Medical Teacher

ISSN: 0142-159X (Print) 1466-187X (Online) Journal homepage: www.tandfonline.com/journals/imte20

Twelve tips on how to provide self-regulated learning (SRL) enhanced feedback on clinical performance

Heather Leggett, John Sandars & Trudie Roberts

To cite this article: Heather Leggett, John Sandars & Trudie Roberts (2019) Twelve tips on how to provide self-regulated learning (SRL) enhanced feedback on clinical performance, Medical Teacher, 41:2, 147-151, DOI: 10.1080/0142159X.2017.1407868

To link to this article: https://doi.org/10.1080/0142159X.2017.1407868

Published online: 11 Dec 2017.

MEDICAL TEACHER
2019, VOL. 41, NO. 2, 147–151
https://doi.org/10.1080/0142159X.2017.1407868

MEDICAL TEACHER
Taylor & Francis
Taylor & Francis Group

TWELVE TIPS

Twelve tips on how to provide self-regulated learning (SRL) enhanced feedback on clinical performance

Heather Leggett[a], John Sandars[b] and Trudie Roberts[a]

[a]Medical Education Unit, University of Leeds, Leeds, UK; [b]Postgraduate Medical Institute, Edge Hill University, Ormskirk, UK

ABSTRACT

The provision of self-regulated learning (SRL) enhanced feedback on performing clinical skills and making a clinical diagnosis recognizes the importance of feedback on the use of key SRL processes. In contrast to the broader concept of self-directed learning, SRL has a specific focus on the individual learner's approach to achieve a task, including their planning, self-monitoring, and future adaptations. The key SRL processes can be identified using structured microanalysis during the clinical task and feedback to the learner using the tips outlined in this article. It is essential that SRL enhanced feedback is integrated with best practice on providing feedback to ensure that its potential is achieved.

Introduction

Feedback is an essential aspect of medical education. By providing information to learners regarding their current performance and how it can be improved, feedback provides an opportunity for learners to progress (Ende 1983). Despite the importance of feedback, there is great variability in its effectiveness and a review of feedback across a variety of disciplines has highlighted that four components are essential: self, task, process, and self-regulated learning (Hattie and Timperley 2007). Feedback on the "self" considers the importance of providing "positive" feedback to maintain motivation. Feedback on the "task" has a focus on the extent to which a task was adequately performed, and feedback on "process" considers what knowledge or skills were used, or not used, to achieve the task. Feedback on self-regulated learning (SRL) appears to be an integral component for effective feedback and considers the self-regulation approach used by the learner as they perform the task.

There are similarities between self-directed learning (SDL) and SRL, with both having a focus on developing independent learners, but SDL is a broader concept that highlights the importance of freedom of choice compared with SRL's focus on the individual learner's approach to achieving a task (Loyens et al. 2008). There is increasing interest in the use of SRL in medical education (Sandars and Cleary 2011), including its importance across a range of clinical performance situations, such as clinical skills (Cleary and Sandars 2011; Andersen et al. 2017) and making a clinical diagnosis (Artino et al. 2014; Patel et al. 2015). However, our personal experience is that feedback on the essential SRL component is rarely given or discussed in the numerous practical guides on how to provide feedback on clinical performance.

In this 12 Tips article, we provide practical advice that is based on our experience of how to provide feedback that is enhanced with SRL components within the context of clinical skills and making a clinical diagnosis. Since the intention of SRL enhanced feedback is to build on the existing approaches that are used by medical educators, it is important that current best practice in providing feedback is also followed, such as that described by Ramani and Krackov (2012) and is kept in mind while reading these tips. An essential aspect is to ensure that feedback is given within a challenging, yet supportive relationship, between the learner and the educator (Telio et al. 2015).

Tip 1

Understand the importance of SRL for feedback

SRL is a three-phase cyclical process during which individuals proactively plan, self-monitor, and adapt their actions to ensure that their chosen goals are met (Zimmerman 2000). There is a forethought phase before any efforts to perform, which involves goal setting, planning a specific strategy with a range of techniques to achieve the goal, and the mobilization of self-efficacy beliefs. This is followed by a performance phase in which the learner self-monitors the extent to which the goal is being achieved by their chosen strategy. During the third phase of self-evaluation, changes are made to the chosen strategy to ensure that the goal is achieved; also self-efficacy beliefs may need to be reinforced and attribution beliefs be challenged (Zimmerman 2000). High performers in clinical skills and diagnostic decision making make greater use of a SRL approach, whereas low performers are less likely to employ a SRL approach (Cleary and Sandars 2011; Artino et al. 2014). Importantly, learners can be trained to improve their SRL, and this has been shown to lead to improvement in their performance (Sitzmann and Ely 2011). Consequently, feedback on a learners' SRL, which helps them to become more self-regulated, is a valuable tool for educators wanting to provide more meaningful and individualized feedback (Durning et al. 2011).

