A training culture in surgery

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The coincidence of the Calman reforms on the training of junior doctors with the reduction in their hours means that the quality and quantity of training must be improved. "Train the trainer" courses are one obvious way of enhancing consultants' teaching skills. An improved capacity to train does not, however, always lead to changed practices. Trained consultants have more confidence about training, but colleagues lacking this preparation may be sceptical of, feel threatened by, or become resistant to new ideas or practices. So trained consultants may keep newly acquired skills to themselves or even revert to former attitudes and practices.

Junior doctors value on the job training very highly. Yet research has shown that their experience of training is often bleak, and the relation between training and service delivery is seen as unsatisfactory.¹ By contrast, in the cardiothoracic surgical unit at Papworth Hospital there is a training culture, in which consultants actively coach juniors through on the job training. This culture is now well established, is resistant to change, and will probably endure. The lesson may be that improving training is as much a matter of changing culture as of training individuals to be better teachers.

Cultures: origins, maintenance, and change

Culture is usually defined in anthropological terms as the values, knowledge, customs, practices, and language of a group of people. As medical students doctors are socialised by this shared professional culture, into which are inserted specific cultural elements relating to particular specialties and to the idiosyncrasies of a department or hospital.

The origins of a culture and its members' associated social identities are usually obscure, but once acquired they are taken for granted and not easily changed. A culture defines reality for members and provides ways of thinking and behaving—the recipe solutions to routine problems. A strong culture may be reproduced over generations.

Although typically a peripheral feature of doctors' professional culture, the training aspect is not a detachable appendage: it is rooted in the rest of the culture. To improve training requires a concurrent change and growth in a department's structure and culture. Understanding the dynamics of "a training culture" entails locating training attitudes and practices in the wider culture that feeds them.

The importance of training

Training varies in its importance and salience in hospital cultures. In the Papworth cardiothoracic unit the six consultants insist that training is an inherent part of their work: "Whenever there are opportunities to train, you train." Training is a professional duty which they enjoy. Like consultants everywhere, they experience a tension between the demands of training and those of service, between a commitment to patients and one to trainees. A difficult balance between the two has to be struck, but it is not, in this unit, a matter of fitting training into free spaces afforded by service. The importance

assigned to training has complex roots. For some of the consultants the training they received as juniors has been influential. When in retrospect it is seen as good it is to be imitated. When it is judged, sometimes on a moral basis, to be bad it is to be avoided:

I was lucky in my surgical training at all stages. By chance I happened upon a senior registrar who was at the end of his days and didn't want to come in at night but wanted just to get his consultancy. He showed me the operations and left me to do them. I got lots of hands on operating, which at the time was perfect for me. A friend, who was as talented, on the same training scheme, got the reverse. He came into the job when the senior registrar was starting too. The senior registrar hogged all the interesting cases. That's why I have a drive to improve juniors' training.

[My own training] was completely unsupervised. The philosophy of one of the consultants was that he wasn't interested in teaching, he hadn't been taught himself, and that gradually I would pick it up.

In short, the unit's philosophy involves a rejection of apprenticeship by osmosis, the process by which, during the daily round of service delivery, a junior somehow "picks up" relevant knowledge, skills, and understanding on the principle of "see one, do one, teach one." In its stead the unit adopts apprenticeship by coaching, where the training is active coaching by the consultant—structured, intentional, planned, and monitored.

Three of the six consultants were themselves trained in this unit. The contrast with what they had experienced elsewhere revealed an alternative to osmosis.

[During my training here the Stanford approach to training] was accepted in that the junior would sometimes be the principal operator and the consultant was the assistant. The consultant's attitude was that you were there to be trained and training was as much part of their work as was the patient. It was like a ray of sunshine. And that's still what I try to do.

The juniors—one senior registrar, three registrars, and five senior house officers—rate the training as excellent and, from prior experience and what they hear on the grapevine, among the best anywhere. Of what does it consist?

Hands on experience and on the job training

The training is primarily a matter of on the job training. The frequent opportunity for hands on experience in theatre pleases the juniors. "Because we want to operate," says one, "the training we're interested in is the operating." The juniors are in theatre for part of almost every weekday. The "Stanford approach" underpins this philosophy. From an early stage every junior takes an active operating role; specialist registrars are quickly placed in the role of principal operator for part of the operation, with the consultant acting as assistant—and, of course, supervisor. In the consultants' words:

Fig 1—Senior house officer opening sternum for coronary artery bypass graft; registrar assisting, consultant supervising

We do the operation using *their* hands. They get to do the practical skills and concentrate on bits of the operation without having to worry initially about the wider sphere of what's going on.

