

Learning culture and feedback: an international study of medical athletes and musicians

Christopher Watling,¹ Erik Driessen,² Cees P M van der Vleuten² & Lorelei Lingard³

OBJECTIVES Feedback should facilitate learning, but within medical education it often fails to deliver on its promise. To better understand why feedback is challenging, we explored the unique perspectives of doctors who had also trained extensively in sport or music, aiming to: (i) distinguish the elements of the response to feedback that are determined by the individual learner from those determined by the learning culture, and (ii) understand how these elements interact in order to make recommendations for improving feedback in medical education.

METHODS Using a constructivist grounded theory approach, we conducted semi-structured interviews with 27 doctors or medical students who had high-level training and competitive or performance experience in sport ($n = 15$) or music ($n = 12$). Data were analysed iteratively using constant comparison. Key themes were identified and their relationships critically examined to derive a conceptual understanding of feedback and its impact.

RESULTS We identified three essential sources of influence on the meaning that feedback assumed:

the individual learner; the characteristics of the feedback, and the learning culture. Individual learner traits, such as motivation and orientation toward feedback, appeared stable across learning contexts. Similarly, certain feedback characteristics, including specificity, credibility and actionability, were valued in sport, music and medicine alike. Learning culture influenced feedback in three ways: (i) by defining expectations for teachers and teacher–learner relationships; (ii) by establishing norms for and expectations of feedback, and (iii) by directing teachers' and learners' attention toward certain dimensions of performance. Learning culture therefore neither creates motivated learners nor defines 'good feedback'; rather, it creates the conditions and opportunities that allow good feedback to occur and learners to respond.

CONCLUSIONS An adequate understanding of feedback requires an integrated approach incorporating both the individual and the learning culture. Our research offers a clear direction for medicine's learning culture: normalise feedback; promote trusting teacher–learner relationships; define clear performance goals, and ensure that the goals of learners and teachers align.

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¹Department of Clinical Neurological Sciences, Schulich School of Medicine and Dentistry, University of Western Ontario, London, ON, Canada

²Department of Educational Development and Research, Faculty of Health, Medicine, and Life Sciences, Maastricht University, Maastricht, the Netherlands

³Department of Medicine, Schulich School of Medicine and Dentistry, University of Western Ontario, London, ON, Canada

Correspondence: Christopher Watling, Office of Postgraduate Medical Education, Medical Sciences Building, Room M103, Schulich School of Medicine and Dentistry, University of Western Ontario, London, Ontario N6A 5C1, Canada. Tel: 00 1 519 661 2019; E-mail: chris.watling@schulich.uwo.ca

 INTRODUCTION

Feedback, although widely espoused as an essential element of effective medical education programmes, is neither straightforward nor risk-free. A 1996 meta-analysis of feedback intervention studies, while demonstrating a modestly beneficial effect of feedback on performance overall, rather alarmingly showed that feedback sometimes had the unintended effect of diminishing performance.¹ Over the last several years, an increasingly nuanced understanding of feedback has emerged.²⁻⁶ It has become clear that for feedback to be an effective facilitator of learning, it must be employed with great care.

This maturing understanding of feedback calls into question medical education's traditional focus on strategies for improving feedback *delivery*; at least as important to effective feedback are the *perceptions* and *responses* of the learner. The effectiveness of feedback has been found to diminish as attention shifts away from the task and toward the self; essentially, feedback that is threatening to self-esteem is less likely to improve performance.¹ This concept has proven helpful in elucidating the tendency of some learners to dismiss or discard feedback they perceive as critical.^{3,4} More recent experimental work has suggested that an individual's regulatory focus – the motivation that guides his or her approach to a task⁷ – determines whether that person's performance is more likely to be improved by positive, reinforcing feedback or by negative, corrective feedback.⁸ Our work in real clinical learning situations has shown that regulatory focus may influence feedback responses, although this by itself may be an inadequate explanation for the variability in these responses.⁹

These explorations of the interpretation and use of feedback are illuminating, but their focus on the individual learner without reference to the learning environment is limiting. We recently explored and compared feedback experiences in three distinct learning cultures – medicine, teacher training and music – and found that each culture created its own context for feedback, which, in turn, strongly influenced how the feedback experience unfolded.⁵ Although the credibility and constructiveness of feedback were valued by learners in all three cultures, the very definitions of credibility and constructiveness were culturally determined.⁵

Feedback therefore appears to be influenced by the characteristics of both the individuals involved and the learning culture within which it is exchanged.

