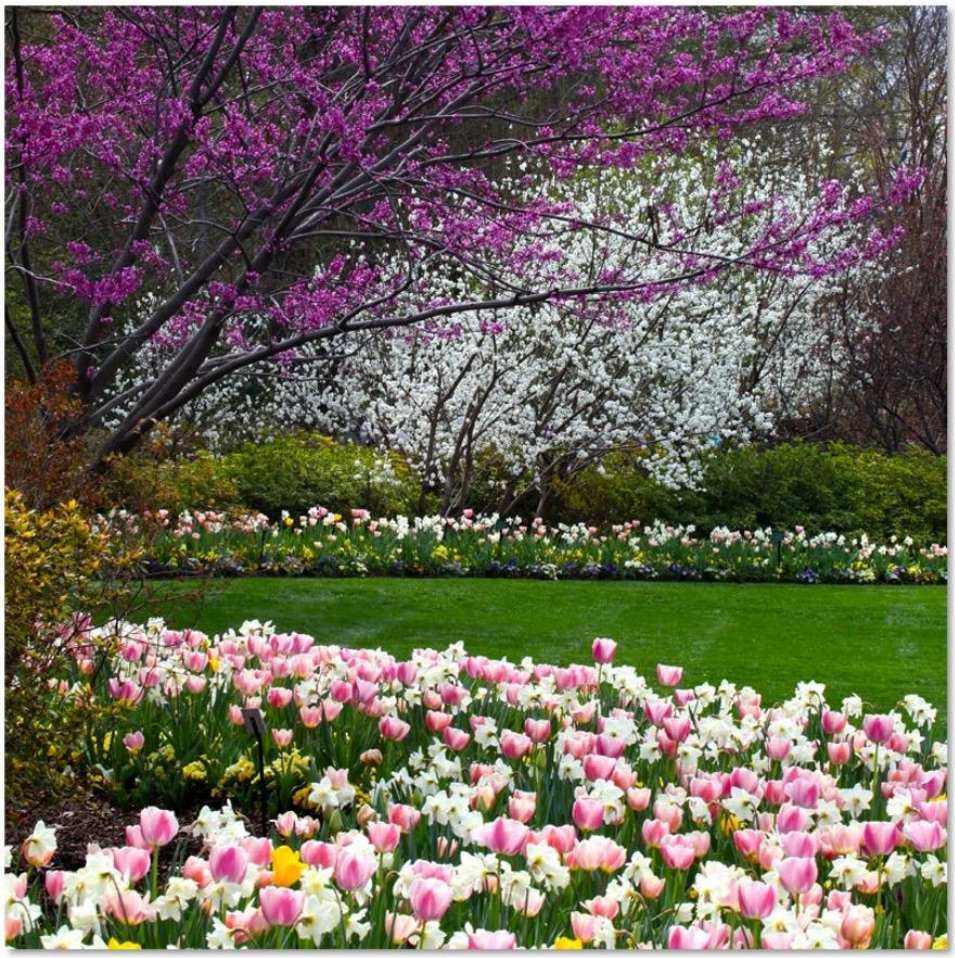
dear residents

Unpacking Learning Theory **April 3, 2022**

Dear Residents,

I hope you are enjoying the Spring weather, rain showers notwithstanding. The Bradford pears and the redbuds are in full bloom. It's worth a visit to The Dallas Arboretum. The Dallas Blooms festival ends on April 10.

