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## Twelve tips for providing academic remediation to widening access learners in medical education

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### ABSTRACT

As medical schools expand access and diversity through widening access initiatives, there is an increasing need to provide academic remediation for learners during their first year in medical school. The previous educational experiences of widening access learners are often mismatched for continuing success in medical school. This article offers 12 tips for providing academic remediation to widening access learners and draws on insights from the learning sciences and research in psychosocial education to support academic development within a holistic framework.

### KEYWORDS

Remediation; widening access; holistic; at-risk; learner support

### Introduction

The increasing shift in medical education toward a widening access agenda has been driven by both a global focus on equal opportunities for learners with diverse background characteristics (Murphy 2021) and a recognition that a medical workforce that is diverse and inclusive is essential to responding to the complex future health and social needs of both individuals and populations (Frenk et al. 2010). With this appropriate and necessary aim to embrace diversification, there are more learners with variable levels of preparation for study at medical school and an increase in the potential need for academic remediation during the first year of medical school (Kebaetse et al. 2018). Learners from widening access backgrounds are often disenfranchised, navigating several challenges (including cultural, financial, etc.), and may have had fewer opportunities for higher level learning experiences in their previous schooling (McGuire 2021). This changing learner population is a unique opportunity to reconceptualize remediation as a transformational and developmental process that is grounded in a larger understanding of the systems within which learning takes place and the strengths that this group of learners bring to their studies at medical school (Aguilar 2013; Nguyen et al. 2022). This article offers 12 tips for using a strength-based and holistic approach to academic remediation that draws on insights from the learning sciences and psychosocial education that responds to the need to develop lifelong learners in medicine (Mylopoulos 2020). Although the primary focus of the article is widening access learners, the tips can be applied or adapted for use across the medical education continuum for learners from diverse backgrounds who experience academic difficulty.

### Tip 1

#### *Adopt a holistic approach to academic remediation*

Adopting a holistic approach to remediation requires using several theoretical lenses that account for the inherent complexity of the remediation process. A holistic approach is underpinned by humanistic psychology theory that emphasizes looking at the whole person and the ecological theory that accounts for the academic macrosystems and microsystems that impact a learner's experience (Bronfenbrenner and Evans 2000). With this overarching framework at the center of the remediation process, providers of academic support staff can identify concerns and situate them within the interrelated dimensions that can impact success: intrapersonal (cognitive, motivational and affective), interpersonal (relationship with peers and faculty) and structural (medical school systems and societal influences, such as financial support) (Sandars et al. 2014). For example, providers of academic support may discover that in addition to difficulties with time management the learner has anxiety and would benefit from a referral to a counselor.

### Tip 2

#### *Use a strengths-based approach to enhance learning*

Academic remediation frequently has a deficit approach with a focus on diagnosing deficiencies that require external resources to remediate (Guerrasio and Aagaard 2014). However, this deficit approach can miss the rich educational strengths that learners bring to their studies and

these are often not recognized by the provider of support (Rodriguez 2013). Recognition of the learner's strengths increases their motivation and helps them to discover the unique and multiple strengths they can draw on to be successful in the medical school learning environment. These strengths originate in the learner's lived experiences of their families and a variety of communities, including sport and religious (Moll et al. 1992).

Providers of support can work with learners one-on-one to use a positive and strength-based approach to identify and build on their existing strengths (Sandars and Murdoch-Eaton 2017). For example, many learners have served as language brokers for their families and have unique strengths in paraphrasing information (Weisskirch et al. 2011), but the same skill can also be used for note-taking during lectures (Moll et al. 1992).

### Tip 3

#### *Help learners develop a model of resilience*

Resilience is often considered to be a personal characteristic that needs to be developed but this narrow focus promotes self-blame (Ungar 2018) and can further perpetuate learner isolation. Instead, resilience can be reframed as a person's capacity to draw on their strengths to navigate their way to resources that sustain their well-being (Ungar 2018). Providers of support can adopt both Greenberger and Padesky (2016) four-step model and Ungar's (2018) work to inform their practice. In Greenberger and Padesky (2016) model, the first step is to ask learners to reflect on a current or past enjoyable activity where they had to solve problems or think about a time where they were under high stress and managed to cope well. Second, learners identify the obstacles they faced when doing the activity and how they managed to persevere. Specifically, learners articulate the behaviors, beliefs, and emotions that helped them overcome the challenge. Along with identifying the thinking process that allowed them to persevere, learners can review Ungar's (2018) list of resources, such as optimism and relationships with others, and rank the resources that they deployed from the most to the least important. Third, learners write down the resources that they deployed and consider the sources from where they were obtained. Fourth, learners write down how they can apply these resources and their sources to the academic remediation process (Greenberger and Padesky 2016). For example, the four-step model can help a learner to identify how they seek help through relationships with other learners.