The problem is that we know very little about the interaction between individual and socio-cultural influences on feedback. Such knowledge is vital for improving the impact of feedback in medical education. Toward this goal, we studied a group of individuals uniquely positioned to offer much-needed insights into this interaction: doctors or doctors in training who have also had the experience of training to high levels of performance within other learning cultures. We specifically sampled individuals with high-level experience in sport or music, anticipating that feedback might play a central role in fields in which a coaching model of learning is prominent. As these individuals travelled from one learning culture to another, we wondered which elements of the feedback experience stayed the same and which changed. Our aim was to distinguish those elements of the response to feedback that are determined by the individual from those that are determined by learning culture in order to explore how these interact, and to understand the implications for improving feedback in medical education.

 METHODS

Our chosen method, constructivist grounded theory, offers a rigorous approach to qualitative data that can generate useful, empirically grounded conceptualisations that advance our understanding of some of the most vexing issues in medical education: those that require an appreciation of the *how* and the *why*.¹⁰ Constructivist grounded theory is rooted in an interpretive tradition; its products are interpretations that are created through the interaction and shared experiences of researchers, research participants and data.¹¹ Because the constructivist paradigm views knowledge as created through the interactions among researchers and participants, both vantage points must be accounted for as data are collected and interpreted.^{11,12} We thus provide the following contextual information: the lead author (CW) is a doctor; his collaborators have significant experience in studying medical education, but their own disciplinary backgrounds are non-medical and include education (ED), psychology and psychometrics (CvdV), and rhetoric (LL). Two researchers (CW and LL) have also had significant training in music.

We undertook purposive sampling of doctors or medical students who had also trained to a high level in music or sport. Like medicine, music and sport can be conceptualised as performance-oriented; learners train to be able to effectively deploy

specific skills in distinct settings and contexts. Unlike medicine, however, music and sport use coaching-type models of learning, in which we anticipated that feedback might be more prominent. We used two main strategies to identify potential participants. Firstly, an e-mail invitation was sent to all residents at our medical school, describing the profile of the individuals we were seeking and inviting their participation if they fit that profile. Secondly, we identified medical students, residents and practising doctors from outside our institution by personal knowledge and discussions with colleagues at other institutions. Twenty-five of our participants were identified using one of these two methods; two additional participants were identified and approached after their names were suggested by other interviewees. The study was approved by the research ethics board of the University of Western Ontario.

We conducted a semi-structured interview with each participant, typically 45–60 minutes in duration, guided by open-ended questions designed to elicit elaboration of experiences of learning and receiving feedback within different learning cultures. Interviews were recorded and transcribed verbatim without identifying information. Of the 27 participants, 12 had a background in music and 15 in sport. One musician participant also had substantial dance training and so was interviewed about that experience also. Most of those with a music background had considered careers in the arts at some stage; some had undergraduate or graduate degrees in music, and some continued to perform or record. Among the athletes, a range of sports were represented, including both team and individual sports. All athletes had competed at a high level; three had appeared at world championships and one was an Olympic gold medallist. Twenty participants were residents, three were senior medical students, and four were practising doctors. Two of the residents were in foundational, internship-type training and had not yet declared an area of specialisation. Among the other 18 residents and the four practising doctors, 14 different specialties were represented: 10 participants were in broadly medical specialties, six were in surgical or interventional specialties, and six were in psychiatry. There were 17 participants from Canada (three sites), three participants from the USA, and seven participants from the Netherlands.

