Top tips for medical students: A guide to effective learning strategies.

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Introduction and Concrete Experience:

Starting medical school can be a daunting experience for many students, not least because of the hurdles they cross to get there in the first instance. The transition from school, an academic hiatus or another working profession to medical school, has been identified as a particularly prominent cause of stress amongst medical students (Radcliffe & Lester, 2003). This, coupled with the innumerable research highlighting academic workload (Damiano *et al*., 2021), frequency of examination (Navas, 2012) and the absence of an individual learning strategy (Nechita *et al*., 2014) as leading causes of stress amongst medical students; it is no surprise that burnout (IsHak *et al*., 2013), depression (Moir *et al*., 2018) and mental health problems (Jafari *et al*., 2012) have become a common theme within these communities.

It follows then that in an attempt to reduce the stress upon medical students, one aspect that they have the capacity to recognise and manipulate is their individual learning style and the learning strategy they choose to employ. As students arrive to study medicine from varying backgrounds and cultures, their educational history

and working proficiencies may vary, influencing the way they prefer to learn and be taught (Ilic & Diug, 2016). For many students there may be a tendency to rely on existing learning methods acquired through previous periods in education (Zhao & Hu, 2021). Unfortunately, the most commonly used learning techniques that students resort to, are also those which have been deemed by contemporary research to be ineffective. Rereading, highlighting and summarizing are three of the most popular methods students tend to use, all three of which were classified as being of low utility when compared with other learning methods (Dunlosky *et al*., 2013). Contrastingly, techniques such as distributed practice (e.g. distributing learning over a period of time or multiple study sessions, as opposed to cramming) and practice testing (e.g. through the use of practice problems, question banks and/or flashcards) were identified as having high utility (Dunlosky *et al*., 2013). The concept of practice testing has been further reinforced (Rawson & Dunlosky, 2011) with research indicating it may be more effective than restudying content (Roediger & Butler, 2011), and others concluding it is effective even without positive feedback (getting the correct answer) (Roediger III *et al*., 2011; Kornell *et al*., 2009).

Having experienced these challenges in my first academic year of Medicine, I began to reflect on the strategies I enforced to maximise my own learning experience. This is described in the next section.

Reflective Observation:
Prior to starting medical school, I studied Biomedical science degree at a London University. As a university that specialised in healthcare sciences, I had significant exposure to many professional disciplines and the opportunity to work alongside them. With modules ranging from the fundamentals of cell biology to complex anatomy, I was cornered very fast into finding a learning strategy that suited me. I found myself observing the different methods members of my cohort used to learn and revise new content. I practiced each method until I stumbled on printing lecture slides and annotating them, summarising the notes as I went along.

This method served me well for my undergraduate degree, but I found it to be increasingly ineffective the moment my medical studies began. Printing lecture slides no longer seemed feasible, and summarised notes no longer felt summarised. This is because I could write chapters of notes, feeling that nothing was actually retained in memory, but rather in inked paper. In my first term of medical school, I very soon realised I was navigating my way in the absence of a learning strategy and found myself asking many questions: Is the problem with my learning style, or is it with the sheer amount of content? Should I learn like other students were learning, or should I continue as I am, hoping a miracle would happen? The first term passed and as the second approached, I began to realise many other students around me were just as confused, going

through a process of trial and error until they landed the jackpot.

Fortunately, this was around the time my attention was brought to the masses of research regarding effective learning strategies amongst students. Having previously heard about the concept of making information more bite-sized i.e. spreading it out over the course of the day, I implemented this along with the concept of practice testing through the use of flashcards. I noticed extremely positive results in memory retention in a very short space of time. Additionally, I noted a decreased perceived level of academic stress. Ultimately, this has made my journey into the third and final term much smoother than the previous two, increasing not only my productivity, but general mood and free time to pursue personal hobbies.

Top Tips:
Having reflected on my experiences, here are some top tips I would like to share with those who have experienced anything remotely similar to myself, or even for those who are just starting their university journey.

The first evidenced based tip I would like to share is for those who have not yet attempted practice testing. The act of testing oneself has been shown on numerous occasions to consolidate knowledge retention (Roediger & Karpicke, 2006; Butler, 2010). This can be achieved through various avenues, including the use of past paper question banks, flashcards or direct peer-to-peer testing.

My preferred method of practice testing is through the use of a flashcard software such as Anki (Elmes, 2006), which using algorithms, presents flashcards more or less frequently based on their difficulty.

My second tip is to distribute your learning time into multiple sessions across the day rather than conducting your learning en masse. One of the most common themes found in books covering cognitive psychology and human memory are the benefits of distributed practice (Benjamin & Tullis, 2010). This means breaking up your study sessions from a single session to multiple. The reason this is a top tip is because there is research supporting the concept of distributed practice and evidence that suggests it is more effective for long term retention than massed practice (Dunlosky *et al*., 2013).

Personally, I have implemented this by identifying the task that needs to be completed and allotting thirty-minute timeslots where I am hyper focused. This is followed by a five-minute break on the condition that the task has not been completed yet.

Finally, Redway (2023) describes the importance of recognising your unique learning style and likens this to the process of making your own signature. This is particularly interesting as even a signature in certain contexts is applied differently e.g. as a printed name. This analogy conveniently captures not only the importance of having a 'signature' but knowing when to adapt this 'signature' to an environment that demands it.

Summary of Top Tips

- Use Anki flashcards for the purpose of practice testing and active recall.
- Bitesize learning / distributed practice is key! Break your learning periods into smaller, more manageable sessions with scheduled breaks in between.
- Embrace your unique learning style signature by trialling methods until you find which works best for you. Once you've found it, exploit this method, but retain the ability to adapt to other learning methods too.

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