

# Using personalized teaching and learning to improve clinical performance

## ABSTRACT

The intention of personalized teaching and learning to improve clinical performance is the optimization of individual performance across a variety of tasks in different environments. Educational interventions need to have a focus on the assessment and feedback of both outcome and process of performance. An essential component of the assessment and feedback on the process of performance is how 'the will' and 'the skill' are dynamically adapted by the individual through self-regulated learning processes. Microanalysis can identify the key self-regulated learning processes and the findings used to inform self-regulated learning enhanced feedback for personalized teaching and learning. The experience of the authors in using self-regulated learning enhanced feedback for optimizing performance in prescribing by junior doctors is discussed.

Improving clinical performance requires a clear appreciation of the nature of performance, and an essential distinction is between performance as an outcome (what is achieved) and as a process (how it is achieved). Medical educators involved in supporting doctors to improve their clinical performance have high interest in the outcome, since this has an impact on patient care, but also have an increasing interest in the process of clinical performance since performance outcomes are dependent on optimization of the process of performance.

This article presents the authors' personal experience of providing educational interventions for personalized teaching and learning to improve clinical performance. It discusses the theoretical underpinning of this approach and also how the authors have practically applied this theoretical understanding to prescribing by junior doctors.

## Importance of personalized teaching and learning

At the heart of the concept of personalized teaching and learning for improving performance is a heightened awareness that the process used by the learner when faced with the challenge of a performance is unique to the individual and that this process is also dependent on the situation (Hanin and Hanina, 2009). In some situations that individual may have a successful performance but in others his/her performance may be less successful.

The intention of personalized teaching and learning is to ensure that each learner can consistently optimize his/her own distinctive range of motivational beliefs and strategies to perform successfully across a range of different situations (Hanin and Hanina, 2009). The use of the term 'optimize' is important since it recognizes that individual performance, both as an outcome and process, will vary depending on the challenge of the task and the environment, such as when managing a complex patient or when under time constraints.

The process to achieve a performance requires the learner to use a variety of strategies that can be broadly classified as 'the will' and 'the skill'. It is essential to enhance motivational beliefs (the will) and to also choose and use the skill that integrates specific knowledge and behaviours, such as how to conduct a clinical inquiry (Pintrich and Schrauben, 1992). However, for the learner to achieve a successful outcome, it is also

essential to ensure that both the will and the skill are constantly adapted to the demands of both the task and the environment over the timescale of the performance. This requires an overall metacognitive ('thinking about thinking') aspect to be considered for any performance (Hacker et al, 1998).

Improving performance requires educational interventions that not only have an assessment and feedback focus on the will and the skill but also the acquisition of transferable learning skills (thinking about thinking) that can be consistently applied to achieve future performance outcomes.

## Importance of feedback

Personalized teaching and learning to optimize and improve clinical performance is underpinned by an overall educational approach that can be practically considered as comprising a sequence of four main phases:

1. Initial performance
2. Assessment
3. Feedback
4. Revised performance (Irons, 2007).

The essential phases of this approach are assessment and feedback, with assessment having a focus on identifying the performance gap (what is being done compared with what should be done) and feedback on providing information to close the gap (Boud and Molloy, 2013). As highlighted earlier in this article, the assessment and feedback should have an emphasis on both the outcome and process of the clinical performance.

It is important for the learner to be aware of whether he/she has successfully achieved a satisfactory clinical performance outcome or not (de Blacam et al, 2012). An important role for the educator is making an external judgment about the performance outcome of the learner. Usually this judgment is set against a recognized standard but sometimes the educator has to make an expert judgment. The importance of the learner having no illusion about the adequacy of his/her clinical performance is so that the learner can internalize this level of performance outcome and subsequently calibrate his/

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her performance as to whether he/she is achieving, or not achieving, the appropriate performance outcome when he/she engages with a future task. This calibration provides an essential opportunity for the learner to focus his/her learning on the modification of the process required for the achievement of this performance outcome (Stone, 2000). Although asking the learner 'how do you think you performed?' helps the educator to assess the extent to which the learner is accurately calibrating his/her performance is very important, it is still essential that the learner is provided with clear external feedback on his/her level of clinical performance in relation to a standard.

In addition to feedback on the clinical performance outcome, it is also important for the learner to understand the process by which he/she has successfully achieved, or not achieved, the performance outcome so that he/she can make appropriate changes to the process that he/she is using when faced with a similar task in the future. This dynamic modification of the will, the skill and the thinking about thinking components of the process of clinical performance in relation to the appropriate performance outcome also becomes internalized and is key to consistent optimization of future performance across a variety of tasks in different environments.

