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ORIGINAL PAPER

Broadening Horizons: a 3-month structured webinar series for undergraduate and postgraduate plastic surgery education

Louis Boyce[1,2] · Chloe Jordan[1,2] · Serena Ramjee[1] · Ellie Evans[3] · Georgios Pafitanis[4,5]

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Abstract

Background We created a 3-month webinar series, entitled *Broadening Horizons*, which explored plastic surgery principles from each subspeciality according to the Intercollegiate Surgical Curriculum Programme (ISCP) for plastic surgery. This article reports on our experience of producing a teaching programme, its impact on our delegates, and provides a useful guide to creating future webinar series in plastic surgery and other specialities.

Methods Pre- and post-course questionnaires were used to perform a needs analysis, collect feedback and assess our delegates' career interests and perceptions of plastic surgery. Delegates rated their responses on 5-point Likert scales. Delegates also undertook a 60-question pre- and post-course exam to test their knowledge.

Results One thousand eight attendances were recorded for the entire 16-part webinar series. Sixty-three (53–73) delegates, including undergraduate, postgraduate and international students, attended each lecture on average. Seventy-five percent of delegates felt they had previously received inadequate plastic surgery teaching. Ninety-six percent were satisfied or very satisfied with *Broadening Horizons*. Confidence in their knowledge of plastic surgery increased significantly from 2 (1–3) (not very confident) to 3 (2–5) (somewhat confident) ($p = 0.01$). Post-course exam scores increased significantly from 49% (32–67) to 56% (23–85) ($p = 0.05$). Career interest and positive perceptions were maintained.

Conclusions This is the first webinar series to provide undergraduates and postgraduates plastic surgery teaching based on ISCP learning objectives. The series increased delegates' knowledge and confidence in their understanding of plastic surgery. This article describes the 5-E-Z step guide to developing future teaching programmes similar to *Broadening Horizons*.

Level of evidence Not ratable Keywords Undergraduate · Postgraduate · Education · Webinar · Plastic surgery

Introduction

In recent decades, interest in plastic surgery careers among UK medical students has significantly declined. Shifts in medical education, focusing increasingly on general medicine, non-technical communication skills and problem-based learning at the expense of traditional subject-based learning, may have inadvertently marginalised plastic surgery [1]. This shift is starkly illustrated by the drop from 78 to 13% in UK medical schools offering plastic surgery education between 1992 and 2008 [1]. Consequently, only 0.02% of doctors entering the UK Foundation Programme (UKFP) are exposed to plastic surgery prior to their specialty training [2]. Aggravating this issue are media misrepresentations and a scarcity of surgical mentors, contributing to waning student interest and affecting referral patterns [3, 4]. For instance, few medical students and general practitioners associate plastic surgeons with specific procedures like tendon repairs, underscoring a disconnect between perception

Louis Boyce and Chloe Jordan contributed to this manuscript equally as co-first authors.

✉ Louis Boyce
louisboyce@gmail.com

1 Barts and The London School of Medicine and Dentistry, London, UK

2 The Royal London Hospital, Barts Health NHS Trust, London, UK

3 Royal Free NHS Foundation Trust, London, UK

4 London Reconstructive Microsurgery Unit (LRMU), Department of Plastic Surgery, Emergency Care and Trauma Division (ECAT), The Royal London Hospital, Barts Health NHS Trust, London, UK

5 Medical School, University of Cyprus, Nicosia, Cyprus

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and the reality of the specialty's scope [5]. Diminishing exposure to plastic surgery has profound implications for career uptake, competition within the field and the overall value of the specialty [6].

Doctors and students have previously organised 1-day extracurricular workshops to stimulate interest in plastic surgery [7, 8]. Medical education was forced to adapt during the COVID-19 pandemic however [9–12], with online teaching prevailing. The British Association of Plastic, Reconstructive and Aesthetic Surgeons (BAPRAS) have made a repository of virtual lectures [13], as well as their E-Learning for Plastic, Reconstructive and Aesthetic Surgery (e-LPRAS) materials, a click-through educational programme designed for plastic surgery trainees studying for the exit examinations, available on their website [14]. Despite these efforts, there remains a distinct lack of opportunities for students and junior trainees to explore the breadth of plastic surgery via a comprehensive, standardised, live teaching programme.