Data were analysed using the constant comparative approach customary in grounded theory.¹² By reading and examining the incidents, experiences and perspectives our participants described, we identi-

fied thematic categories. As incident was compared with incident, and experience with experience, the breadth and characteristics of these categories were defined. Particular attention was paid to discrepant examples to ensure that the analysis could account for their occurrence. Consistent with grounded theory principles, the process was iterative, with analysis occurring alongside and informing data collection: themes identified in the examination of initial transcripts were explored in more depth in subsequent interviews using new questions.

Coding, the process of organising data into key conceptual categories or themes, was carried out by the lead author (CW). Initially, four transcripts were examined in depth and key themes in the data were identified. The themes identified in these initial four transcripts were compared repeatedly across transcripts and coding categories were defined to accommodate, organise and categorise the data. A memo was written that identified these preliminary coding categories, and a definition was written for each category in an effort to elaborate the range of data each category would contain. As this initial coding scheme was then applied to subsequent transcripts, the process of re-examining categories and refining definitions was ongoing and iterative. At regular intervals through the analytic process, teleconferences involving the entire research team were held to discuss and modify the evolving coding scheme and the conceptual analysis arising from it. Once the coding scheme was refined, relationships among categories were explored to facilitate the raising of the analytic level from the merely categorical to the conceptual in order to render the data analysis more meaningful. Consistent with our grounded theory approach, we employed theoretical sampling, continuing data collection until thematic saturation was achieved.¹³ Saturation does not mean that no new ideas could have been identified with additional data collection; rather, it implies the collection of *sufficient* data to enable an adequate understanding of the dimensions and properties of our key concepts.¹³

RESULTS

We identified three essential sources of influence on the meaning that feedback assumes in a learning situation: the individual learner; the characteristics of the feedback exchanged, and the learning culture. Whereas individual learner attributes and the characteristics of feedback that is considered valuable appeared to be relatively stable across the

different fields, learning culture was highly variable from one discipline to the next, and appeared to play a substantial role in modulating the use and impact of feedback. We will describe each of these influences in greater depth, illustrating key concepts with representative quotations from participants.

The individual learner

When asked to identify similarities between the experience of learning in medicine and the experience of learning in sport or music, participants often pointed to personal characteristics that were not, in fact, culturally specific, such as a personal orientation toward discipline and hard work that could facilitate effective learning, whatever the context:

‘What I learn in sports is that you have to work hard and you have to really invest to get good results and that’s similar for your [medical] education.’ (Participant 14)

Many participants expressed a sense of their own cognitive traits and learning preferences as remaining intact across disparate disciplines.

Individuals attached their own value to feedback as a facilitator of learning, and expressed preferences for the style of feedback they found motivating or responded to best. Although some participants preferred positive reinforcing feedback and others sought critical feedback, these preferences appeared fairly stable within individuals. As one practising doctor and former competitive rower noted:

‘When it comes to feedback, I’ve always felt that I respond better to very positive constructive feedback. For example, someone saying “Try to do it more like this” instead of “Don’t do it that way”. And, that was true in rowing and probably in medicine as well...’ (Participant 10)

The receipt of feedback was widely perceived as an emotion-laden experience. Participants recognised that, regardless of whether feedback occurred in sport, music or medicine, it could trigger in them an emotional response that could influence the ease with which they could learn from feedback and adopt its lessons. As one musician/practising doctor noted:

‘Although I perfectly understand the need for feedback, I’m too sensitive... When it’s harsh, I take it very personally.’ (Participant 7)

Not surprisingly, the emotional impact of feedback was identified as an issue primarily when feedback was perceived as negative, critical or corrective. Across disciplines, participants recognised the challenge involved in distinguishing criticism of their performance from criticism of themselves as individuals. Commenting on this struggle, one musician/resident noted:

‘Sometimes the feedback when harsh, it is not harsh about the lack of knowledge it’s harsh about the person themselves.’ (Participant 5)

Some felt that their ability to meet this challenge improved modestly with time. One athlete/resident observed:

‘I think it does get easier. But... it never becomes completely devoid of emotion. I won’t burst out crying anymore because I’m told I had a bad game. But it still affects you.’ (Participant 21)

For others, critical feedback remained a consistent emotional struggle, whether in sport, music or medicine.