They're not asked to do anything they are not capable of. You bring them in slowly. So it's graduated in all sorts of different ways, bearing in mind the patient all the time [fig 1].

Senior house officers soon grasp the philosophy and wholeheartedly support it. The speed with which they are given an active operating role while being taught contrasts with their experience of other centres, where they spent most time on the wards.

We are able to *do* things. It isn't a matter of just watching cases being done. And when we actually do something, we are taught *how* to do it. [Consultants] are very strict in their technique.

There's a high throughput here, a lot of cases. So the registrars aren't having to fight with you for cases, because they do twice as many cases as in other hospitals at their level. So they're more inclined to be generous to us: we're not seen as competition [fig 2].

To offer juniors regular hands on experience from an early stage, in a system providing safe, graduated practice, requires seven important features of active coaching:

Fig 2—Registrar operating; consultant assisting

- A commitment to provision of opportunities for surgical work
- Close supervision of trainees by the coach with appropriate intervention
- The development of mutual confidence by coach and trainee
- The acquisition by trainees of technical mastery through graduated practice
- The monitoring of trainees' progression by consultants
- Regular feedback from trainers
- Constant availability of trainers to support trainees with help and advice.

The cycle of training can begin only when consultants are willing to "give away," in a planned and monitored way, parts of the operation—and this they do, to the juniors' delight. Giving away operative opportunities would be foolhardy unless set within a philosophy and practice of training that requires from the consultant as coach:

- A sound knowledge of a trainee's existing level of skill
- The selection of an operative task that is within the trainee's potential
- A mental model of trainee progression against which each trainee is matched
- Intervention when appropriate not merely in the patient's interest but to demonstrate to the junior what is needed.

In terms of a seven step model of progression in surgical training—an elaboration of the "see one, do one, teach one" thesis (see box)—juniors are moved as rapidly as possible to step 3 in elementary surgery, remaining in steps 1 and 2 for more difficult parts. In any one operation a registrar may be in each of the first four steps for different parts. To get trainees as fast as possible into step 4, the coaches need a clear mental model of the process of progression. By close supervision they monitor trainee progression through the stages, offering operative experience when there is a suitable match between an opportunity provided by the case and the trainee's capability. As juniors display

Seven steps of progression

- Step 1: trainee observes
- Step 2: trainee assists the coach
- Step 3: trainee does under coach's supervision
- Step 4: trainee does with the coach in the vicinity
- Step 5: trainee does on his or her own
- Step 6: trainee perfects it through regular practice
- Step 7: trainee now a teacher and teaches it.

competence, they progress through the steps. The words of a consultant, "I'm going to teach you how to swim just exactly one foot out of your depth," echo those of Sir John Harvey Jones that "the best performance is achieved by the combination of an objective a little further away than one thinks one can achieve combined with a relentless expectation from above that one will achieve it."² This is no baptism of fire: progression is rapid, but gentle and steady. As the registrars report:

It's a gradual progression, but you don't notice the progression. You gradually do more and more, but you almost don't notice the milestones.

Early on I was taken through a few things with the bosses, from the beginning to the end. Gradually they faded into the background and soon I was happily doing the first third and the last third of the

Fig 3—Senior registrar operating, senior house officer assisting, but consultant advising at top end

operation. Over the last months they've faded more and more from the scene. I'm now doing some appropriate cases on my own and I'm very happy with that. But they're always in the hospital, they'll always come and help. It's a question of knowing your own limits, being taught them and then appreciating them.

Giving away operative experience on this scale is painful for consultants. Like all surgeons, they enjoy the surgery: it is hard to be assistant to one doing it less well, but it is a psychological cost of good training (fig 3).

There is a danger that trainee surgeons come to believe that surgery is primarily about technical skills and that the sheer number of operations done is a measure of one's skill. The consultants know that, in a culture which assigns priority to hands on experience, this danger must be avoided. With supervised practice manual dexterity is acquired relatively easily. The difficult part, not easily taught, is the clinical judgment, the decision making before, during, and after surgery. As one consultant says, "The only difference between me and registrars who are good is that I make better decisions than they do. I know when *not* to do something." This is central to learning through on the job training.