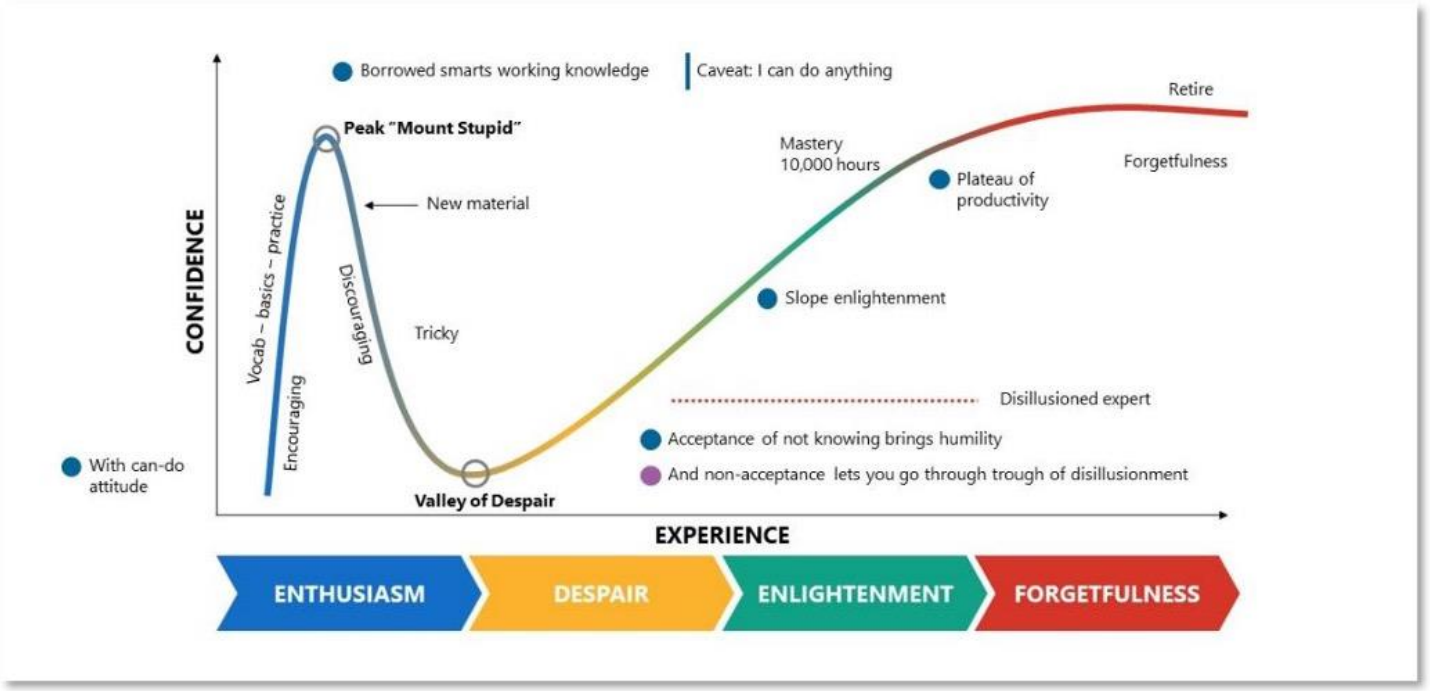


https://www.dallasarboretum.org/events-activities/dallas-blooms/

The graduating residents are in the last quarter of their residency training. At this point senior residents are at near-peak of internal medicine knowledge and skills. Once you graduate, some of these skills will

begin to fade (depending on your career choice), even as you acquire new ones. Shortly after you complete residency, you will sit for the ABIM initial certification examination. The overwhelming majority of our residents pass the exam on the first attempt. You then enter a period called Maintenance of Certification (MOC). In 10 years, you will be due to retake the exam (and be recertified for another 10 years) or enter a new pathway called Longitudinal Knowledge Assessment (LKA). LKA involves answering 30 questions each quarter on an ongoing basis. I don't think I need to convince you of the need to keep your knowledge and skills current. All the same, many physicians in practice have found the formalization of this requirement irksome.

As new knowledge arises, we may not immediately encounter it – no one one can keep up with everything. This leads to the well described problem of "you don't know what you don't know" or the Dunning-Kruger Effect. We overestimate our knowledge and skills in social and in scientific contexts – we are unskilled and yet, unaware that we are unskilled.



There are four principles from learning theory that emphasize the need for formal pathways for knowledge acquisition and retention:

1. **Cognitive skills must be kept current**
    - In the absence of practice, skills decline over time. For example, I don't think I would trust myself to safely place a central line today. I did this with ease during residency – but that was over 30 years ago!
    - Knowledge must be retrieved fast enough to be useful. We can all look stuff up, but if the relevant framework is buried deep in our remote memory – we will struggle to access it.
    - Old knowledge makes it harder to learn new knowledge. Old knowledge is competing with new knowledge and conversely, new knowledge can interfere with retrieving old knowledge. Availability bias is very much at play here. We tend to make inferences on what is readily retrievable.
    - As our knowledge becomes increasingly dependent on our experience – we hazard relying too heavily on these idiosyncratic experiences. Pattern recognition is double-edged – enables rapid diagnosis but is prone to cognitive errors.

2. **Self-assessment is not enough**
    - While we have some ability to self-assess strengths and weakness, we are also subject to systemic biases in self-assessment. We are drawn to the topics we already enjoy or know something about.
    - When new knowledge seems less relevant to us, we may simply miss it. I am frequently surprised when a lecture makes mention of a defining article in a major journal from a few years – I am left wondering how I missed it!
    - We have a tendency to stop studying early – we skim, we flip pages, we move on to the next thing. We are prone to "fluency illusions."
3. **Testing enhances learning and retention**
    - Being tested is a powerful learning experience. It's an effective strategy to enhance retrieval. Getting something wrong is an excellent way to capture and store new information.
    - Spaced repetition and interleaving (mixing up categories, rather than unitizing related topics) is a useful strategy.
    - Feedback for both correct and incorrect answers is invaluable.
4. **Goals and consequences motivate**
    - If you expect to be tested, you will engage in better learning practices, which will enhance retention.
    - We are all intrinsically motivated to keep current to provide better patient care. We need to leverage that inner drive. A commitment to excellence in patient care is a commitment to lifelong learning.

With our rich conferences, and the other tools at your disposal (MKSAP, NEJM Knowledgeplus), I hope you are developing the learning and self-testing habits now that will ensure that you remain on the path of lifelong learning. You are an exceptionally bright bunch and each day I am reminded of just how smart you are – keep those edges sharp!

Best regards,

Dino Kazi