Feedback characteristics

We identified a number of features that remained remarkably stable across learning cultures and appeared to influence the impact of feedback on learning. Feedback considered good or helpful was specific, timely, actionable and credible. One resident, describing why feedback received in violin training had been so useful, commented:

‘...the feedback is always very, very specific. And it’s not just specific about a particular thing that you did or didn’t do, but it’s right now, *that*, that you did just now. It’s in real time.’ (Participant 1)

When feedback was described as meaningful in medical training, it tended to have similar characteristics. Reflecting on why she recalled the feedback received from one particular supervisor during residency training as so useful, a practising psychiatrist noted:

‘...she just made it very, very specific.’ (Participant 2)

Feedback was also highly valued when learners could appreciate a clear link between feedback and performance improvement. One participant

recalled a critical piece of feedback related to rowing technique that had immediate, palpable benefits:

‘It was so effective, and it made the boat feel so good... And, I remember thinking this is one of the most important technique details I’m ever going to hear, ever. I mean you could feel an instant difference in the whole boat when everyone did it.’ (Participant 10)

A clear line from feedback to better performance was equally valued in medical learning scenarios:

‘When you’ve been doing something for the last 30 cases, and all of a sudden someone pipes up and says, “Well, why don’t you try doing this, it might be better,” and then it works, and you think, oh my goodness, that’s amazing, how did I not know that before? It feels really good when you make a change and it makes a big difference in the outcome.’ (Participant 11)

Across fields of learning, participants were frustrated by feedback that was vague or non-specific, that was not readily actionable, or that failed to resonate with them, either because the rationale was not communicated or because the feedback conflicted with their developing sense of professional identity. Non-specific feedback was a particularly frequent problem in medicine, as this doctor/musician noted:

‘A lot of the feedback people get... is that of course your knowledge is never as good as it can be. It’s a really vague thing... But saying to the musician, “Well, that was pretty good but you could play a little better,” that’s really the equivalent.’ (Participant 24)

Vague, non-specific feedback, although perhaps more endemic in medical training than elsewhere, was not valued in any learning context, as this comment about unhelpful feedback from a piano teacher reveals:

‘I figured she wasn’t actually a very good teacher... She didn’t really offer as much specific feedback on how to make things better or how to improve things.’ (Participant 6)

Similarly, feedback that was not considered actionable was generally devalued regardless of learning culture. One resident, commenting on learning surgical skills, noted:

‘If they tell you [that] you need to improve but they can’t tell you how, then it’s useless information.’ (Participant 11)

This last comment was echoed by a doctor/musician who recalled the frustratingly non-actionable feedback given by an orchestra director:

‘We got a lot of feedback like... “Needs to sound happier, needs to sound sadder”... It gave us what the goal was, in her mind, but maybe not exactly how to get there, other than trial and error until she heard something that she liked.’ (Participant 17)

Learning culture as a modulator of feedback

Although we found striking similarities in the characteristics of feedback valued by learners across divergent learning cultures, we found important differences in how learning cultures either facilitated or constrained the exchange of feedback possessing these valued features. Learning culture appeared to influence feedback in three ways: (i) by defining expectations of teachers and teacher–learner relationships; (ii) by establishing norms for and expectations of feedback, and (iii) by directing teachers’ and learners’ attention toward certain dimensions of performance. Each of these influences is discussed.