Responsibility and trust

On the job training requires consultants not merely to give considerable responsibility to juniors but to train them up to it within a system of close supervision. Outside theatre or during the night the delegation of responsibility to juniors has to be more restricted than in theatre because very close supervision is impossible. Under a pool system juniors work with all six consultants in theatre according to demand and rotate between wards once a month. At ward level extensive responsibility is replaced by a system in which a different type of trust is the key ingredient.

The culture induces in trainees (a) a need to recognise the limits of their knowledge and skill, combined with (b) a thorough grasp of the differences in consultant preferences in the management of patients, and (c) a readiness at all times to seek advice or refer a matter "up the line" without hesitation whenever there is doubt about a clinical decision. Consultants insist that juniors must never be afraid to call them at any time, day or night; juniors report that they are happy to do so. This contrasts with their earlier experience.

In my first house job I was told by the consultant that I wasn't allowed to call him, I was only allowed to call the [senior house officer]. And the SHO was

only allowed to call the registrar. The registrar could call the [senior registrar] and the SR could call the consultant only if the Queen Mother was run over in front of casualty. That was one of the consultants on my first day and he was serious. The consultants here aren't at the end of the bed, but 24 hours a day, seven days a week, they're on call and if there's a problem with a patient, phone them. You wouldn't think twice about it. Four o'clock in the morning, you phone them and they don't mind.

Trainees thus acquire a low threshold of readiness, when uncertain, to check up the line, and consultants in turn must willingly be called out, and then reassure rather than rebuke if the summons proves to be unwarranted. By this means the "ladder system" of responsibility and trust is successfully sustained. For trainees, reduced freedom to make autonomous decisions on patient management is accepted as a fair price for the responsibility they are given in what is central to their identity as surgeons—hands on training in theatre.

Competition and collaboration

Competition to obtain a post in this unit is considerable. Relations among juniors are, however, collaborative rather than competitive. The tempering factor is the use of a pool instead of a firm system, with all the juniors being shared among all the consultants for theatre, and on a rotational basis for wards. This reduces competition among the juniors for access to particular consultants and induces cooperation for ward work, since these duties are now shared.

We're all in the same boat, we *know* we're in the same boat, and so if you shovel the shit on other people you'll very quickly get it shovelled back.

Elements of competition remain, but they are a matter of keeping a sharp eye on what someone of an equivalent status is being allowed to do, as a marker of one's competence and progression. The jealousy, Schadenfreude, and back stabbing that rear their malicious heads in severely competitive relationships are rare.

The consultants explain the absence of negative competition as a product of the unit's emphasis on team spirit. The trainees, from a less rose tinted perspective, realise that it is impossible to engage in the collaboration needed to make the pool system effective if the competition becomes cut throat. Moreover, whereas in many surgical departments only those juniors who are highly proactive and ask for hands on operating experience actually get it, in this unit the consultants give this to trainees whether they ask for it or not, as a matter of policy. Although here as elsewhere proactive juniors probably elicit more training than do the diffident, the senior house officer who reported, "I don't think you have to be pushy: especially in theatre: the consultants will teach willy nilly," reveals the relative absence of competition for opportunities to operate. In consequence, competitiveness becomes a healthy competition against oneself.

Trainee satisfaction and commitment

The juniors are very satisfied with their training and so are highly committed.

This is the best job I've done by a mile, simply because we have protected time in theatre and for the first time, every single day, I'm using my hands and being taught how to cut and how to stitch, which I haven't had in other jobs. I think this job is by far the busiest and the hardest but I've learnt in two months more surgery than I did [elsewhere] in a year and a half.

Juniors work hard but without complaint because of the pay off in the quality and quantity of training. In a

culture specialising in on the job training, service delivery is regarded as a means to getting trained, not an obstacle to it.

Reputation and recruitment

"The people here want to train," said a consultant. "We get the reward of attracting good trainees, so we are encouraged to train them." The thesis is simple: invest in training; high quality trainees at exit give the unit a strong reputation for training; the quality of applicants rises; training becomes easier and service delivery better; the system becomes self-perpetuating. Good training is, after all, a form of succession planning.

