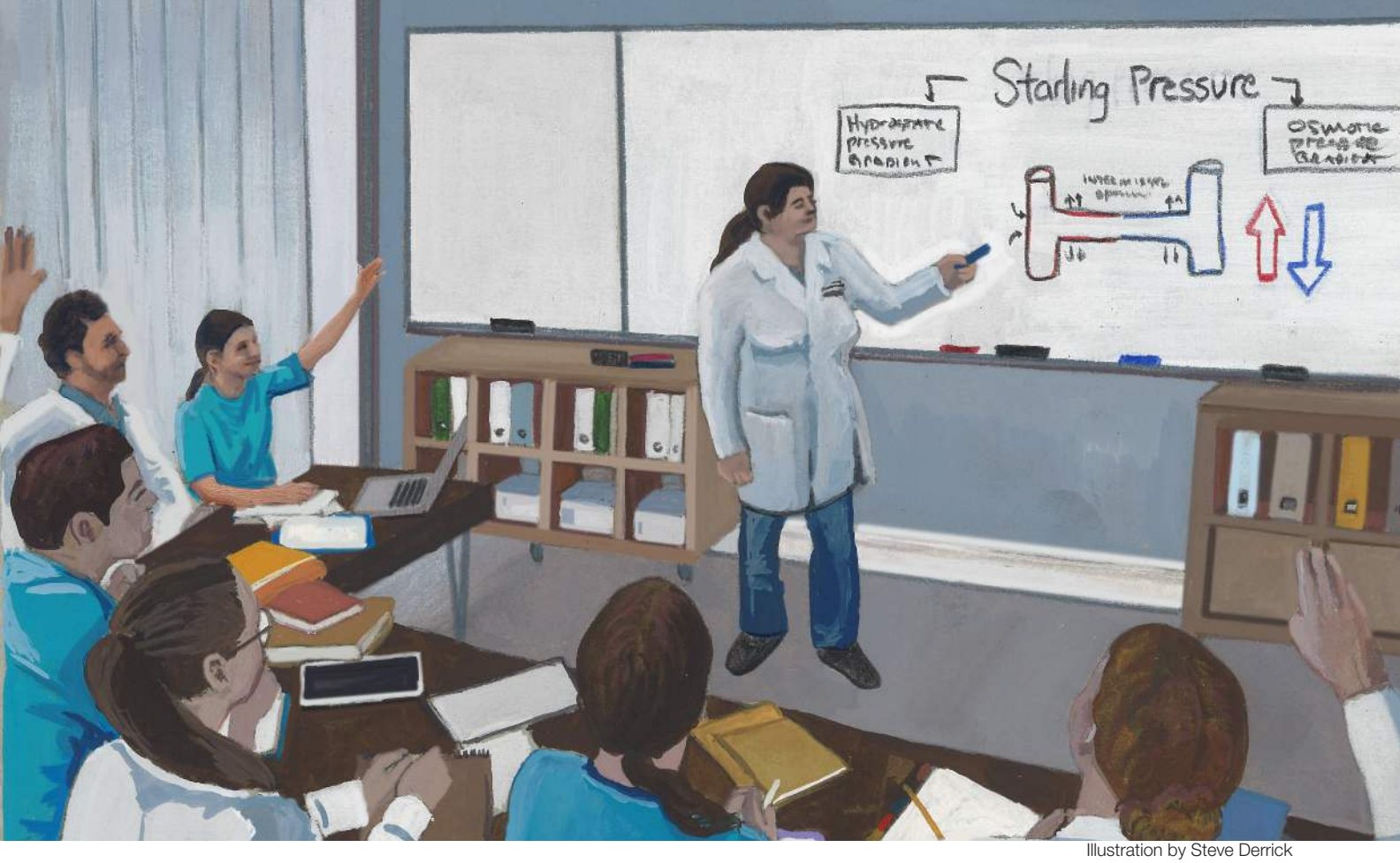

Illustration by Steve Derrick

Am I bored yet?