Underpinning the provision of any feedback are important general educational principles that have become increasingly recognized for the effective acceptance of the feedback message by the learner, including the development of a more reciprocal relationship in which the learner takes personal responsibility for his/her learning, and also for the implementation of change by the learner (Ramani and Krackov, 2012).

### Importance of feedback on self-regulated learning

There is increasing recognition of the limitations of assessment and feedback that has only has a focus on the will and the skill aspects of the process of performance. Research across a wide range of performance contexts, from academic to music and sport to clinical, has consistently highlighted the vital contribution of self-regulated learning as an essential component for the achievement of successful performance outcomes across a variety of tasks in different environments (Sandars and Cleary, 2011; Schunk and Zimmerman, 2011).

## “ The key self-regulated learning processes used by an individual learner during performance can be assessed by the educator with structured questions as the learner performs a task in real time. ”

A simple analogy of the importance of self-regulated learning for successful performance is that of a musician who can play all of the notes correctly to produce a musical sound but the tune is unrecognized since the notes are not coordinated as a recognizable tune. This analogy is likely to clearly resonate with the experience of most educators as they have observed learners across the continuum of clinical performance, from undergraduate to postgraduate to continuing medical education. These learners may have the will and the skill but have ineffective thinking about thinking as the task difficulty increases or the task moves from one context to another.

There are several theoretical and conceptual models of self-regulated learning but all models are based on metacognition (thinking about thinking). The models describe three sequential phases (planning, self-monitoring, adaptive change) that dynamically interact before, during and after any performance (Puustinen and Pulkkinen, 2001). In addition, in each phase of self-regulated learning there are also several key self-regulated learning processes.

The typical model considers that when an individual learner engages with a particular task in a specific environment there is an initial planning phase before performance. In this phase, the learner actively sets him-/herself a specific goal for the successful achievement of the task within the environment. The learner then chooses appropriate strategies, both the will and the skill, to achieve these goals. Once the performance is underway, the learner constantly self-monitors his/her performance to ensure that his/her chosen strategies are achieving his/her goal and its intended effects on the performance. Adaptive changes may be required to fine tune the chosen strategies during performance to ensure that the task is successfully achieved. Adaptive changes may also be considered after the performance, with building of an individual repertoire of effective strategies in response to performance processes across a variety of tasks in different environments.

The key self-regulated learning processes used by an individual learner during performance can be assessed by the educator with structured questions as the learner performs a task in real time. This method of assessment is called self-regulated learning microanalysis and has been applied across several disciplines, from academic to music and sport to clinical, and provides essential information for feedback to the learner (Cleary et al, 2012). This method of identification of key self-regulated learning processes has been applied across several disciplines, from academic to music and sport to clinical, and provides essential information for feedback to the learner. An important and consistent finding from research is that feedback on the extent to which one or more of the key self-regulated learning processes are used, or not used, by a learner during a performance is associated with improved performance (Cleary et al, 2017).

From the authors' experience and discussion with colleagues, most assessments of clinical performance and subsequent feedback focus on the skill (knowledge and behaviour) component but rarely on the will and the essential key self-regulated learning processes associated with clinical performance. This is surprising since a narrative review of previous meta-analyses of the effectiveness of feedback across a variety of disciplines highlighted the importance of providing feedback that included all the components of outcomes, the will and the skill strategies and self-regulated learning (Hattie and Timperley, 2007). Similarly, a systematic review of effective remediation approaches highlights the importance of feedback on self-regulated learning processes for long-term improvement in performance (Cleland et al, 2013).

### Importance of experience

Optimization of performance is enhanced by assessment and feedback of both clinical performance outcome and process in a wide variety of situations in which there are different challenges created by the complexity of both the task and the

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environment (Ericsson et al, 1993). The intention of an educational intervention that provides feedback on self-regulated learning processes is that an individual learner can build an increasingly rich awareness of how his/her own performance can be dynamically modified to consistently optimize his/her future performance across a wide range of different tasks and environments (Butler and Winne, 1995). This has important implications for all educators to ensure that learners have wide clinical exposure, either in simulation or real-life contexts.

#### Personalized teaching and learning for prescribing

This section discusses the authors' personal experience of using personalized teaching and learning for optimizing and improving performance in prescribing by junior doctors (Health Education England, 2017). This approach has been to use self-regulated learning enhanced feedback, with self-regulated learning microanalysis to enhance the usual assessment and feedback approach that has a focus on outcome and also the will and the skill strategies. Greater detail of the approach, with specific illustrative examples of questions to identify the various key self-regulated learning processes and appropriate feedback statements, is beyond the remit of this article but can be readily found in several articles (Durning et al, 2011; Leggett et al, 2017).