One byproduct is the strong sense of institutional pride. Members at all levels of the surgical team want others to excel in all they do—such as producing papers for journals or major conferences—which adds to the collective prestige. This in turn reinforces the need to set and reach high standards and to find the time and energy to do so. From institutional pride springs strong team spirit and high morale, both of which contribute to a readiness to work hard. Strong cohesion in turn fosters internal differentiation and allows debate to thrive—key ingredients of a learning community.

The unit as learning community

It is not uncommon for junior doctors to speak critically about the quality of training but nevertheless to identify one or more consultants who have trained them well. One of the distinctive features of the Papworth unit is that all the trainees speak well about all the trainers. It is becoming a learning community. "In a learning organisation," say Watkins and Marsick, "learning is a continuous, strategically used process—integrated with, and running parallel to, work."³

The four characteristics that justify the description "learning community" are that a department's senior members:

- See themselves as actively engaged in learning as well as teaching
- Make training by coaching a key priority
- Ensure that training is integrated with service delivery
- Are honest about their limitations and seek continuous improvement.

These features evolved over many years. The present consultants respect the influence of their predecessors. In the early 1970s Sir Terence English joined Ben Milstein, 15 years his senior. In the operating theatre they would, in working together on a case, openly debate on

the basis of their distinctive experience and specialisation. Such readiness of consultants to learn from each other, and from mistakes without hiding them, created a non-hierarchical climate of learning in which all, including juniors, could learn without anxiety. A decade later, the present senior consultant, fresh from experience with the Stanford approach to training, complemented and strengthened this culture by giving this non-hierarchical approach to teaching and learning a strong practical expression in the hands on contribution of the juniors in theatre. Milstein, now in retirement, insists on the importance of the way he was trained by Robin Pilcher, who acknowledged the strength of his training under Wilfred Trotter in the 1920s. The roots of this maturing culture go back at least six generations.

Today it is central to the culture that the consultants define themselves, not just their trainees, as learners. The early years as a consultant are seen as a particularly important stage. The trainer as learner is a necessary precondition of effective on the job training as well as the path to expertise. As one of the younger consultants explains:

There will be some procedures I've done less of and still need to consolidate as a consultant, even though a junior may be quite capable of doing them. It is my role to make sure the juniors don't get into any difficulty that I can't get them out of. So I've got to be a master of something before I give it away [fig 4].

This is a key feature of a learning culture, since it underpins the priority consultants assign to coaching—training through service delivery rather than in spite of it. While proud of their reputation for training, the consultants know the danger of complacency: they think of their training as no better than their last trainee.

A training culture is by definition self-critical. Limitations are accepted by consultants rather than denied or conceded defensively. For this reason they accept feedback on training from the senior registrar, who believes he should report to consultants any problems or deficiencies with training, provided he treats it as constructive criticism, not whingeing.

Rectifying weaknesses

The unit has several weaknesses, some of which are accepted by the consultants, who believe more formal or didactic teaching is desirable. The juniors agree that, though training in theatre is outstanding, other aspects of teaching are weaker. Weaknesses could be rectified by:

- Better documentation
- More semiformal teaching
- Richer feedback
- More teaching at ward level.

DOCUMENTATION

The unit relies on oral and informal processes and is reluctant to develop documentation about training. As a result, the department does not have a written training policy, so it is difficult for the consultants to:

- Explain easily and quickly the unit's training policy to newcomers, visitors, and bodies who need to see it—the postgraduate dean, the clinical tutor, the speciality advisory committee
- Disseminate their philosophy and practice to other departments and hospitals that might be interested
- Monitor and review the policy.

In short, poor documentation puts the unit at risk of being parochial and complacent. Most of the juniors believe that training would be improved if there were written plans⁴ and targets which could then be

Fig 4—Consultant operating; registrar assisting

monitored, reviewed, and modified from time to time in a formal discussion of progress with the educational supervisor to whom every junior is assigned.

SEMIFORMAL TEACHING

It is not didactic teaching that the juniors most want; there is limited value in lecture style teaching when the juniors are at very different levels and when information is readily found in books and journals. Rather they want interactive sessions in which consultants talk about their work and cases presented in ways that might be of relevance and interest to them. They want consultant time—say an hour's session from each consultant every six weeks—in which they gain what can probably be learnt in no other way: talking over, exchanging ideas about, and debating around those problems that expose the consultant's clinical judgment and the hard won wisdom of experience. This the consultants are more reluctant to provide than either on the job training or formal sessions.