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The call came to my research lab at the medical school. "Can you meet with the Dean tomorrow at 8 a.m.?"

"Of course," I replied, as if such invitations were routine.

It was March 1990, and I was a newly-tenured associate professor of physiology. Like most faculty, I was juggling research with teaching and committee work. I'd never been in the Dean's Office before.

"I'll get right to the point," the Dean said, "I'm asking you to become the associate dean for pre-clinical medical education, starting in July."

Whatever agenda I'd imagined for a meeting with the Dean, it wasn't this.

"I know this is out of the blue," he said. "Ask questions, think it over, let me know next week."

The obvious questions—why me? What are the responsibilities? What's the time commitment?—did not occur to me in the moment. If I took the job, it would be a life-altering decision in my professional career.

Over the next few days, I weighed the pros and cons. Being in charge of pre-clinical medical education, otherwise known as the first two years of medical school, is a full-time teaching and leadership job.

I hashed it out with family and sought the advice of colleagues in my trusted inner circle. Saying "yes" would mean not renewing my NIH grant. Not renewing my grant would mean closing the door to my lab and to funded basic science research—forever. Basic science is unforgiving that way.

I lost sleep over the decision. When I did sleep, I dreamt about the lab. What if this new teaching and

administrative gig didn't work out? It would be an irreversible decision.

The choice was binary. Either research or full-time medical education. Should I continue what I was trained, and expected, to do? Or, should I seize a leadership opportunity that I'd never considered?

In the end, it came down to gut. I was drawn to the education job in ways that I wasn't drawn to research. Teaching and students were my passions; encouraging others' teaching was something I'd already enjoyed on a smaller scale. Now, I would be encouraging the entire pre-clinical teaching operation—20 courses and hundreds of faculty. Now, I would be shepherding thousands of students through the first two years of medical school. I could close my eyes and imagine doing that forever.

Word spread in my home department of physiology. My trusted inner circle was thrilled—in part for me and in part because they'd have a fellow teacher in the administration.

Professor "Clank," a senior colleague (and not a member of my inner circle), heard the news of my decision and greeted me cheerily in the hall. (I tried to duck into my office at the oncoming sight, but I wasn't fast enough.) "Linda, such terrific news. You won't have time for research now."

Whatever that meant.

Clank went on, unsolicited. "I've been at this for many years, as you know. I'll tell you something that no one else will."

I mustered interest. "I'd appreciate your advice."

Clank cozied up. I'd never been that close to him before. His skin was doughier than I expected. He whispered loudly, "All teachers eventually become bored."

"I hope to avoid that," I said, "but thank you. By the way, I look forward to your lecture tomorrow morning." In preparation for the new job, I would attend all lectures in the medical curriculum, both to acquaint myself with the strengths of the faculty and to live the student experience.

What have I done?

The following day at 8 a.m., I was seated visibly up front in the side section of the medical school auditorium. From that vantage point, I could observe the students and the lecturer. Clank was at the podium.

"I'm Professor Clank. Put that newspaper down," he barked at a student sitting in the back row.

"First slide. You've done my readings, so we begin with my chart. By tomorrow, memorize my important arrows that show a normal person."

"Excuse me, Professor Clank." It was a student in the second row. "Most of us are confused about the arrows. Can you explain what they mean?"

"The arrows are up and down, increase and decrease," Clank responded, without looking up. "Come to my office if you don't understand."

"Professor Clank, excuse me, what are your office hours?" Again from the second row.

"Nine to 10 a.m. We're wasting time," said Clank.

The second-row student muttered, "We're in class then."

My lips tightened, and I scanned the room.

Several hands went up, but Clank pressed on.

"Next slide. Here are my important arrows for an abnormal patient. Memorize these too."

A cluster in the third-row sighed in unison. "Abnormal patient? Guess they didn't have person-centered language in the ol' days of 'important arrows,'" said one student. The cluster erupted.