Prescribing can be considered as an outcome, which can be assessed as the 'correctness of the prescription', but an in-depth understanding of the process (strategies and self-regulated learning) is essential for providing personalized educational interventions. The process of prescribing is complex and involves the initiation, monitoring, continuation and modification of medication therapy (Kamarudin et al, 2013). Prescribing demands a thorough knowledge and understanding of clinical pharmacology that is integrated with clinical diagnostic decision-making skills, including clinical inquiry and problem solving around stopping or starting medication, prescribing medication when the diagnosis remains ambiguous, and

management dilemmas when the evidence base for a particular medication is lacking or absent. These particular skills are challenging for novices who lack clinical experience, and an essential aspect of personalized teaching and learning for novices is to assess and provide feedback on both their underpinning knowledge and also their clinical diagnostic decision-making skills.

Identifying the self-regulated learning processes (before, during and after performance) used by individuals when prescribing is also essential for educators in making sense of the process of performance so appropriate feedback can be provided. For example, identifying the goal envisaged by the individual before undertaking the prescribing allows educators to judge whether the individual was 'on track' from the outset, or drifted 'off track' at some point in the process. Furthermore, individuals who struggle with prescribing may incorrectly focus on the narrow facet of 'writing of a prescription', whereas individuals who are high performing may be more inclined to correctly integrate the several aspects involved in prescribing into a broader goal, such as choosing the right drug, at the right time, for the right patient.

Prescribing safely in challenging situations requires the ability to manage distractions in the environment during a prescribing task. The authors have noted that high performers, in contrast to low performers, are more likely to self-monitor and focus greater attention on 'being safe' and concentrating on the task at hand despite various distractions.

After a prescribing task, the authors have noted that low performers, in contrast to high performers, may not recall the clinical case or presentation, nor the prescriptions made at the time, after the performance event. In addition, high performers following a prescribing situation are able to identify aspects of their performance to adaptively change next time around, such as the extent of their checking for interactions. Low performers tend to offer simplistic responses for changing their approach next time around depending on their perceptions about the outcome experienced by the patient.

The authors consider that self-regulated learning microanalysis can offer invaluable insights into the process of performance by an individual learner as he/she engages with a defined task within a specific environment, with this assessment information being used to provide self-regulated learning enhanced feedback for optimization of individual clinical performance.

#### Conclusions

Personalized teaching and learning for improving clinical performance requires a focus on both the outcome and process of individual performance across a variety of tasks in different environments. Educational interventions require a focus on how an individual learner dynamically uses a range of strategies (the will and the skill), to consistently optimize his/her performance across a variety of tasks in different environments. This requires assessment and feedback on the use of key self-regulated learning processes by the learner before, during and after performance. The authors recommend the use of self-regulated learning enhanced feedback, which builds on existing approaches that all educators use when giving feedback and further research to measure the impact of this educational intervention on improving clinical performance. **BJHM**

*Conflict of interest: none.*

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**KEY POINTS**

- Personalized teaching and learning optimizes individual clinical performance across a range of tasks and environments.
- Personalized teaching and learning requires an assessment and feedback focus on both the outcome and process of clinical performance.
- Essential assessment and feedback on the process of performance includes both the use of strategies ('the will' and 'the skill') and the self-regulated learning processes.
- The use of microanalysis of key self-regulated learning processes can inform the provision of self-regulated learning feedback.

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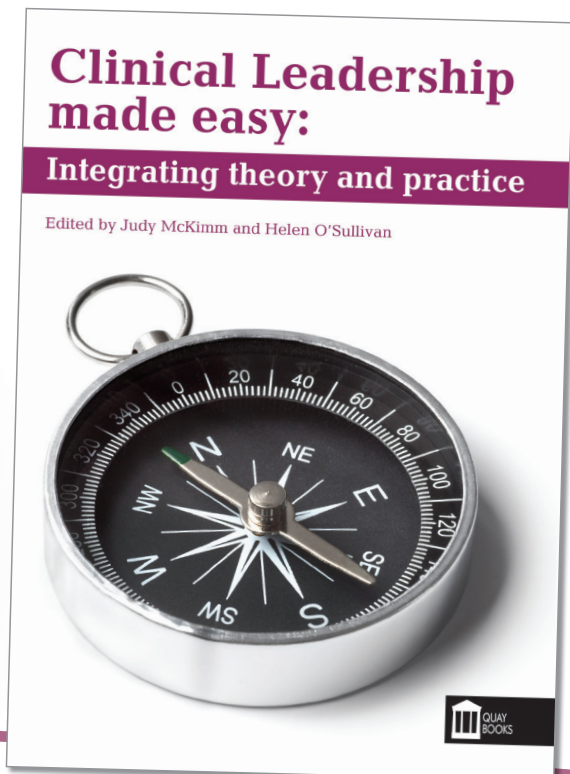
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