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SAGE(S) advice: application of a standardized train the trainer model for faculty involved in a Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) hands-on course

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Abstract

Introduction Currently, no prerequisite teaching qualification is required to serve as faculty for SAGES hands-on courses (SAGES-HOC). The Lapco-Train-the-Trainers (Lapco-TT) is a course for surgical trainers, in which delegates learn a standardized teaching technique for skills acquisition. The aims of this study were to 1) determine if this curriculum could be delivered in a day course to SAGES-HOC faculty and 2) assess the impact of such training on learners' educational experience taught by this faculty at a subsequent SAGES-HOC.

Methods and procedures Six experts attended a one-day Lapco-TT course. SAGES-HOC participants were split into two groups: Group A taught by Lapco-TT trained, and Group B by "untrained" course faculty. Opinion surveys were completed by both the SAGES-HOC learners and the Lapco-TT trained course faculty. Furthermore, the latter underwent self-, learner-, and observer-based evaluation using a previously validated teaching assessment tool (cSTTAR). Mean scores were reported and analyzed [Mann–Whitney U, *t* test ($p<0.05$)].

Results All 6 Lapco-TT delegates found the course useful (5), and felt that it would influence the way they taught in the OR (4.83), that their course objectives were met (4.83), and that they would recommend the course to their colleagues (4.83). Of the SAGES-HOC participants, compared to Group B ($n=22$), Group A learners($n=10$) better understood what they were supposed to learn (5 vs. 4.15 [$p=0.046$]) and do (5 vs. 4 [$p=0.046$]), felt that the session was well organized (5 vs. 4 [$p=0.046$]), that time was used effectively (5 vs. 3.9 [$p=0.046$]), and that performance feedback was sufficient (5 vs. 3.9 [$p=0.028$]) and effective (5 vs. 3.95 [$p=0.028$]). Group A faculty were rated significantly higher by their learners on the cSTTARs than Group B ($p<0.0005$). Group A faculty rated themselves significantly lower than both expert observers ($p<0.0005$) and compared to the Group B faculty's self-assessment ($p<0.002$).

Conclusions The Lapco-TT course can be delivered effectively over one day and impacts the educational experience of learners at a SAGES-HOC. This could help establish a standardized method of teaching at SAGES-HOCs and thereby increase their value for learners.

Keywords Surgical education · Continuing professional development · Hands-on course · Skills training and acquisition · Train-the-trainer

Hands-on courses, where participants use simulated models to learn and practice new techniques, have been proven to

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be the most educationally beneficial course model for practicing surgeons to learn a new practical procedure, particularly for advanced laparoscopic surgery [1]. For this reason, the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) continues to offer and run such courses, in a multitude of different topics [2]. Such SAGES hands-on courses ((SAGES-HOC)), however, are expensive to deliver, in terms of the materials used, the necessary space required to accommodate the course, the cost of the time commitment and travel for both participants and course faculty alike, and indeed the direct fees for the course faculty themselves [3]. Over recent years, participation in SAGES-HOC has dropped off with learners citing an unfavorable cost to educational benefit ratio [4, 5]. At present, no prerequisite teaching qualification is needed to be able to serve as faculty on a SAGES-HOC, just the need to be an expert, technically proficient in the subject matter, and to be selected by the Course Chair and Co-Chair [3].

The Laparoscopic colectomy-Train-the-Trainer (Lapco-TT) program was initially developed in the United Kingdom (UK) in order to teach its participants, known as delegates, a standardized teaching technique for skills acquisition with a demonstrable positive impact on both delegates' teaching ability and their learners' proficiency gain curves [6]. Despite its original application to optimize the efficiency and efficacy of teaching laparoscopic colorectal surgery in order to boost adoption rates of laparoscopic colectomy in the UK, Lapco-TT has been expanded internationally, including the United States (US) [7]. The aims of this study were (1) to determine if this curriculum could be delivered in a day course to delegates who were SAGES-HOC course faculty and (2) to assess the impact of such training on the educational experience of learners taught by these delegates at a subsequent SAGES-HOC.