### Tip 4

#### *Draw on behavior change models to disrupt resistance to adopting new practices*

Adopting new learning strategies can be likened to adopting new skills that lead to a healthy lifestyle and similar to those changing their lifestyle habits, learners in academic remediation can be resistant to adopting new approaches (Loyens et al. 2007). To help close behavioral gaps, providers of support can draw on the transtheoretical model of behavior change (Prochaska and DiClemente 1983) to understand the behavior of the learner and use specific techniques to nudge (Thaler and Sunstein 2021) the learner

to make decisions that will bring them closer to achieving their goals.

The transtheoretical model of change proposes that change unfolds over time through a series of stages – pre-contemplation, contemplation, preparation, action, and maintenance (Prochaska and DiClemente 1983). In the maintenance stage, people have sustained specific behavior changes and are increasingly more confident in their ability to continue to implement the changes. To help the learner achieve the maintenance stage, specific behavior change techniques can be used such as motivational interviewing and implementation intentions (Miller and Rollnick 2012). The motivational interviewing framework involves a four-step process of engaging, focusing, evoking, and planning with the learner. It entails asking open-ended questions such as: If you make these changes, what are the best results you can imagine? What is good about continuing with your current habits? What would you lose or give up? How would things be better if you changed? Questions such as this can also be explored by creating a decisional balance worksheet where learners list the advantages and disadvantages of maintaining specific habits. This process serves to evoke change talk to drive autonomy and personal motivation for wanting to change their habits (Miller and Rollnick 2012).

Implementation intentions can also be employed to help create specific habits to remind the learner of the particular behaviors they want to employ (Gollwitzer 1999), and this approach can improve performance scores (Duckworth et al. 2013). An implementation intention helps learners to self-regulate by using the frame: 'If X happens, then I will do Y.' For example, a learner might say, 'If I get stuck while working through a question, then I will ask myself what I already know.'

### Tip 5

#### *Support learners in using spaced practice to enhance their learning*

Although many learners are accustomed to engaging in massed practice or cramming throughout their prior educational careers, this practice is insufficient to meet the rigorous demands of learning in a complex environment and leads to poor academic performance (Bickerdike et al. 2016). While cramming initially results in increased short-term retention of information, the results diminish quickly if it is the sole strategy used (Hattie 2009). More importantly, cramming limits the ability to retain the information to develop the robust cognitive architecture needed to support the complexity of critical thinking for clinical work (DeVoe 2011). Instead, engaging in spaced practice or studying in smaller increments of time over multiple days improves retention of new information and supports creating the schemas that can be thoughtfully applied to solve complex cases (Van Hoof et al. 2021).

Spaced practice promotes retention of information, restores the depleted working memory resources caused by mental effort during learning, and improves cognitive integration by creating relationships between different pieces of information (Ignacio and Chen 2020; Chen et al. 2021). This practice can take multiple forms in a daily and weekly schedule to help learners develop the strong

knowledge base that will be essential to organizing information for problem-solving. When planning their week, learners can space out study sessions by blocking off specific days dedicated to learning the initial material and other days to review the material and make connections. For example, on a Monday a learner might focus on acquiring information from Anatomy and on a Wednesday self-test by drawing diagrams from memory or creating a chart to display the relationships among the details of the topic. Alternatively, within a given day, learners can block off 1–2 h to study and come back to the learning session after a cognitive break, such as a nature walk or connecting with friends (Pink 2018). These structured cognitive breaks activate the brain and provide varied cues to enhance mastery and memory of new information (Van Hoof et al. 2021). For instance, a learner might actively create a concept map for a lecture in the morning, take a walk with a friend, and later in the day, self-test with questions on the topic. These practices are in contrast to the popular method of studying one topic for 4 h a day and never returning to the material until the day of the exam (Cutting and Saks 2012).

### Tip 6

#### ***Support learners in using multiple forms of retrieval practice that can be applied across contexts***

Although it is well known that retrieval practice or the testing effect, leads to high quality learning, learners tend to rely heavily on practice questions as the sole form of engaging in retrieval (Roediger III et al. 2011). While practice questions are used extensively and are proven to improve learning compared to other study strategies (Dunlosky et al. 2013) exploring multiple ways to implement retrieval can help learners gain the myriad of benefits of retrieval practice, including enhancing fact-based learning and transfer of learning (Butler 2010).