We designed a 16-part webinar series, entitled *Broadening Horizons*, which explored the fundamentals of each plastic surgery subspecialty. Herein, we describe our experience producing the series, and present the 5-E-Z step guide to developing similar future educational programmes—an 'easy' five-step approach where each step begins with the letter 'E':

1. *Expose* 'a gap in the market'
2. *Enlist* the right team
3. *Establish* a robust curriculum
4. *Enhance* the learning experience
5. *Evaluate* programme performance

Whilst analogous to Kern's six steps to curriculum development [15], the 5-E-Z step guide introduces a novel and improved framework specifically tailored to address the unique practical challenges of developing a webinar series. We surveyed medical students and postgraduate trainees on their prior exposure, career interest, knowledge and perceptions of plastic surgery, and gathered feedback to evaluate the impact of our webinar series.

Methods

Webinar series

Broadening Horizons was entirely developed by Barts and The London Association of Plastic, Reconstructive and Aesthetic Surgery (BLAPRAS) committee members, and overseen by the senior author.

The webinar series featured 16 live lectures, occurring weekly, from June to August 2022. Learning objectives for each lecture were devised according to Plastic Surgery Curriculum within the Intercollegiate Surgical Curriculum Programme (ISCP) [16]. The series timetable and modules are shown in Table 1. Each 45-min webinar, plus live Q&A discussion, took place online via ZOOM™. All speakers were FRCS (Fellowship of the Royal College of Surgeons)-qualified subspecialists for their dedicated lecture, who were invited to speak via e-mail. Speakers provided their teaching services as a part of their job description for the National Health Service (NHS). Webinars were recorded and made available to delegates subject to speakers' consent.

Table 1 Timetable for the *Broadening Horizons* webinar series and the number of attendees per webinar

Date	Webinar topic	Number of attendees
Week 1	Oncoplastic Breast Surgery	71
	Breast Cancer Reconstruction	71
Week 2	Vascular Anomalies & Lasers	68
	Sarcoma	66
Week 3	Craniofacial Trauma	57
	Lower Limb Trauma	65
Week 4	Craniosynostosis	61
	Upper Limb & Hand	60
Week 5	Chest Wall Reconstruction	58
	Head & Neck Reconstruction	73
Week 6	Wound Healing	58
	Burns	69
Week 7	Skin	57
	Aesthetics	62
Week 8	Ear Reconstruction	53
	Cleft, Lip & Palate	61

Broadening Horizons received sponsorship from BAPRAS and the Plastic Surgery Trainees Association (PLASTA). Participants were permitted to claim one Continuing Medical Education point for every hour of education delivered by our webinars; however, the series did not contribute towards any established medical curriculum.

Recruitment and data collection

Broadening Horizons was advertised via BLAPRAS social media accounts, attracting medical students and junior trainee who registered via an online form. Eligibility included medical students at any level and postgraduate trainees not yet specialised. Registrants were invited to voluntarily enrol in our study, which involved completing pre- and post-course questionnaires and an exam via Jisc™ Online Surveys. We performed a needs analysis to identify pre-course levels of exposure to plastic surgery. Delegates were asked to rate statements related to career interest,

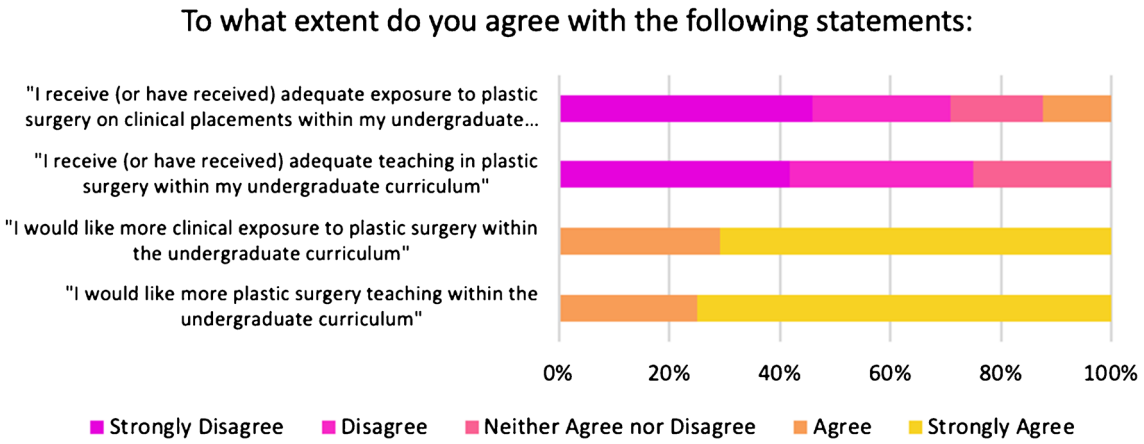

Fig. 1 Needs analysis demonstrating delegates' amount of pre-course exposure to plastic surgery

knowledge and perceptions of plastic surgery along 5-point Likert scales, from which a score between 1 (least positive) to 5 (most positive) was derived. Delegates also ranked the 10 surgical specialities recognised by the Royal College of Surgeons in order of interest in pursuing as a future career.