Materials and methods

Lapco-TT delegate course and its evaluation

Six general surgeons were selected as faculty for a SAGES-HOC in hernia repair, who were experts in abdominal wall reconstruction, attended a day long Lapco-TT course just before the Annual SAGES Meeting held in Nashville, TN, in 2015. This intensive teaching course, known as SAGES-Lapco-TT, was split up into small group discussions; involved role-play and hands-on teaching methods; and included reflection, assessment, feedback, and review sessions (Appendix 1). In an attempt to minimize distractions and maximize the educational benefit, delegates were required to attend the entire session and were prohibited from using cell phones. The instructors of the SAGES-Lapco-TT included both expert teachers who had themselves been through the Lapco-TT as delegates and who had previously taught on standard Lapco-TT courses, and two of the founding members (MC, TC) of the Lapco-TT course itself. In this way, the hope was that the teaching and the overall quality of the course were not compromised by altering the usual Lapco-TT curriculum. At the end of the SAGES-Lapco-TT course, the six delegates completed an anonymous 14-item questionnaire using a five-point Likert scale (1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree) inquiring about the effectiveness of the course. This questionnaire also contained four open-ended questions with free text responses. Mean values were calculated and descriptive statistics reported.

SAGES-HOC course and evaluation

The following day, for the SAGES-HOC, registered participants (i.e., learners) were split into two groups based on the course faculty teaching them: Group A were taught by Lapco-TT trained course faculty, whereas Group B were taught by course faculty who had not received such training. All faculty for this course had been invited by the Chair and Co-Chair of the course. This instruction was given during the afternoon cadaveric component of the hernia course entitled "All Things Hernia." For this cadaveric session, learners were to be taught in both open and laparoscopic approaches to ventral hernia repairs. Each station was set up as per an operating room, with the cadaver draped and with full laparoscopic and open instruments and equipment and energy devices available. Group A learners had two learners per cadaver station with a single-course faculty instructor; Group B learners had two to three learners per cadaver station with a single-course faculty instructor.

Evaluation of the SAGES-HOC course and its faculty was threefold. Learners in both Group A and B completed a 28-item course questionnaire using Likert-type scales. In addition, all Group A course faculty underwent 360° evaluations using the "course Structured Training Trainer Assessment Report (cSTTAR)" [4], a teaching assessment tool developed for evaluating course faculty teaching effectiveness. The cSTTAR assesses teaching in three parts, the "set" or discussion between trainer and trainee prior to commencing the educational intervention, the "dialogue," which is the teaching that occurs during the educational intervention (i.e., the cadaveric training for the SAGES-HOC), and the "closure," which is the discussion and feedback session undertaken at the conclusion of the educational intervention. This 360° evaluation included self-, learner-, and observer-based assessment with the cSTTAR. Expert observers consisted of Lapco-TT faculty members. Mean scores were reported and analyzed, using non-parametric test (Mann–Whitney U) for the opinion surveys, and t test for the cSTTAR scores (taking $p < 0.05$ as significant).

Results

SAGES-Lapco-TT course

Table 1 summarizes the 6 SAGES-Lapco-TT delegates' impression of the Lapco-TT training. Overall, the course was very well received by the delegates who thought that it would have utility in their everyday teaching in the OR and that it transferred well from the UK Lapco-TT course. Most importantly, delegates felt that the course met their objectives and that they would recommend it to colleagues.

SAGES-HOC in "all things hernia"

Thirty-two registered learners attended the SAGES-HOC entitled "All Things Hernia." Group A consisted of 10 learners taught by 5 SAGES-Lapco-TT delegates (the sixth delegate served as the HOC Course Director). Group B consisted of 22 delegates taught by the remaining 10 course faculty instructors who had not undergone SAGES-Lapco-TT training. Table 2 summarizes the comparison of learners' responses to the SAGES-HOC effectiveness between Group A and Group B. Statistically significant higher ratings were demonstrated on every item listed by Group A learners compared to Group B learners. Additionally, when asked to give their course faculty an overall rating, 100% of Group A learners gave their instructors an "honors" rating,