Along with frequent low-stakes practice questions that can be interspersed throughout a learning session, any form of reconstructing knowledge by bringing information to mind from memory can yield benefits (Van Hoof et al. 2021). This can include creating concept maps from memory, drawing pictures to represent an idea without any additional aids, free recall by writing about a specific topic from memory, and explaining ideas to peers (Blunt and Karpicke 2014). After doing so, learners can verify the information they recreated is correct by reviewing study aids or asking a peer for feedback to identify and correct errors in their mental models (Tullis and Goldstone 2020). These varied forms of retrieval practice create desirable difficulties (Bjork and Bjork 2020) that enhance long-term retention of knowledge and can be applied while in the clinic, studying independently, or learning with peers.

### Tip 7

#### ***Support learners in strategically planning their study sessions***

Strategically planning study sessions using varied forms of practice can be utilized to help learners identify what kind of practice is relevant for the task at hand (Carvalho and Goldstone 2015) and also for their individual learning needs rather than emulating others' study plans (Swan Sein

et al. 2021). This can be accomplished by clarifying the difference between blocked and interleaved practice and deploying these forms of practice strategically during study sessions. For instance, providers of support can teach learners that in the initial stages of learning, beginning with blocked practice, or focusing on one concept at a time, is critical to building foundational knowledge. Blocked practice can also be used in later stages of learning as a tool for when the similarities between items of the same concept are hard to detect (Carvalho and Goldstone 2015). While blocked practice can be used throughout the learning process as needed, interleaved practice has also been demonstrated to boost long-term retention and is a critical component in the development of learning plans (Sana et al. 2017). Interleaved practice entails implementing a schedule of practice that mixes different kinds of problems or mixing different kinds of material within a single study session (Dunlosky et al. 2013). For example, learners could effectively interleave by studying a few courses each day and reserve the weekends for specific blocked practice of difficult topics, such as Physiology. However, for interleaving to be effective, learners need to mix up similar concepts so that they are engaging in differentiating, reflecting, and understanding the similarities and differences between related topics. This promotes discrimination-based learning and retrieval practice (Sana et al. 2017). Interleaving is particularly important in the middle of a program of study, such as a module, when learners are more likely to forget the information that they had encountered at the beginning (Agarwal and Bain 2019).

### Tip 8

#### ***Aid learners in structuring their environment to improve learning efficiency***

Environments are often the 'invisible hand' that shapes human behavior (Clear 2018) and supporting learners in how to structure their physical and digital environment for optimal performance can yield positive gains in learning. For example, assigning a dedicated working space with a desk that faces the wall can remove any distracting visual or auditory noise (Kastner and Nobre 2014). Learners can also use physical or sensory cues to enter a state of focus, such as by wearing only specific clothes for studying (Adam and Galinsky 2012). Along with these strategies, learners can maintain their focus by intentionally working in 'cognitive sprints' of 60–120 min (Globerson et al. 1989), removing their mobile phones from the environment (Ward et al. 2017), and avoiding task switching that diminishes the cognitive resources required to study effectively (Bellur et al. 2015). Encouraging learners to identify new environments conducive to studying is also important, such as the library.

### Tip 9

#### ***Use think alouds to support learners in recognizing important information***

Learners who are struggling often have difficulty organizing and integrating information to determine what is important and benefit from engaging in active learning strategies

that encourage higher levels of critical thinking (Sampson and Clark 2009; Winston et al. 2010). Providers of support can work with learners to clarify their understanding by demonstrating how to create physical representations of knowledge that identify the relationships among ideas (Paul 2021). These physical representations can take multiple forms, including flowcharts, diagrams, matrix notes, and concept maps. Given that matrix notes and concept maps have proven to be the most effective form of contextualizing understanding (Kauffman et al. 2011; Blunt and Karpicke 2014), staff can model a think aloud for how they would approach creating a concept map or matrix notes. In a strategic think aloud, staff can focus on illuminating the four dimensions of learning (Fisher and Frey 2014): declarative (What is it?), procedural (How do I use it?), conditional (When and where do I use it?), and reflective (How do I know I used it correctly?). This process helps learners identify what is most important while deepening their understanding of the material (McGuire 2021).

