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ple are faced with the need to limit their survey size in order to achieve the official support of schools that know their students feel over-studied. Under such pressure there is no room for much more than outcome measures. For similar reasons longitudinal studies are rare, expensive and limited.

In the context of medical school, typical predictors of well-being may not apply, or at least will apply in complex and contextual ways

We agree, therefore, that it is worthwhile to pursue large, high-quality, multicentre, longitudinal studies, but we also believe that it would be unfortunate if more process-oriented measures were to continue to be overlooked. Attending to these will involve discussing with medical schools, and with students themselves, the importance of investigating the more complex dynamics of the formation experience, as well as obtaining snapshots of students' emotional states. In our experience, students are so used to participating in prevalence studies that they balk at longer questionnaires that ask about their social networks or how they see themselves as medical students. It has also been our experience that when we discuss with students and graduates what we see as the paradoxical processes of stress, well-being and identity formation in medical school, we find ourselves touching on a very real experience for many. In this way, a complex systems approach to medical student well-being may provide a platform for starting some important conversations at many levels, with researchers, educators and students.

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Does trainee confidence influence acceptance of feedback?

Donald A Curtis & Patricia O'Sullivan

In this issue of *Medical Education*, Montagne *et al.*[1] ask an important question: 'Are learning needs and learning goals aligned?' That is, following feedback, do trainees and observers agree on action plans for improved performance? The short answer is no, they do not. Although it is considered foundational to professional development, feedback can also result in inconsistent and, at times, unanticipated outcomes.[2–4] Understanding why has been the impetus for considerable research on how feedback operationalises trainee motivation, learning and practice.

In this commentary we review briefly the current findings about feedback. We then introduce the role of confidence and concepts of how that might provide a basis for an intervention to help educators better align learner needs and goals.

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Although it is foundational to professional development, feedback can result in inconsistent and unanticipated outcomes

Whereas investigators have historically focused on when, how and where feedback should be delivered, recent research evaluates issues related to the acceptance of feedback, and investigates whether trainee reflection occurs in response to feedback.[3,4] After all, feedback by itself is merely instruction, and if feedback does not result in reflection and revision of thought or practice, it is an incomplete process and an incomplete learning opportunity. An apparent limitation of the success of feedback is the leap of faith we make when we assume that trainees will reconcile observer feedback into practice. Faculty members believe their feedback message is credible, relevant and something the trainee is emotionally prepared to hear and thus assume that it will result in learning goals congruent with the feedback. As this is often not the case, facilitated reflection is suggested to help learners reconcile feedback, especially when observer feedback is inconsistent with trainee self-perceptions.[3,4] The problem is that even with facilitated feedback, we often don't know if the feedback will be accepted or acted upon.

If feedback does not result in revision of thought or practice, it is an incomplete process

Feedback acceptance is influenced by many factors, including workplace culture, experience, relationships, the perceived quality of the feedback, and confidence.[4,5] Although confidence influences how trainees seek, reflect and respond to feedback,[4,5] we seldom consider trainee confidence in our education programmes. This may be because confidence as a construct is difficult to measure and possibly also because it is considered too personal. Our purpose is to outline the rationale for a simple educational intervention in which trainees self-monitor their confidence, and to indicate how faculty members can use this information diagnostically.[6]

A limitation of the success of feedback is the leap of faith we make when we assume that trainees will reconcile feedback into practice

The belief that individuals have in what they can do on specific tasks with the knowledge and skills they possess is termed 'self-efficacy'; this forms the foundation of social cognitive theory.[7] Self-confidence is an individual's general belief in his or her ability to succeed, is a more global construct than self-efficacy, and is related to, but independent of, cognitive abilities. Confidence is an important quality in a learner because it predicts the effort, perseverance and resilience an individual will engage towards accomplishing a task.[8]

In the clinical setting, it is often difficult to know how confident a trainee is, or how prepared he or she is to receive feedback. As trainee confidence is powerfully supported by experience, it is to the observer's advantage to understand the trainee's experience before offering feedback.[4] When we think that trainees are asking for feedback, they are sometimes actually soliciting reassurance.[4] We also need to realise that some trainees will attempt to increase their confidence by selectively accepting positive feedback and discounting negative feedback,[4] which points to the value of establishing familiarity and dialogue before providing feedback.

When we think that trainees are asking for feedback, they are sometimes actually soliciting reassurance

Although we want trainees to be confident, there is an interesting paradox in the suggestion of confidence. Sometimes trainees are confident and incorrect, and their strongly held incorrect beliefs are often resistant to change[9] and can interfere with student learning.[10] So, although confidence is a favourable characteristic for seeking and responding to corrective feedback, a trainee who is incorrect but confident is often resistant to changing his or her view. Clayton *et al.*[11] identified overconfidence in trainees on surgical procedures in which they had no experience, and highlighted the potential dangers to patient care of such overconfidence. Although the literature on the congruence between self-confidence and competence in health education is mixed,[11] Hecimovich *et al.* [12] developed and validated scales of trainee confidence in patient communication and in clinical skills, and concluded that tracking change in levels of confidence in specific skills over time can be used to identify students who require additional help. We argue that confidence as a construct is important and ideally trainees should be able to self-monitor their levels of confidence so that they are appropriately confident. Unfortunately, the self-monitoring of confidence and the provision of feedback on appropriate levels of confidence is seldom considered in education programmes.

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Although we want trainees to be confident, there is an interesting paradox in the suggestion of confidence

How and when should trainees learn to self-monitor confidence? The goal is for trainees to gain practice in reflecting on confidence during decision-making experiences in which they receive feedback in the form of externally derived data. We feel the ideal time for this is early in training, perhaps in didactic courses that offer opportunities to use assessments as a way to provide external feedback on accuracy (correctness) and self-monitoring (accuracy and confidence).[6,13] We have used scenario questions which ask trainees to indicate the most correct answer and also to indicate their level of confidence in their response. The concordance of confidence with correctness is evaluated by question, student, subject domain and over time. We also identify underconfident and overconfident trainees. We have noticed consistent patterns of response whereby students give more incorrect but confident (misinformed) responses on questions relating to surgery, and fewer misinformed responses on questions of diagnosis. We provide this feedback to trainees in aggregate, individually, and by subject. This tells them and us how calibrated they are with regard to accuracy and confidence, and allows us to tailor feedback to specific student needs.

The provision of feedback on appropriate levels of confidence is seldom considered in education programmes

A secondary value of recording confidence and correctness on assessments is that it affords an ability to distinguish among different learners. Students who are incorrect and not confident represent those who would benefit from early feedback that will increase retention and might improve metacognitive monitoring.[6] Students who are misinformed (incorrect but confident) are qualitatively different from those who are uninformed. For these confident trainees, learning they have given an unanticipated incorrect response may result in their spending additional time on self-monitoring, which has direct testing benefits.[13]

The self-monitoring of one's actions is considered integral to lifelong learning. We ask trainees to self-monitor knowledge and decision-making skills because foundation knowledge and clinical judgement are important. We use assessments to provide feedback to trainees on these constructs. We feel that the monitoring of confidence will have important impacts on receptivity to feedback and the ability to develop meaningful goals.

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