The exam comprised 60 single-best answer questions testing knowledge taught throughout the webinar series. Each speaker formulated 3 to 4 questions each. A 50% pass mark was determined by committee consensus. Delegates attempted the same 1-h long exam pre- and post-course. Delegates with the highest exam scores were awarded a £20.00 Amazon voucher. Participation certificates were also given to delegates who attended the series. *Broadening Horizons'* operating expenses included a ZOOM™ Business Account, prize vouchers and production costs for the pre-reading booklets.

Data analysis

Likert scale scores and rankings were aggregated to find mean scores and ranges where appropriate. The percentage of participants who responded a certain way, e.g. 'strongly agree' for a given question, was reported. Changes in pre- and post-course questionnaire data were analysed using the McNemar test. Friedman and Conover tests were used for the surgical specialties data ranked according to career interest. Change in exam score was analysed using two-tailed paired Student's *t* tests.

Results

Demographics

A total of 307 individuals expressed initial interest in participating in the *Broadening Horizons* program. Across the 16-part webinar series, there were 1008 recorded attendances, averaging 63 (53–73) delegates per session (Table 1). The maximum attrition rate was 16%. Each participant attended 12 webinars on average.

Thirty-three participants (10.7% response rate) completed the pre-course questionnaire and exam, with 24 completing the post-course requirements (7.8% response rate). The 9 participants lost to follow-up were excluded from our final analyses. The ratio of male-to-female participants was 1:1. Fourteen participants attended the course from a country outside of the UK. Both medical students ($n=19$) and postgraduate trainees ($n=5$) were included.

Needs analysis

Seventy-five percent ($n=18$) and 71% ($n=17$) of participants disagreed or strongly disagreed that they received adequate plastic surgery teaching, or sufficient exposure to the specialty on clinical placements, respectively (Fig. 1). Eighty-eight percent ($n=17$) and 79% ($n=21$) of participants report that little to no time is dedicated to plastic surgery teaching and clinical exposure, in the undergraduate curriculum, respectively. Fifty-eight percent ($n=14$) of participants spend moderate-to-large amounts on extracurricular activities to learn about plastic surgery, with textbooks and webinars being the most popular resources. The least common sources of plastic surgery education were small-group teaching, clinical placements and lectures from medical school. Ninety-six percent ($n=23$) of participants agreed or strongly agreed that they would like to receive more teaching and clinical exposure to plastic surgery during medical school and postgraduate training.

Knowledge of plastic surgery

Participant confidence in their knowledge of plastic surgery rose from 2 (1–3) (not very confident) to 3 (2–5) (somewhat

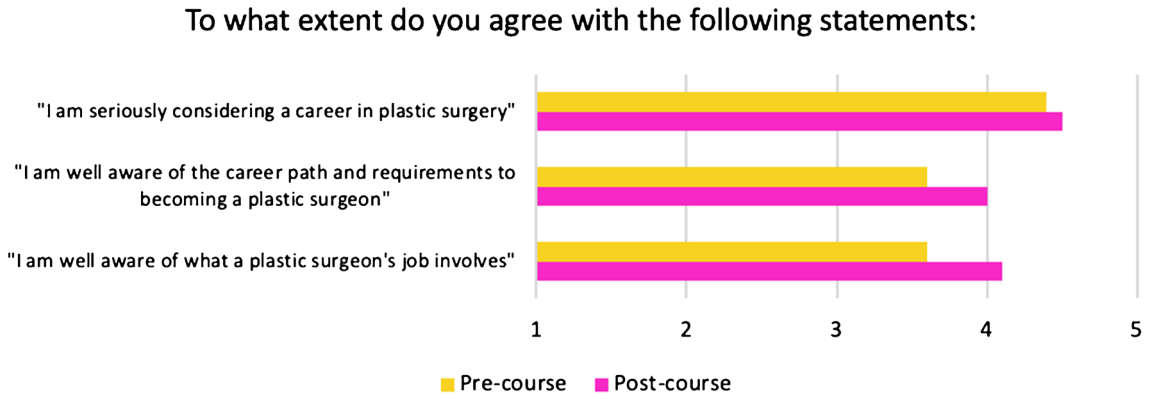

Fig. 2 Career interests and understanding of the career pathway among participants pre- and post-course

confident) ($p = 0.01$). Mean pre- and post-course exam scores were 49% (32–67) and 56% (23–85) ($p = 0.05$), respectively. Pre-course, 11 participants failed to accurately name 5 plastic surgery subspecialties; post-course, all participants accurately completed this task ($p = 0.02$).

