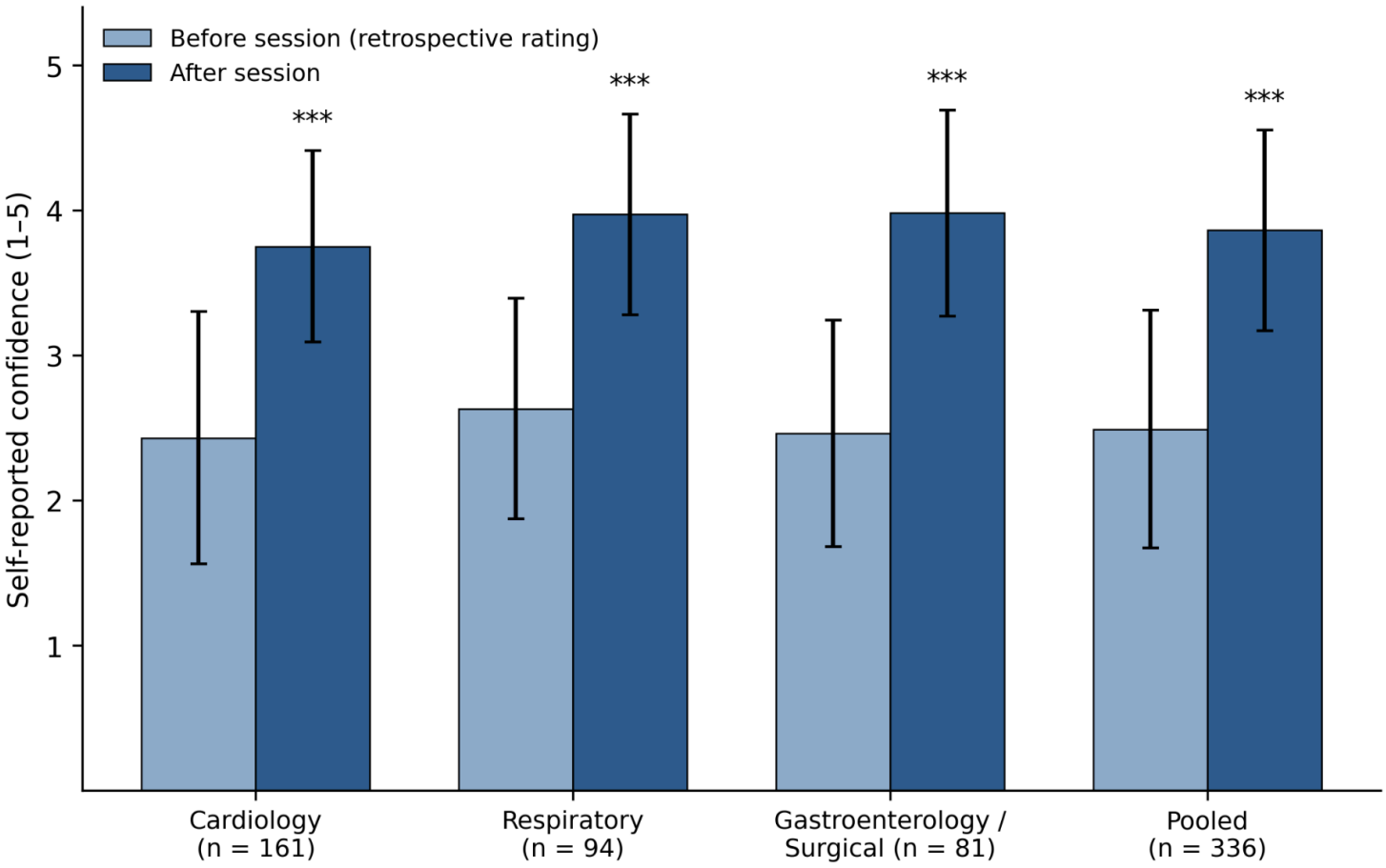


Figure 1

Self-reported confidence before and after teaching, by system block and pooled (n = 336). Bars show mean scores on the five-point scale with standard deviations; "before" ratings were collected retrospectively at the same sitting as "after" ratings. ***p < 0.001, Wilcoxon signed-rank test.