Table 1 SAGES-Lapco-TT delegates' opinion regarding the course

Please give your opinion on the following statements regarding the SAGES-Lapco-TT course	Range	Mean
It was useful	5	5
It will influence the way that I teach in the OR	4–5	4.8
I will use set, dialogue and closure in my teaching	4–5	4.7
I will use the SIXSTEPS* in my teaching	4–5	4.7
There was an issue with language given that the course originated from the UK	1–2	1.2
Cultural differences between the US and the UK influenced the relevance of some of the course material	1–3	1.8
The course was transferrable to the US without problem	4–5	4.5
The course facilities were excellent	4–5	4.2
My course objectives were met	4–5	4.8
The course structure was excellent	4–5	4.8
The quality of the faculty was excellent	5	5
The course had high educational value	4–5	4.7
I would strongly recommend the course to my colleagues	4–5	4.8
The course was relevant to teaching in my specialty	4–5	4.7

(Scale 1 strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree)

SIXSTEPS*: a Lapco-TT teaching structure

Table 2 Post course opinion from the two groups of delegates: Group A had the trainers who had attended the SAGES-Lapco-TT course and Group B who had the standard SAGES faculty

Item	Group A	Group B	p
To what extent are you confident in your ability to adopt the procedures taught today in clinical practice	4.83	3.89	0.021
I understood clearly what I was expected to do	5	4	0.046
I understood clearly what I was supposed to learn	5	4.15	0.046
The simulator models were relevant to my professional development as a surgeon	5	3.72	0.027
I had sufficient opportunities for practice at the simulators	5	3.63	0.011
The session was organised well	5	4	0.046
Time was used effectively	5	3.9	0.046
I received sufficient feedback about my learning/performance	5	3.9	0.028
Methods used for giving feedback were effective	5	3.95	0.028

whereas only 50% of Group B learners gave an "honors" rating. The remaining Group B ratings of instructors included a 31% "high pass" rate and a 19% a "pass" rate.

Table 3A–C summarize the cSTTAR assessments of course faculty for Groups A and B. Group A course faculty were rated significantly higher by their learners than Group B course faculty in all three sections of the cSTTAR training assessment (Set 4.97 vs. 3.97 $p < 0.0005$, Dialogue 4.92 vs. 4.51 $p < 0.0005$, Closure 4.96 vs. 4.75, $p < 0.01$) (Table 3a). Group A course faculty rated themselves significantly lower than both the expert observers (Set 4.23 vs. 4.98 $p < 0.0005$, Dialogue 3.55 vs. 4.79 $p < 0.0005$ and Closure 3.38 vs. 4.87 $p < 0.0005$) and when compared to the Group B faculty's self-assessment (Set 4.23 vs. 4.50 $p = 0.38$, Dialogue 3.55 vs. 4.60, Closure 3.38 vs. 4.38 $p < 0.002$) (Table 3b, 3c).

Discussion

To our knowledge, this manuscript describes the first example of any Surgical Society, inside or outside of the US, training its HOC faculty in a standardized teaching technique prior to serving as instructors for a HOC. Training trainers to improve teaching effectiveness as a concept is not new, and it has been shown to have been put to good effect in the UK for training faculty to teach laparoscopic colectomy and colonoscopy [8, 9]. Ordinarily, the Lapco-TT course runs over 2 days, with the second day involving hands-on practice in the operating room with observed teaching sessions in the technique. The Lapco-TT curriculum appeared to be adaptable to a one-day course, given that the SAGES-HOC the next day could serve as the hands-on practice with observed teaching. With this altered structure, however, the SAGES-Lapco-TT delegates did not have the opportunity to observe each other teach, nor practice giving feedback, important components of the second day of the Lapco-TT course. This fact, perhaps, is reflected in the way these delegates assessed themselves as SAGES-HOC faculty, since they significantly under-rated their own performance compared to how the observing experts scored them. Had they received more feedback and observed the other delegates that they might have been able to rate themselves better as they would have had more insight and a context to which to compare their own performance. Alternatively, it may have just been that the delegates had developed a greater awareness (i.e., insight) related to their teaching style and ability. As a result, they were more acutely aware of situations in which they were not effective in teaching (i.e., being consciously incompetent), and, hence, rated themselves more severely. In contrast, the course faculty who had

Table 3 Comparison of the average scores for the trainers teaching in the three sections of the cSTTAR