Tip 2

Use microanalysis to assess SRL

Providing SRL enhanced feedback requires the identification of the SRL approach being used by the learner.

CONTACT Heather Leggett h.leggett@leeds.ac.uk Medical Education Unit, University of Leeds, Leeds, UK

Research which has used SRL to assess and improve performance has successfully utilized a microanalytic framework to distinguish between high and low performers (Cleary et al. 2012). Microanalysis adapts the use of "think-aloud protocols" and real-time observation to assess learner's SRL approach during or immediately after a specific task, with targeted questions related to the forethought, performance, and self-evaluation phases. This is advantageous, since it can assess thought processes and actions taken while the event is still underway rather than after the event. Consequently, more specific and detailed feedback can be given to the learner based on their responses.

The questions should be structured to elicit the key SRL components within each phase of the SRL cycle. These components will be discussed in Tips 3–9. Examples of microanalytic questions and their timing to inform feedback are outlined in Tip 10.

Tip 3

Give feedback on self-efficacy and confidence

Self-efficacy is the extent to which an individual feels confident about whether they can achieve a task (Zimmerman 2000) but also how receptive and responsive they are to feedback (Dweck and Leggett 1988). For example, an under-confident learner is less likely to believe in their ability to improve, whereas an over-confident learner is less likely to recognize when they have underperformed and not attribute this to their own skills (Hadwin and Webster 2013). Understanding and correctly identifying and conveying student's self-efficacy and confidence back to them will facilitate students in creating their own accurate self-evaluation of their own performance. Identification of the learner's beliefs about their self-efficacy can help the educator to focus their feedback to ensure that under-confident or over-confident learners begin to appreciate that their performance is related to their own skills and not attribute their performance to luck or other factors outside of their control. The importance of attribution beliefs is further discussed in Tip 8.

Tip 4

Give feedback on goal setting

The goals that the learner sets are fundamental to the performance of a task, whether a clinical skill or making a clinical diagnosis. Learners who set clear and specific goals before performing a task which are focused on the steps, procedures, or strategies required to complete the task have higher levels of performance, and can learn more effectively from past performances (Cleary and Zimmerman 2001; Cleary and Sandars 2011). In contrast, those who do not set clear and specific goals are more likely to focus only on the end outcome of the task. For example, the goals of a good self-regulated learner preparing to take blood from a patient would be to "go through the procedure in my head, step by step, before I actually do it … try to have a plan of action in my mind", whereas a poor self-regulated learner's goal will simply be to take blood (Cleary and Sandars 2011, p. e371). Feedback should have a focus on how clear and specific the learner's goal setting is and encourage them to set appropriately challenging, relevant, process focused, and specific goals.

Tip 5

Give feedback on strategic planning

High performing learners engage in strategic planning before they begin a task, with a range of clearly defined specific techniques that they believe will lead to successful achievement of the goal set in response to the task (Cleary and Zimmerman 2001; Sandars and Cleary 2011). Thinking in terms of specific strategies or techniques, such as the detailed procedure of taking a blood sample, auscultation of the heart or taking a cardiac history, will help learners to monitor and regulate their progression through the task and make adaptive changes to keep on track or to improve in future tasks. Feedback should encourage learners to "think strategically", with a clear and specific strategy or technique that is set before, self-monitored during, and reflected upon after clinical performance.

Tip 6

Give feedback on self-monitoring

High performing learners are more likely to actively adapt or change their chosen strategy or technique throughout the task by using self-monitoring to increase their awareness of their progress towards achieving their intended goals (Sandars and Cleary 2011). Without developing self-monitoring, the learner cannot dynamically change their performance to the demands of a task that is evolving, such as when there is an unexpected and unusual physical sign or response to a clinical enquiry question. Interestingly, structured reflection *during* the making of clinical diagnoses appears to improve learners' diagnostic competence by fostering the restructuring of their existing medical knowledge about the diagnosis and associated diseases (Mamede et al. 2012). SRL enhanced feedback should focus on assessing the learner's self-monitoring and provide them with feedback to ensure that this essential component of SRL is utilized during their performance.