### Tip 10

#### ***Promote practices that encourage cognitive flexibility***

Cognitive flexibility is also a significant predictor of academic performance (Stad et al. 2018) and can reduce the tendency that learners have of adhering to ineffective learning practices (Loyens et al. 2007; Winston et al. 2010). Providers of support can encourage learners to interrupt these habits by engaging in structured metacognitive monitoring with pauses to check their thinking and change their behavior (Ross et al. 2014). During study break times, a few key questions learners can ask are: What is happening? Is this what I want to happen now? Am I becoming hyper focused and need to switch to the bigger picture? How can I flexibly move from the bigger picture to details? How else can I change what I am doing to achieve the results I want? (Schön 1983; Plack and Santasier 2004). Reframing and pausing to inquire can enhance skills in cognitive flexibility and improve academic success.

### Tip 11

#### ***Support learners in identifying cognitive biases that can lead to inefficient learning***

Engaging in critical reflection with learners can also illuminate common thinking errors that lead to inefficient learning practices. In the context of academic remediation, a common thinking error includes overconfidence, that is often known as the Dunning-Kruger effect (Kruger and Dunning 1999; Winston 2015). Learners experiencing academic difficulty tend to overestimate their likelihood of success (Kruger and Dunning 1999; Winston 2015), rely on external feedback (Hattie and Timperley 2007; Winston 2015) and have difficulties with metacognition and self-regulation which then correlates with lower exam scores (Artino et al. 2012). To combat this, providers of support can discuss common cognitive biases, such as the Dunning-Kruger effect, and work with learners to enhance accuracy in the self-assessment of their likelihood of success. For example, to improve their accuracy in self-assessment, learners can rate their perceived confidence levels (on a 0–100 scale),

gauge their satisfaction that they have provided the correct answer (on a 5-point Likert scale), and then justify their response using a free-form format before being given the correct answer (Leggett et al. 2012). After being given the correct answer, learners can reflect on incorrect answers and what they specifically would need to know to increase their confidence rating for the answer to be correct (Leggett et al. 2012). In this process, learners will become aware of the gap between their current and desired state of learning, activating the discrepancy reduction mechanism by focusing their time on what they have yet to master (Verkoeijen et al. 2005) while simultaneously increasing their skills in meta-cognitive monitoring and self-assessment.

### Tip 12

#### ***Proactively intervene by developing tiered systems of support***

Beyond interventions with individual learners, medical schools can maximize scarce human capital resources and normalize the remediation process by building tiered systems of support. A model that provides proactive and developmental support for all learners, while differentiating the nature and the intensity of the support (Stegers-Jager et al. 2017; Nash 2020) promotes an institutional culture that values all learners. In a tiered model, Tier 1 interventions are intended to ease the transition into medical school and provide adequate education for all learners. While in the K-12 education literature, Tier 1 is conceptualized as providing research-based instruction for all learners (McIntosh and Goodman 2016), it can be adapted in the medical school context. For example, courses can be offered to all incoming learners with skills in self-regulated learning and evidence-based learning strategies. These 'learning to learn' courses can provide learners with a useful opportunity to complete and reflect on the Motivated Strategies for Learning Questionnaire to identify specific motivation, cognitive, self-regulation and environmental structuring strategies that learners may need to adjust to their learning (Sandars and Homer 2012).

In addition to Tier 1 or universal support for all learners, Tier 2 includes small group interventions for learners who are underperforming (Stegers-Jager et al. 2017). Small group interventions can take multiple forms. Content-related learning needs can be addressed through small group tutoring (Khalil 2022) and working with faculty members to review key concepts or test errors (Guerrasio 2018). Learning strategies can be taught by interweaving 'what to learn' with 'how to learn' in small group tutoring programs or through an additional mandatory cognitive skills program for identified learners who are struggling (Winston et al. 2010).

Despite these efforts, given the complexity of remediation, there will still be learners who exhibit the need for intensive remediation and would benefit from individualized support. Tier 3 support could entail a mandatory learner-created growth plan (Bierer et al. 2015) that is created with a multi-disciplinary 'student success team', with expertise in both psychosocial and academic support (Guerrasio 2018). These teams can offer different perspectives that can generate holistic and comprehensive solutions beyond re-taking an exam (Chou et al. 2019).

## Conclusion

Holistic and evidence-based approaches are essential for providing academic remediation of widening access learners in medical education. Medical schools can create tiered systems of support for all learners that are underpinned by a strengths-based approach.

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