Expectations of teachers

Within learning cultures there existed distinct notions about the role of teachers and the quality and quantity of feedback they would be expected to provide. Music teachers and sports coaches were seen as central and indispensable to learners’ development, providing motivation, direction and support for learning. Reflecting on her prior training as a pianist, one doctor noted that her progress was:

‘...based on these masterful people providing very, very continuous input into that process.’ (Participant 2)

Expectations of medical teachers, by contrast, were more modest. Medical teachers more often served as role models, providing examples of desired performance rather than motivation and continuous guidance:

‘...in medicine it’s mostly like they are a kind of role model to you and you are looking at how

they do it and then you like it and try to do it also.’ (Participant 26)

Expecting more seemed unreasonable to some participants:

‘Well, in music, their job is to teach and in medicine, their job is to treat patients and teach and do research and do a bunch of different things... Some days are really good days for teaching and others aren’t. *And that’s fine*. But music teachers are teachers. That’s what they’re paid for, is just to teach.’ (Participant 8)

The comment ‘and that’s fine’ is telling about expectations; learners in medicine seemed to accept the need to lower their expectations of teaching and feedback based on the medical learning culture’s requirement that its teachers play multiple roles simultaneously.

The teacher–learner relationship

Across cultures, meaningful feedback seemed more likely to occur in the context of a strong, trusting relationship between the teacher and learner. One doctor/musician noted:

‘Your music teacher is someone that will know you for at least a somewhat extended period of time. There’s this level of comfort on a social level that occurs... There will always be this undertone of... truly knowing that this person has your best interest at heart and also has been observing you for long enough that whatever he or she is saying has some substance to it and some truth.’ (Participant 24)

The longitudinal relationship with the music teacher facilitated the perception of feedback as not only accurate and well informed, but also firmly well intentioned. Within such trusting relationships, feedback could be more direct, more critical and at times harsher, while remaining influential. Without such relationships, feedback was less likely to be perceived as credible and thus less likely to be accepted and acted upon. One participant, reflecting on the consequences of feedback provided in the absence of a solid relationship, noted that such feedback can be easy to discard:

‘In medicine... you always have feedback of somebody who doesn’t really know you. So... you can give it a rest a bit more because you can

always think “Oh well, they don’t know me” if you disagree.’ (Participant 23)

These examples illustrate a larger point: throughout the data, trusting longitudinal teacher–learner relationships were much more readily identified within music and sport than they were in medicine. Although the importance of relationship was clear across cultures, the opportunities for trusting relationships to occur appear to be sporadic in medicine. In general, relationships with teachers and coaches in music and sport were closer, more personal and more durable than those that routinely occur within medical training. There was an emotional element to some of these relationships that was largely absent from those described in medical settings, as this doctor/musician’s comments reveal:

‘When you’re starting with a music teacher on a prolonged basis it’s a very intimate relationship; they get to know you as [a] human being. They not only help you with your playing but they also kind of see you through all your human foibles.’ (Participant 19)

Lasting, close personal relationships appeared uncommon in medicine, in which supervisors were more often perceived as distant or as ‘almost a stranger, in an emotional sense’ (Participant 24). Participants attributed this difference not to the people involved, but, rather, to medicine’s pedagogical practice of requiring frequent changes of both learning venue and supervisor. Some also felt that the dual role of the teacher as instructor and evaluator was problematic, inhibiting the development of the kind of relationship that seemed to flourish in coached disciplines:

‘In medicine, the instructor, or the teacher, or the preceptor... they may have been on my side, but they were also the person that I had to impress. They were also the evaluator. So, maybe, because of that dual role... you feel like, yes, they probably have your best interests in mind, but there is a certain distance there.’ (Participant 1)

Time was considered a key facilitator of the development of trusting relationships; time allowed teachers to come to know their learners personally, and also to understand their performance, including both its weaknesses and its strengths. Medicine, however, affords a limited amount of time, as this doctor/musician observed:

'If I think about residency, you can often establish a very nice relationship with a preceptor, but it's always limited by time. You have this nice relationship, and it takes a little bit of time to establish the relationship. You enjoy it for a period of time, but then you disappear, and you are replaced by the next resident who comes along, right? It's not as if they're sitting waiting for your call. They have the next person to supervise. I think it's difficult to establish that longer-term relationship.' (Participant 7)