FEEDBACK

Junior doctors often complain of a lack of direct feedback from consultants, having instead to infer how well they are doing from indirect evidence. The unit's consultants see feedback as important, but they either overestimate the amount they give or underestimate the amount the juniors would like.

Feedback in relation to the hands on experience in theatre is rated by trainees as good. They are told very clearly when they do something wrong or inappropriate, but they are less satisfied by the general feedback on their overall progression.

When you've put a stitch in the wrong place, he'll tell you. What is hard to tell is how I'm doing overall. No one will give you an overall judgement. Am I going to do all right in this specialty? Have I got the potential? Whatever your degree of self confidence is, it's still nice to be told. It's very hard: no one will ever give you a straight answer.

Juniors don't like to embarrass consultants by confronting them with direct questions about their progress. In their turn consultants seem reluctant to give the juniors these overall judgements: after all, they may be mistaken. To juniors, however, vague assurances that all is well are no substitute for frank and clear indications about the quality of performance and career prospects. Good training practice involves two kinds of feedback: that given on specific actions—immediate, informal, and formative; and that given in general to cover weeks or months of work—delayed, formal, and summative. The consultants in the unit are at present much more effective with the first kind than they are with the second.

TEACHING AT WARD LEVEL

The juniors think it desirable to have a teaching ward round, and this would be more natural and easier to do if the juniors were organised into conventional firms in place of the pool.

The pool system has the advantages of flexibility for cover and the deployment of juniors according to need; it contributes to higher productivity in theatre; and it provides each consultant with a mix of levels and skills among assisting juniors. On the other hand, a firm system would provide greater continuity of care of a single patient, which also aids holistic learning by trainees. Yet firms might create narrow loyalties—"my registrar"—and create divisions within the unit.

All seek the advantages of both systems and the disadvantages of neither. The consultants are divided on the advantages and disadvantages of each, so a modified "firm" system is being trialed as a possible way of achieving an acceptable hybrid.

Conclusion

A culture is not just a collection of people with shared ideas; and a training culture is not just a set of consultants who all just happen to think training important. A culture is a way of life; and a training culture is a way of life in which training is part of the fabric of values, beliefs, and practices. Training cultures are like corals—living, slow to form, sensitive to their ecology, intricate, and subtle, but once fractured not easily repaired.

In the light of the Calman reforms and current concerns in hospitals about how to improve the quality of training without reducing service, the most significant aspect of the training culture can be summed up in the simple slogan: "training pays." It shows that good training does not necessarily mean reducing service delivery and taking time from it. On the contrary, training that is properly planned and executed enhances service. That training must be done at the expense of service is the defence many consultants deploy to explain why they cannot improve training. The Papworth way reveals the flaws in the thesis that training requires sacrifices in service. High quality training is a double investment: it increases service delivery, and it provides an above average preparation for future consultants. There are short term costs to such training, but they are outweighed by the medium to long term benefits.

[The consultants] have our greater interest at heart and they seem to enjoy watching us mature, grow, improve, get better, get quicker. They get out of us keen, committed juniors. It's a trade off. They get more skills, more work out of us and in the long run they save time in what they do.—A TRAINEE

I'll be responsible in my lifetime for something like 10 000 operations. I could do 10 000 operations and die: what have I done? If over 20 years I train 10 guys over two years each, they too will do 10 000 operations. Then if you could infuse them with the same ethic of teaching, it cascades like a chain letter.—A CONSULTANT

Developing the teaching skills of individual consultants through training courses does not in itself create a training culture. We need answers to challenging questions, such as:

- Whether such a training culture is replicable in other departments or hospitals
- Whether there are different but equally effective surgical training cultures
- Whether learning cultures can be developed over a much shorter period of time
- In what ways a training culture in a medical specialty is similar to and different from the one described here
- How to make a whole department, not the individual consultant, the unit of change in reforming training.

For the Calman reforms to succeed, teams, departments and whole hospitals must learn how to reinvent their cultures so that training enters their way of life alongside service.

By teaching I mean the imparting of knowledge, and for that we are dependent on our teachers; by training I mean the cultivation of aptitude, and for that we are dependent on our opportunities and ourselves."—WILFRED TROTTER, surgeon, 1932.⁵

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