	Group A trainers (mean score)	S.D.	Group B trainers (mean score)	S.D.	Independent *t* test (2 tailed, equal variances assumed)
(A) Course delegates' opinion[a]					
Set	4.97	0.24	3.97	1.45	F 203, df 215, p < 0.0005
Dialogue	4.92	0.31	4.51	1.18	F 70.6, df 406, p < 0.0005
Closure	4.96	0.35	4.75	0.64	F 26.9, df 227, p < 0.011
	Group A trainers (mean score)	S.D	Group B trainers (mean score)	S.D	Independent *t* test (2 tailed, equal variances assumed)
(B) Trainers own opinion[b]					
Set	4.23	1.36	4.50	1.04	F 5.19, df 59, p = 0.38
Dialogue	3.55	1.49	4.60	1.07	F 48.01, df 170, p < 0.0005
Closure	3.38	1.51	4.38	1.39	F 4.43, df 85, p < 0.002
	Group A trainers (self) (mean score)	S.D	Observers (mean score)	S.D	Independent *t* test (2 tailed, equal variances assumed)
(C) Trained observer assessors[c]					
Set	4.23	1.36	4.98	0.13	F 152.1, df 91, $p < 0.0005$
Dialogue	3.55	1.49	4.79	0.17	F 214.5, df 468, $p < 0.0005$
Closure	3.38	1.51	4.87	0.67	F 82.1, df 93, $p < 0.0005$

[a]as per the course delegates' opinion. Group A trainers were rated significantly higher in all areas of teaching compared with Group B

[b]as per the trainers own opinion (i.e., self-assessment). Group B trainers rated themselves significantly higher in both the dialogue and closure sections than those trainers from Group A

[c]as per the trained observer assessors (Lapco-TT faculty). Group A trainers significantly under-rated their performance

not undergone Lapco-TT training were unaware of their teaching styles and abilities and, thus, did not recognize instances of ineffectiveness (i.e., they were unconsciously incompetent), rating themselves higher overall. Nevertheless, the SAGES-Lapco-TT delegates felt that their participation in the SAGES-Lapco-TT course was highly valuable, in terms of its educational value, structure, and faculty. They also confirmed that they would adapt their teaching style and that their learning objectives had been met. Most importantly, the delegates found such value in the SAGES-Lapco-TT course that they would recommend it to their colleagues. Furthermore, review of the results from the SAGES-HOC post session questionnaire showed that the Group A learners, when compared to Group B learners, felt that the feedback given during the SAGES-HOC session was not only sufficient, but more effective.

A further important result from the SAGES-HOC post session questionnaire was that relating to how confident the learners felt to adopt the procedures they had been taught in the course. The Group A learners felt significantly more confident than those in Group B. This finding is important since one of the most difficult issues is procedure uptake after attending a course, with many participants not having the confidence to adopt the procedure into their clinical practice [10].

The Group A course faculty were rated significantly higher than the Group B course faculty in all aspects of the training assessment. Given that the main difference between course faculty within Group A and within Group B consisted of participation in the SAGES-Lapco-TT course, this finding suggests that the materials learnt in the course enabled them to alter their teaching style, helping make them more effective and efficient teachers.

Limitations of this study do exist. First, the comparisons include the small sample sizes, introducing potential bias, and limiting power. Additionally, a degree of selection bias occurred in which the course faculty, who were chosen by the Course Chair to participate in the Lapco-TT, were potentially more inclined and interested in teaching and instruction than those who declined. In addition, course participants were capped at 2 per station for Group A and at 4 for Group B. Finally, due to a limited number of observers, the course faculty in Group B could not be evaluated by observers using the cSTTAR. It would have been helpful for these instructors to have been assessed by observers to determine if the teaching shortfalls perceived by the delegates were real.

Future projects include following up with learners who took the SAGES-HOC course in "All Things Hernia" to see if they have actually adopted techniques taught in the course within their clinical practice and comparing such adoption between the two learner groups. In addition, enrollment in such HOC courses will be followed to see if the standardized teaching has an impact on the popularity of such courses.

The SAGES-Lapco-TT course can be delivered effectively over one day, with the delegates' application of the new teaching techniques learnt appearing to have a positive impact on the educational experience of learners at a SAGES-HOC. This Lapco-TT training could help establish a standardized method of teaching for SAGES-HOCs and thereby increase their value for learners.

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Compliance with ethical standards

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