Tip 7

Give feedback on self-evaluation

Self-evaluation with reflection on performance assists the learner in creating their own internal SRL feedback so that they can begin to calibrate and adjust their performance to the varying demands of a task (Butler and Winne 1995; Hattie and Timperley 2007). Furthermore, learner self-reflection prior to feedback may improve how well the feedback is received (Pelgrim et al. 2013), and reflection after feedback may also influence later use of that feedback (Sargeant et al. 2009). Feedback should incorporate a focus on encouraging the learner to self-evaluate and reflect on their performance after the task, both before and after they have been given feedback. This could include allocating time for reflection, using a reflective log or asking the learner direct questions about their reflection and asking

Table 1. Example of SRL feedback on making a diagnosis.

Key SRL process	Timing of SRL assessment questions	SRL assessment questions	Focus of SRL feedback	Illustrative examples of SRL feedback to an under-performing student making a clinical diagnosis of chest pain
Self-efficacy	Before/at the beginning of the task	How confident on a scale of 1–10 do you feel in your ability to make a successful diagnostic decision on your first attempt? (10 is most confident)	Identification of the learner's pre-task self-efficacy beliefs are required for SRL feedback after the post-task self-efficacy beliefs have been identified	Only provided after the post-task self-efficacy beliefs have been identified
Goal setting	Before/at the beginning of the task	Do you have any goals in mind to help you diagnose this patient?	Learner should be encouraged to set specific detailed goals since it helps them to have more of a focus during the task	"Your goal of 'to reach a diagnosis' was too broad for the nature of the patients complaint of chest pain. Your goals should be more specific, detailed and focused on what you need to achieve in order to reach a diagnosis"
Strategic planning	Before/at the beginning of the task	What do you think you need to do to successfully diagnose this patient?	Learner should be encouraged to set a specific strategy, with a range of techniques, to be used to achieve their goal	"Your stated strategy 'to ask questions to arrive at a diagnosis' was not as specific as it could have been. A specific strategy, structured around what type of questions you wanted to ask and why, may have made it easier to obtain an appropriate history to make a differential diagnosis of chest pain"
Self-monitoring	During the task	What have you been thinking of whilst going through this task?	Learner should be encouraged to make a conscious effort to self-monitor their progress towards their goal	"You did not seem to be aware of how your chosen strategy of asking questions about gastro-esophageal reflux was effective or not during the consultation. The patient described additional symptoms which did not fit a potential diagnosis of gastro-oesophageal reflux"
Self-evaluation	After the task	What do you use or focus on to determine whether or not you made an accurate diagnostic decision?	Learners should be encouraged to use outcomes, such as a goals and a specific strategy to evaluate their performance	"You considered that you made an accurate differential diagnosis because it 'fitted with the answers to the questions' but you were not aware of which questions you were asking had a specific goal of identifying each important differential diagnosis"
Attribution beliefs	After the task	What do you think stopped/facilitated you achieving a successful diagnostic decision today?	Learner should be encouraged to make attribution beliefs which link to their own efforts and abilities	"When asked why you thought you got the diagnosis wrong you said it was because it was a hard diagnosis to make. Whilst this was not an easy case you need to think about how you could have asked questions differently"
Adaptive changes	After the task	What do you need to do next time to make a successful diagnosis with a similar patient?	Learner should be encouraged to make adaptive inferences which focus on changing their choice of strategy or techniques	"What questions would you ask, and why, if you had to take a history for making a clinical diagnosis of chest pain in the future?"
Self-efficacy	After the task	How confident on a scale of 1–10 do you feel in your ability to make a successful diagnostic decision in similar cases in the future? (10 is most confident)	Use the self-efficacy scores from the beginning and end of the task to assess whether the learner is over or under confident. For over confident learners direct their attention to why they were over confident and how their approach to the task lead to poor performance. For under confident learners make explicit the link between their approach to the task and positive outcomes	"Your self-rating of your confidence was low both before and after making the diagnosis. However, you asked specific questions to identify some of the main differential diagnoses. If you ask a wider range of specific questions for all of the main differential diagnoses you should successfully make a diagnosis in the future"

them to create an action plan based on their reflection and feedback.