Career interest

Participants ranked plastic surgery first versus other surgical specialties in terms of interest in pursuing as a future career ($p < 0.05$). Eighty-three percent ($n = 20$) of participants agreed or strongly agreed that they were seriously considering a career in plastic surgery (Fig. 2). Seventy-five percent ($n = 18$) of participants (58% ($n = 14$) pre-course) were aware of what a plastic surgeon's job involves, and 79% ($n = 17$) understood the career path to becoming a plastic surgeon post-course (67% ($n = 16$) pre-course).

Perceptions of plastic surgery

Over 92% ($n = 22$) of participants agreed or strongly agreed that plastic surgery was a demanding, rewarding and competitive career, that plastic surgeons perform procedures that improve aesthetic appearance and that plastic surgeons improve quality of life (Fig. 3). Participants also agreed that plastic surgeons sometimes or often perform limb-saving (from 92% ($n = 22$) to 100% ($n = 24$)) and lifesaving (from 79% ($n = 17$) to 88% ($n = 21$)) operations. Over 63% believed plastic surgeons were well paid. Forty-five percent ($n = 11$) disagreed with the statement "plastic surgeons work mainly in the private sector" pre-course, which rose to 50% ($n = 12$) post-course.

Feedback

Over 96% ($n = 23$) of participants were satisfied with the webinar series, regarding lecture content, organisation and course structure, online platforms used and communication with the *Broadening Horizons* team (Fig. 4).

Discussion

This article describes the first plastic surgery webinar series aimed at medical students and junior trainees to reflect the fundamental ISCP learning objectives for plastic surgery [16]. This programme of 16 virtual lectures provided delegates with almost 32 h of plastic surgery teaching, focussing on key principles and knowledge required to achieve the core competencies of a plastic surgeon in the UK. *Broadening Horizons* received highly positive feedback, increased awareness of the specialty, positively influenced perceptions of plastic surgery and boosted confidence in knowledge and understanding.

This webinar series distinguishes itself from existing BAPRAS initiatives in several key dimensions: Our learning objectives align directly with the ISCP curriculum, ensuring relevancy and rigor, whilst remaining focussed on our target audience of medical undergraduates and UKFP-level trainees, who found educational and inspirational utility in our webinars. Our programme enhanced learning by incorporating pre-reading material and administering a pre- and post-course exam, coupled with a live Q&A segment for real-time engagement. Uniquely, a BLAPRAS committee member moderated each session, effectively bridging the gap between high-level specialised content and the delegates' nascent professional context.

Broadening Horizons attracted an international audience, illustrating the power of social media and videoconferencing platforms to connect enthusiastic students with inspirational educators. The shift to online platforms for plastic surgery education, accelerated by the COVID-19 pandemic [17, 18], is exemplified by *Broadening Horizons*, alongside other programs like PLASTA's National Webinar Series [19] and Santamaria et al.'s Master Series:

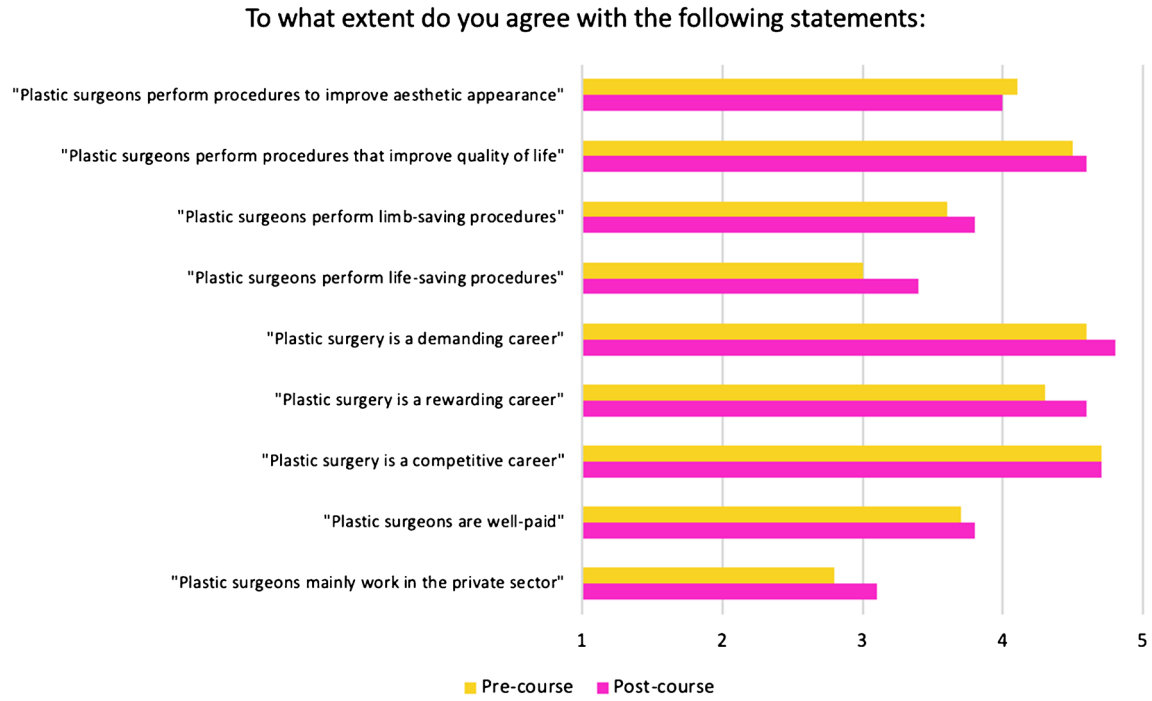

Fig. 3 Perceptions of plastic surgery among participants pre- and post-course

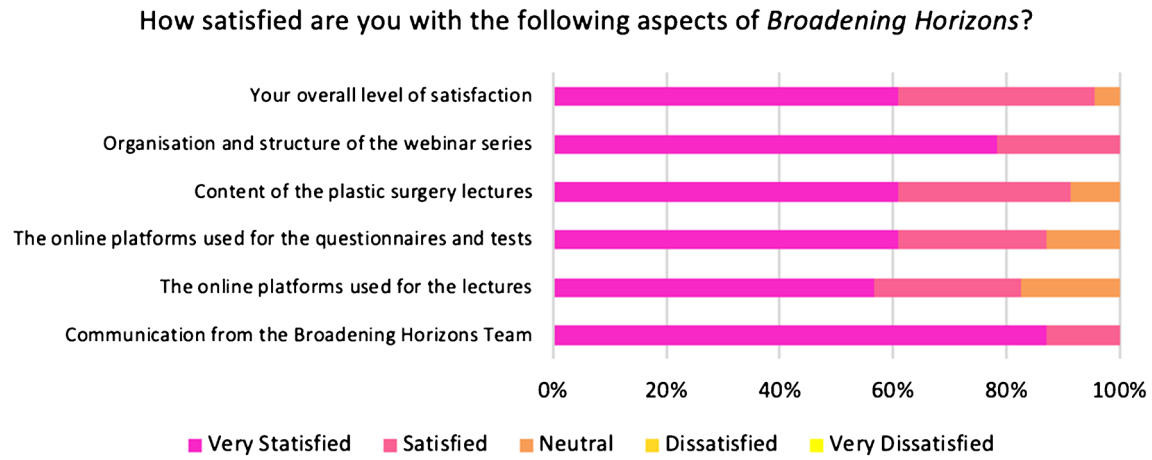

Fig. 4 Participant feedback on the *Broadening Horizons* webinar series

Microsurgery for Residents [20]. Whilst extensive assessments of pre- and post-webinar series are scarce, our findings resonate with certain studies emerging from the USA [21–23]. Reghunathan et al. demonstrated that a 66-min plastic surgery virtual module significantly enhanced students' ability to identify appropriate referrals and boosted confidence in handling plastic surgery cases [22]. This aligns with a systematic review indicating high satisfaction and learning outcomes from plastic surgery online learning, comparable to traditional methods [20]. *Broadening Horizons* not only mirrors these examples but further enriches the pool of online educational resources.

Following the positive feedback received from *Broadening Horizons* delegates, we developed the 5-E-Z step guide to producing future webinar series in plastic surgery and other specialities. Our proposed framework closely maps onto other established curriculum development frameworks such as Kern's six steps [15] and the 6Cs toolkit [24] for teaching–learning-assessment at the program level (Table 2). The 5-E-Z steps

repackage these frameworks in an accessible way, with emphasis on the practicalities of developing a teaching programme.