Time alone was insufficient; rather, frequent and sustained teacher observation of learner performance seemed critical. Again, this practice of deliberate observation was fundamental to the teacher–learner relationship in music and sport, but not as common in medical settings:

'In medicine, how many staff have actually observed you doing a procedure? How many times have staff directly observed me taking a history from a patient? Not too many... Your music teacher is standing over your shoulder, listening to what you're doing for an hour every couple of weeks.' (Participant 17)

Expectations of feedback

Most participants recognised feedback as playing a central role in their development in music or sport, but a more marginal role in their medical learning. One doctor/musician stated:

'I feel that feedback has a much smaller role in how medicine is taught. I think, in music, in that culture, feedback is vital... it's so vital that it's not even called feedback.' (Participant 1)

The cultural expectation, in sport or music, of feedback as a routine and essential part of learning was especially prominent around critical feedback. Coached disciplines normalised critical feedback in a way that most participants felt was missing from medical training:

'You expect your coach to criticise everything you do because if they're not, then that means they weren't watching. So there's this free rein to just say, "Well, you didn't do that right, you didn't do that right, you need to do this more." Whereas, I find that [in medicine] ... people are less willing to give a step-by-step critique because it's less expected.' (Participant 11)

Experience in music or sport appeared to reinforce the value of feedback for learning for some individuals, some of whom seemed to carry this belief in the value of feedback into their medical training. A former musician noted:

'It's just that you get used to receiving criticism, that you can then translate it into making you better, because ultimately, in music, when you're criticised, it ultimately makes you a better player.' (Participant 9)

Modulation of emotion

The level of cultural expectations imposed on critical feedback appeared to modulate the emotional impact of that feedback on learners. Although emotional responses to feedback may be thought of representative of an attribute of the individual learner, some participants noted that critical feedback felt different in different contexts. Consider this example from an athlete/resident:

'It was harder for me to get criticism during med school and residency. Sports I didn't mind; maybe I expected them to criticise me, maybe that was the mindset.' (Participant 15)

When criticism was normalised by a culture, it was expected by learners and its emotional impact was sometimes dampened, whereas when it was less expected, its emotional impact might be more acute.

Although a few participants indicated that receiving criticism never became easier, most acknowledged that their own capacity to be productive users of feedback increased with time, particularly in response to time spent in coaching cultures in which criticism was frequent and routine. Participants developed strategies for distinguishing feedback on their performance from criticism of themselves as individuals, dampening their emotional response to difficult feedback and facilitating its uptake:

'It's a result of training... If you had experiences where someone has said, "Nope, you're doing this wrong," yeah, it feels bad and they teach you that a little bit and maybe things get better. And then next time that happens, I think the next time you get that sort of criticism, you're probably going to be able to take a step back and not take it as personally.' (Participant 17)

Cultural concepts of performance

Performance, in general, seemed more limited in scope in sport and in music, and thus performance goals were more readily defined. With well-defined learning goals, feedback was perceived as easier to provide. One doctor with experience as an elite swimmer summarised the difference in how the two fields conceptualised performance, and the resulting impact on feedback:

‘I think in medicine every situation is different from the next situation and every patient is different from the last patient. And in sport it’s always swimming 100 or 200 m, it’s always the same. And so it’s easier to do something with the feedback because the next time it’s more or less the same.’ (Participant 26)

Medical performance was not only multifaceted, but much of it was conceptualised in terms of knowledge, as something the learner *has*, by contrast with the externally visible performance characteristic of sport and music, which represents something the learner *does*. Feedback in medicine was therefore often constructed around ill-defined performance goals; many noted that it was either directed primarily at their knowledge or that it lacked direction entirely:

‘With the clinical side of things... it’s not one single focused endpoint. So I think feedback is always less directed, and people have a lot harder time giving it.’ (Participant 11)