Tip 8

Give feedback on attribution beliefs

Attribution beliefs are the learners' specific beliefs about the causes of their performance, with high performers being more likely to consider that the cause of their performance is controlled by themselves and low performers being more likely to consider that their performance is influenced by factors outside of their control (Graham and Weiner 1996). Such attributions are adaptive since they enhance learner's self-efficacy beliefs to improve their performance (Bandura 1997), and will also re-direct learner's attention back onto focusing on the strategic planning required to complete the task (see Tip 5); an effective focus on strategic planning is key to successful task performance (Cleary et al. 2006). Feedback should facilitate learners to recognize their mistakes and attribute them to a strategy they can modify for future learning and performance, instead of blaming factors outside of their control that they cannot modify, such as "the wrong type of patient" (Sandars and Cleary 2011).

Tip 9

Give feedback on adaptive changes

Adaptive changes to the chosen strategy or techniques improve the learner's performance and are dependent on having strategic attribution beliefs (Kitsantas and Zimmerman 2002). These individuals are more likely to recognize the need for adaptive changes to the strategy employed during or after the task. Learners who make strategic attributions are more likely to make strategic adaptive changes and to modify their strategy in future tasks (Cleary et al. 2006; Sandars and Cleary 2011). Ultimately, these learners are more likely to be able to adjust their approach during real time tasks in order to improve their performance. Feedback should encourage learners to make adaptive changes to their chosen strategy after poor performance.

Tip 10

Provide SRL feedback as a coherent whole

Tips 3–9 highlight feedback around the important components of the SRL process. The components are interdependent and an essential skill for the educator is the integration into a coherent whole. Table 1 illustrates how SRL enhanced feedback on making a diagnosis can be provided and aligned with key SRL processes using the timing of relevant focused questions. It is important to note that the microanalytic questions do need to be tailored to the specific task at hand.

Tip 11

Overcoming educators' learning curve

Initially, educators may find that providing SRL enhanced feedback is time consuming but we have found that educators can begin to quickly adapt the SRL questions to their usual feedback approach through repeated practice. One dilemma educators may face is the identification of the learner's self-efficacy, goal setting, planning, and self-monitoring before and during a real-life encounter with a patient in a clinical setting. It is not always appropriate to interrupt a clinical task when a patient is present in order to ask the learner a question. Our experience suggests that this can be overcome by the learner writing down the answers to the pre-performance questions before the clinical encounter or by the educator asking the questions immediately after the encounter.

Tip 12

Always give your usual feedback

It is essential that feedback on SRL is provided within current "best practice" and with feedback on the self, task, and process components which are required for effective feedback. This integrated approach to feedback is the key feature of SRL enhanced feedback. Feedback given to a learner should be nonjudgmental towards that learner as an individual (not influenced by personal feelings toward the learner), reinforce positive actions, guide future practice by identifying areas for improvement (Gigante et al. 2011), and be negotiated between the educator and the learner (Telio et al. 2015). The previous 12 Tips articles by Ramani and Krackov (2012) and van der Leeuw and Slootweg (2013) offer useful advice in providing "best practice" feedback. In the context of feedback on clinical skills or making a clinical diagnosis, specific information on technique, such as correct placement of the needle for taking blood or stethoscope on the chest for auscultation of the heart, or factual information, such as the multiple causes of shortness of breath, is likely to be required also.

Conclusions

The provision of SRL enhanced feedback requires identification of the key SRL processes but this needs to be integrated with best practice for giving feedback. We consider that SRL enhanced feedback offers an essential opportunity to improve the effectiveness of feedback on clinical skills and making a clinical diagnosis. In addition, SRL enhanced feedback can develop the essential SRL skills required for self-directed and life-long learning.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

Notes on contributors

Heather Leggett, Msc, PhD, is a research fellow at the University of Leeds. Her interests are in the use of self-regulated learning to identify and improve performance.

John Sandars, MSc, MD, MRCP, MRCGP, FAcadMEd, is a Professor of Medical Education in the Postgraduate Medical Institute at Edge Hill University and has a research and development interest in enhancing professional performance, especially with the use of self-regulated learning.

Trudie Roberts, BSc (Hons) MBChB, PhD, FRCP, FHEA, is a Professor of Medical Education and Director at Leeds Institute of Medical Education, University of Leeds, UK.

ORCID

Heather Leggett http://orcid.org/0000-0001-8708-9842
John Sandars http://orcid.org/0000-0003-3930-387X

References

Andersen SA, Konge L, Mikkelsen PT, Cayé-Thomasen P, Sørensen MS. 2017. Mapping the plateau of novices in virtual reality simulation training of mastoidectomy. Laryngoscope. 127:907–914.