1. *Expose* 'a gap in the market'

An extracurricular teaching programme must address a deficiency within the curricula of existing educational institutions. Limited exposure to plastic surgery in undergraduate and early postgraduate training has been a long-standing issue [25–27]. Indeed, over 70% of our delegates felt that hardly any of their plastic surgical knowledge had come from their undergraduate education. We identified this dearth of plastic surgery teaching as an opportunity to stimulate interest, share knowledge and dispel misconceptions about the specialty.

2. *Enlist* the right team

Recruiting a team of committed diligent individuals and clearly assigning roles are essential to delivering an exceptional webinar series. The following responsibilities were divided among our team members: contacting potential speakers; social media marketing; producing information booklets and timetables; acquiring sponsorship; hosting the webinars; and creating feedback questionnaires. Mentorship from a consultant plastic surgeon and medical educator provided invaluable experience to this endeavour.

3. *Establish* a robust curriculum

Firstly, we based our learning objectives on the ISCP for plastic surgery—the gold-standard UK framework for training doctors to the level of a consultant plastic surgeon—and tailored them to our audience by focussing on the basic required competencies outlined in the curriculum. Secondly, we selected recognised subspecialists who had completed the FRCS(Plast) exit exam to speak, ensuring experience and familiarity with the subject matter.

4. *Enhance* the learning experience

Passively listening to lectures results in the lowest information retention rate [26]. *Broadening Horizons* aimed to actively engage delegates by encouraging audience participation with polls and Q&As. We created a pre-reading booklet of relevant anatomy and basic principles, serving as a wieldy foundation for learning. Moreover, pre- and post-testing has been shown to improve learning outcomes [28]. This multimodal approach to education appears was widely appreciated by our audience [29].

5. *Evaluate* programme performance

Table 2 A comparison between the 5-E-Z step guide, Kern's six steps and the 6Cs toolkit to curriculum development

5-E-Z	Kern's six Steps	6Cs toolkit
Expose	Problem Identification and Needs Assessment, Goals and Objectives	Contextualisation
Enlist	Implementation	Coordination
Establish	Educational Strategies, Goals and Objectives	Commands, Contextualisation
Enhance	Educational Strategies	Contextualisation, Coordination, Collections, Collations
Evaluate	Implementation, Evaluation	Collections, Collations, Connections

We surveyed our delegates, collected feedback and tested knowledge to demonstrate the positive impact *Broadening Horizons* had on perceptions, interest and confidence. Moreover, we were able to highlight the limitations of a standalone extracurricular webinar series. For example, post-course confidence and test results were considerably lower than the maximum possible scores. The series broached each subspecialty only once and naturally lacks practical clinical exposure. A spiral curriculum, designed to revisit, integrate and contextualise important topics, may improve knowledge retention more than a simple linear curriculum [30], and applying knowledge learnt didactically to the clinical environment stimulates experiential learning which is crucial for surgical education [31].

Our study had a small sample size and was at increased risk of selection bias since delegates enrolled on a voluntary basis. *Broadening Horizons* participants were already highly interested in plastic surgery and willing to engage in a 3-month commitment, which does not represent the broader student population's attitudes. Evidence of considerable interest and knowledge was therefore expected in the pre-course responses, which may attenuate changes in post-course results. Future research could explore the long-term effects of similar virtual educational interventions, assessing if the initial interest translates into sustained career choices in plastic surgery.

Conclusions

Broadening Horizons, a 3-month plastic surgery webinar series, fostered confidence in plastic surgical knowledge (from 'not very confident' to 'somewhat confident' ($p = 0.01$)), marginally increased interest and awareness of plastic surgery ($p < 0.05$) and maintained positive perceptions of the specialty. However, the results should be interpreted with caution due to a modest response rate. The series appealed to a diverse audience, including undergraduates, postgraduates and international delegates, and provided valuable exposure to the ISCP for plastic surgery. Our 5-E-Z step guide provides a blueprint for developing future extracurricular teaching programmes in plastic surgery and beyond.

Funding This study did not receive any funding from any source.

Data Availability Data generated or analysed during the study are available from the corresponding author by request.

Declarations

Ethics approval Ethical approval for this study was sought from Queen Mary Ethics of Research Committee (reference number: QMERC20.250).

Consent to participate Consent was obtained for all study participants.

Conflict of interest The authors declare no conflict of interest.

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