Furthermore, for many participants, having a clear sense that their own goals and those of their teacher were aligned was fundamental to their being receptive to critical feedback. Goal alignment appeared vital across cultures: it was typically almost implicit in sport and music, but was sometimes subject to doubt within medicine. Consider the following remark from a doctor/musician:

‘The common goal of your teacher and yourself is, of course, to just make the best music that you can, which is a really noble thing. It was always for me, really hard to be offended, truly offended by comments in music.’ (Participant 24)

Our data included examples across the various learning cultures of contexts in which goal alignment powerfully impacted the value assigned to feedback, often allowing even harshly critical feedback to be perceived as productive and meaningful

for learning, but whereas such goal alignment was present in virtually all examples from music and sport, its perceived presence was not assured within medicine, which suggests that the problem may be related to culture more than it is to individuals. When the very definition of performance goals was hazy, there appeared to be a greater chance that teachers’ and learners’ goals would be misaligned.

DISCUSSION

Hodkinson *et al.*¹⁴ observed that individuals frequently move between learning cultures. Our study has exploited the research potential of this observation by studying individuals who have done just that by moving across learning contexts such as those of sport, music and medicine. Their experiences of feedback across learning cultures offer useful insights into the interactions between the individual and the socio-cultural dimensions of feedback. Our results contradict notions of learning as being *either* an individual *or* a socio-cultural process. Instead, we offer a new integrated conceptualisation of feedback, in which its success and impact depend on effective interaction between its individual and its cultural influences.

Motivational aspects of learning have been said to travel well from one culture to the next.¹⁵ Indeed, the individuals we studied possessed certain cognitive and motivational traits that are likely to have contributed to their success across learning cultures. We extend this idea beyond individuals to feedback itself by showing that certain fundamental characteristics of feedback – specificity, timeliness, actionability and credibility – also travel well across learning cultures. Our key contribution, however, is in articulating the influence of learning culture on these fundamentals. Learning culture neither creates motivated learners nor defines ‘good feedback’. Rather, it creates the conditions in which good feedback can occur, and opportunities for it to do so and for learners to respond. This integrated view of feedback allows a better understanding of why feedback has remained so challenging in medical education, and offers a way forward.

Implications for medical education

Our data were replete with stories of meaningful feedback that had enabled learning and produced tangible results. Unfortunately, these shining examples were much more frequently drawn from participants’ experiences outside medicine than within it.

We must therefore ask why medical education, despite recognising the importance of feedback, continues to fail to provide consistently meaningful feedback to its learners. The answer may refer to the perspective from which we have approached our efforts to improve feedback. Guidance on optimising feedback has targeted those aspects of feedback that are universal and thus context-free. Most often, the focus has been on the characteristics of the feedback itself, which is not surprising as this part of the equation is most readily controlled by individual teachers.^{16–18} There has been less frequent, but increasing, attention paid to the important contribution of the individual learner's perspective and how that influences his or her uptake and use of feedback.^{19,20} The learning culture has largely been left out of the equation.

We do not suggest that attending to learner receptivity and emotion, or creating sound feedback that is specific, timely, actionable and credible, are unimportant. We do suggest that these activities are insufficient. No matter how well intentioned or well crafted it is, feedback may be doomed to fail if it is not situated within a supportive learning culture. Many have bemoaned medicine's underachievement in supporting effective feedback for its learners and have called for system- and culture-level change.^{21–23} Our research offers clear targets for change within our learning culture that must be hit in order to optimise the impact of feedback. Medical education must normalise feedback, promote trusting teacher–learner relationships, define clear performance goals, and ensure that the goals of learners and teachers align.