Artino AR, Cleary TJ, Dong T, Hemmer PA, Durning SJ. 2014. Exploring clinical reasoning in novices: a self-regulated learning microanalytic assessment approach. Med Educ. 48:280–291.

Bandura A. 1997. Self-efficacy: the exercise of control. New York: Freeman.

Butler DL, Winne PH. 1995. Feedback and self-regulated learning: a theoretical synthesis. Rev Educ Res. 65:245–281.

Cleary TJ, Callan GL, Zimmerman BJ. 2012. Assessing self-regulation as a cyclical, context-specific phenomenon: overview and analysis of SRL microanalytic protocols. Educ Res Int. 2012:1–19.

Cleary TJ, Sandars J. 2011. Assessing self-regulatory processes during clinical skill performance: a pilot study. Med Teach. 33:e368–e374.

Cleary TJ, Zimmerman BJ. 2001. Self-regulation differences during athletic practice by experts, non-experts, and novices. J Appl Sport Psychol. 13:185–206.

Cleary T, Zimmerman BJ, Keating T. 2006. Training physical education students to self-regulate during basketball free throw practice. Res Q Exerc Sport. 77:251–262.

Durning SJ, Cleary TJ, Sandars J, Hemmer PA, Kokotailo P, Artino AR. 2011. Perspective: viewing "Strugglers" through a different lens: how a self-regulated learning perspective can help medical educators with assessment and remediation. Acad Med. 86:488–495.

Dweck CS, Leggett EL. 1988. A social-cognitive approach to motivation and personality. Psych Rev. 95:256.

Ende J. 1983. Feedback in clinical medical education. JAMA. 250:777–781.

Gigante J, Dell M, Sharkey A. 2011. Getting beyond "good job": how to give effective feedback. Pediatrics. 127:205–207.

Graham S, Weiner B. 1996. Chapter 4: Theories and principles of motivation. In: Berliner DC, Calfee, RC, editors. Handbook of educational psychology. New Jersey: Lawrence Erlbaum Associates, Inc; p. 63–84.

Hadwin AF, Webster EA. 2013. Calibration in goal setting: examining the nature of judgments of confidence. Learn Instr. 30:37–47.

Hattie J, Timperley H. 2007. The power of feedback. Rev Educ Res. 77:81–112.

Kitsantas A, Zimmerman BJ. 2002. Comparing self-regulatory processes among novice, non-expert, and expert volleyball players: a microanalytic study. J Appl Sport Psychol. 14:91–105.

van der Leeuw RM, Slootweg IA. 2013. Twelve tips for making the best use of feedback. Med Teach. 35:348–351.

Loyens SM, Magda J, Rikers RM. 2008. Self-directed learning in problem-based learning and its relationships with self-regulated learning. Educ Psychol Rev. 20:411–427.

Mamede S, van Gog T, Moura AS, de Faria R, Peixoto JM, Rikers RM, Schmidt HG. 2012. Reflection as a strategy to foster medical students' acquisition of diagnostic competence. Med Educ. 46:464–472.

Patel R, Sandars J, Carr S. 2015. Clinical diagnostic decision-making in real life contexts: a trans-theoretical approach for teaching: AMEE guide no. 95. Med Teach. 37:211–227.

Pelgrim EA, Kramer AW, Mokkink HG, Van der Vleuten CP. 2013. Reflection as a component of formative assessment appears to be instrumental in promoting the use of feedback; an observational study. Med Teach. 35:772–778.

Ramani S, Krackov SK. 2012. Twelve tips for giving feedback effectively in the clinical environment. Med Teach. 34:787–791.

Sandars J, Cleary TJ. 2011. Self-regulation theory: applications to medical education: AMEE Guide No. 58. Med Teach. teacher 33:875–886.

Sargeant JM, Mann KV, Van der Vleuten CP, Metsemakers JF. 2009. Reflection: a link between receiving and using assessment feedback. Adv Health Sci Educ Theory Pract. 14:399–410.

Sitzmann T, Ely K. 2011. A meta-analysis of self-regulated learning in work-related training and educational attainment: what we know and where we need to go. Psychol Bull. 137:421–442.

Telio S, Ajjawi R, Regehr G. 2015. The "educational alliance" as a framework for reconceptualizing feedback in medical education. Acad Med. 90:609–614.

Zimmerman BJ. 2000. Self-efficacy: an essential motive to learn. Contemp Educ Psychol. 25:82–91.