INTRODUCTION

"Intention to learn is helpful only if it leads to the use of good learning strategies."

— Alan Baddeley

I'd like to ask you some questions.

1. Have you ever failed an exam or performed poorly in a course and knew you could do better?

2. Have you ever felt completely overwhelmed and anxious about your academic course load?

3. Are you unsure that you will be able to learn all you need to care successfully for patients?

If you answered yes to any of these questions, then I know exactly how you feel. I'd also like to offer some help.

Let's face it, being a pharmacy student is tough. In my 25 years as a pharmacy professor, I have witnessed significant changes in the educational demands placed on students. Driven by the rapid advances in the biological, pharmaceutical, and clinical sciences as well as the expanding clinical role of the pharmacist in all practice settings, pharmacy schools have had to make substantial changes to their curricula. These include expanding already crowded didactic and experiential elements and adding extensive cocurricular and extracurricular requirements for graduation. To graduate, pharmacy students must be able to navigate all of this while still meeting personal and work-related responsibilities. It sounds impossible, and for many students it presents a significant challenge, especially if they have difficulty learning.

There are many reasons why students struggle with their learning. Some are unsuccessful because they lack necessary prerequisite knowledge or experience. Others may not reach their potential due to socioeconomic challenges or health-related issues. Still others fall short due to lack of appropriate motivation or solid learning skills. I am familiar with what it is like to be a struggling student because I was one. In high school, I earned good grades, participated in all the "right" extracurricular activities, and chose a local college with an excellent reputation. I majored in chemistry in hopes of fulfilling my dreams of attending medical school. Unfortunately, my first 2 years in college were less than successful. By the time I entered my junior year, it began to dawn on me (thanks to my middling academic performance and the recent letter I received from the college's prehealth committee) that my life's career plan was about to change, whether I wanted it to or not. I was devastated, lost, and confused. Fortunately, I had some good academic advising and a wonderful winter internship that led me to a graduate program in Pharmacology and Toxicology.

Considering what I just revealed about myself, I am certain that the irony of finding myself on the first day of graduate school sitting in a physiology course with 80+ first-year medical students will not be lost on you. The scene that day was what you might expect. Some students were sitting, some were standing, and others were milling about waiting for their first lecture to begin. It was abundantly clear from facial expressions and tone of background conversations that the emotions in the room were a mix of anticipation, excitement, and a heavy dose of anxiety. Speaking for myself, I was panicked and felt a little like a fraud. The hard lesson I had learned from my undergraduate experience was that I was not smart enough to go to medical school and that I had no idea how I was going to pass this course.

Promptly at 8:00 AM our professor walked into the front of the classroom. As students quickly found their seats, he silently set down his lecture notes, dimmed the lights, and turned on the overhead projector. Turning towards the class, he stood for a moment looking out across the lecture hall. Silence fell across the across the room,

and as we sat, pens ready and notebooks open, he spoke the words that would have a profound impact on my life.

"Studying for medical school is like eating a salami."

What I most remember from that moment was confusion. As I looked at my fellow classmates out of the corner of my eye to gauge their reactions, I remember thinking, "What did salami have to do with physiology or studying for medical school?" The only thing I really knew about salami was that it was a deli meat and delicious when eaten on a bagel with cream cheese. I could tell from my classmate's facial expressions and murmuring that I was not alone in my confusion. As the whispered confusion subsided, our professor went on to explain his statement to the class. His explanation is best summarized from the following excerpt taken from a worksheet passed out in class that morning:

"You study material daily in small, manageable portions just as you would eat —and digest!— 'salami slices' in daily meals as opposed to swallowing the whole salami in a single meal on the weekend."

This worksheet also contained a "recipe for an efficient learning strategy" and was based on an article recently published in the journal Academic Medicine.[1] This "recipe" required the use of the following 6 "ingredients":

1. **previewing material and notes the night before lecture**
2. **taking notes in class**
3. **studying and correcting class notes on the same day**
4. **getting daily feedback through self-testing**
5. **getting timely help from instructors**
6. **reinforcing and cleaning up problem areas on the weekend**

That evening I began to consider what I learned in class, and it began to dawn on me that perhaps the reason for my underperformance as an undergraduate was my approach to learning was faulty. I had survived largely through sheer will and determination, suffering through long, last-minute cramming sessions and using passive study strategies that looked nothing like the proposed method I had learned that day. As I committed to apply the basic principles of this "methodology," I began to see immediate improvement in my learning. Daily structured studying of material in small manageable bites, while still challenging, began reaping rewards far more important than just good grades. For the first time, I felt free to learn material for the sake of learning, not just to pass a course. Any anxiety that I had in the past about academic success was overshadowed by my new ability to retain and apply concepts that I was learning.

Despite the profound impact this strategy had on my learning, I do not want to give the false impression that it made school easy or that I did not experience challenges and struggles. Real learning is hard work. Like any student, I suffered normal pretest anxiety, studied long hours, and sometimes wondered if classes would ever end. I even had a few bad exams. The difference was that I had a system and a set of skills that gave me the confidence to tackle any academic challenge no matter how difficult.

The members of the medical physiology teaching team and my professors in the Pharmacology and Toxicology Department where I earned my PhD were exceptional educators. They realized that good teaching was more than just effective transferal of information to their students. They saw it as an opportunity to teach students how to learn. Moreover, they were able to translate and operationalize the latest (at the time) learning theory so that it was useful to their students. I hope that with this book I can carry on this legacy.

Much has been learned about human learning since I was a graduate student. Recent advances in the field of cognitive psychology have revealed powerful, evidence-based learning strategies that teachers and students can use to increase retention and understanding of new information. Books like *Make it Stick: The Science of Successful Learning; A Mind for Numbers: How to Excel at Science and Math; Learn Better: Mastering the Skills for Success in Life, Business, and School, or How to Become an Expert in Just About Anything;*[2-3] and web-based resources like The Learning Scientists' website and podcast (https://www.learningscientists.org/podcast-episodes)[4] and the extremely popular Massive Online Open Course (MOOC) "Learning How to Learn"[5] are just a few of the many examples of how scientists and educators are trying to spread the word about evidence-based learning strategies and to debunk some of the myths we hold about learning. The dissemination of these findings are coming in the nick of time as students are experiencing a crisis in higher education. Tuition costs continue to rise while completion rates of 4-year degrees in the United States are abysmally low with only 54% of undergraduate students completing a 4-year degree in 6 years.[6] Data collected by the American Association of Colleges of Pharmacy (AACP) in their annual Profile of Pharmacy Students reveals that pharmacy student attrition rates have steadily risen from a low of 1.3% in 2004 to over 12% in 2019, with 6.7% of pharmacy students experiencing delayed graduation.[7]

The systematized approach to learning described in this book is largely based on these learning strategies, as well as fundamental and proven teaching principles, the best advice from learning experts, and my own personal experience as a teacher and academic coach. It is designed to be a practical guide to help students that lack an organized approach to their studying and to help those that do, improve their ef-

fectiveness as learners. Over my career, I have seen firsthand the psychological and financial consequences of delayed graduation, dismissal, or withdrawals on student pharmacists. While some of these students had confounding factors that could not be helped, I believe that many might have had a different outcome if they had possessed the necessary skills and knowledge about effective learning strategies. I hope that the strategies in this book in partnership with your effort and commitment will help you avoid becoming a statistic and develop into an effective and independent life-long learner.

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