Medicine's learning culture has tended to marginalise feedback and, for that matter, the very role of teachers in guiding learning, relying more on providing access for learners to clinical experiences and supplying them with role models to emulate. Medicine must instead normalise feedback as a routine tool for learning. When critical feedback is embedded in the cultural fabric of learning, as it is in sport and music, learners expect it and may accept its lessons more readily. The teacher–learner relationship, although understood to be central in coached disciplines,²⁴ has not typically been allowed to develop and flourish in medicine in a way that might promote more meaningful experiences of feedback. The important elements of a feedback-friendly teacher–learner relationship include not only trust and in-depth knowledge of the learner, but also regular and visible direct observation of learner performance. The problem in medicine is

not a lack of human capacity for meaningful teacher–learner relationships, but, rather, a cultural failure to recognise the importance of such relationships and to create opportunities to nurture them. Encouragingly, there are initiatives within medical education that demonstrate that culture change is possible in this area. Longitudinal integrated clerkships, for example, facilitate the development of durable, trusting teacher–learner relationships and, in turn, the quality and authenticity of feedback offered within those relationships appears to be enhanced.²⁵

Feedback also appears to flourish within learning cultures in which the performance goals of learners are readily defined, and in which the alignment of the learning goals of learners and their teachers is readily achieved. Our results suggest that medicine struggles to clearly define goals for its learners, which is not surprising given the complexity of medical work. One need only look to the various competency-based frameworks guiding medical learning to see how multifaceted are our efforts to describe successful medical performance, which rests on the simultaneous engagement of multiple competencies.^{26,27} Our participants' comments suggest that in medical learning, teachers often settle for the provision of vague commentary on learners' global knowledge rather than undertaking the more challenging task of defining explicit performance goals and providing feedback aligned with these goals. Medicine's almost universal requirement that its supervisors serve as both teachers and assessors of their learners may further complicate the issue of alignment; it may be challenging for learners to feel confident that teachers are 'on their side' when those same teachers are responsible for conducting potentially high-stakes assessments. Medicine should seriously consider decoupling coaching and assessment.

Learning cultures, of course, are not homogeneous. The learning cultures of sport and music do not guarantee that meaningful feedback will be exchanged, any more than the learning culture of medicine dooms feedback to be meaningless. Our data have shown that both effective and ineffective feedback can exist within the learning cultures of sport, music and medicine. Although the cultures of sport and music make it easier for high-quality feedback to occur, teachers and learners must take advantage of the cultural facilitators of feedback for its impact to be realised. Although the medical learning culture tends to create barriers to the exchange of meaningful feedback, the best feedback examples in medicine often reflect occasions on

which teachers, learners or organisations have found ways to adapt the culture to reduce its constraints on feedback.

Some of our study design decisions may have influenced the interpretation and transferability of our results. It is possible that our participants, as high achievers in other fields, differ from typical medical learners in their perspectives on feedback. Feedback is perhaps more explicit in sport and music than it is in medicine, and so our finding that useful feedback is less consistently found in medical training might, in part, reflect the difficulty of recalling feedback offered in the context of clinical work, where it is less likely to be identified as such. We also acknowledge that pockets of effective feedback occur within medical training and may have been under-represented, particularly when held up against the near-constant feedback within the cultures of sport and music training. Although we included medical students, residents and practising doctors in our sample, residents accounted for the majority of our participants, thus providing a particular and perhaps limited perspective. We felt, however, that residents were especially likely to be informative, given that feedback is generally more frequent in training than in practice; we also expected that residents would be closer to their sport or music careers, and thus more readily able to relate and reflect upon specific experiences.

CONCLUSIONS

The value of feedback for learning rests on both individual and socio-cultural influences. We ignore either at our peril. Much good work has already been done with reference to the elements of feedback that are within the control of the individual participants involved. We must now direct our gaze to medicine's learning culture. A learning culture is more than the physical or social setting for learning; it is also about values.¹⁴ If medicine is to re-imagine its learning culture to create conditions that are more favourable for the provision of meaningful feedback, it will need to embrace the routine exchange of high-quality feedback as a core professional value.

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CvdV and LL contributed ideas to the study design, participated in the analytic process through an iterative process of discussion, read all manuscript drafts, and offered suggestions for revisions. All authors approved the final version of the manuscript submitted.

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