Clank continued, "Here are my arrows for another abnormal patient."

The third-row cluster groaned. Dozens of hands went up around the room.

"Professor Clank, all of us are confused. Will the arrows be tested? What do they mean?"

"Of course they will be tested. I told you to memorize them."

My jaws were now in full-clench.

There was rustling throughout the auditorium. In the back, a notebook slammed shut.

Clank studied his watch and sighed.

It was 8:05 a.m., only 45 minutes to go.

Naysayers can be right

That was Professor Clank, the colleague who predicted I'd be bored if I invested the rest of my career in medical education.

Of course, I should have dismissed him—a grim colleague who hadn't found the joy in teaching that I had. Why then did his words keep ringing in my ears? Were they just a disturbing irritant, designed to throw me off my game? Or, were they something more?

Truth is, I knew why I couldn't shake him. Such naysayers, party poopers, and wet blankets have the annoying habit of sometimes being right. In their joyless bluster, there can be nuggets of truth. What if Clank was right? I would be making an irreversible career change into full-time medical education.

Thus began my habit of regular boredom-checks, initially with the intention to prove Clank wrong.

First boredom check

"Good morning, first years, welcome to capillary physiology! In this hour, we'll visit Ernest Starling and the capillary pressures he described in the late 19th century."

My first slide was a daguerreotype of young Starling.

"Here he is in 1893, dressed for capillary work in bow tie, vest, and pocket watch."

That was my warm-up for the first-year medical class.

"There are four Starling pressures that work 24-7 to sustain a healthy circulation.

"When Starling goes haywire, there can be drastic fluid build-up in the body. The next slide shows a patient with pitting edema. What do you see?"

There were gasps from the students, and one volunteered, "The patient has extreme accumulation of fluid in the abdomen and lower legs."

"Yes, absolutely. Why do you think it's called 'pitting' edema?"

A student ventured, "'Pitting' sounds like indentations."

"Perfect! Pitting edema is so remarkable that when the physician presses a finger into the swollen limb, the indentation remains. That is Starling in action."

Isn't it surprising that we teachers can tell pretty much the same story, year after year, as if we just discovered it? This year's first-year medical students were learning the same Starling pressures that previous first-years learned. And the ones before them.

It's not our job to amuse ourselves by finding something new to report on the Starling front. Our job is to prepare all students with the principles that will make them excellent physicians—a heady responsibility that neutralizes any possibility of boredom.

In my inner argument with Clank, that was my first rebuttal.

I continued with the current first-years, "Starling pressures are physics. Some of you are comfortable in that world. Others break out in hives at the terms 'pressure' and 'physics.'

"I promise that Starling is for everyone, not just for the physics types. With a visual approach to capillaries, you all will 'own' Starling."

I went to the board to demonstrate the visual capillary. As I talked, I drew arrows that showed the direction and size of Starling pressures.

It was going well, but there was a fly in the ointment that had to be addressed.

"I must now break the flow of the story with a possibly difficult point that has tripped up students in the past: Two of the Starling pressures are caused by protein."

It was best to head off panic by saying upfront that this strange idea was "possibly difficult." The explanation of how protein causes pressure is among the most difficult in all of physiology.

I took a deep breath, then dove in with a brief step-by-step explanation, riding a razor-thin balance between being too theoretical (yet correct) and too simple (yet dumbed down). It didn't matter that I rode that line successfully last year or that last year's students nodded in understanding. Last year didn't count; this year's group must be convinced anew.

How could I be bored when I was afraid of choking on the explanation?

"Now, let's have fun," I said. "Let's change the Starling pressures and predict what happens to fluid build-up, as in the patient with edema."

There are endless examples, each requiring prediction of a pressure change and whether it will cause edema. At the end of the hour, students lined up at the podium to share their capillary stories.

The first student in line related personally. "My grandma had left heart failure after a heart attack. She almost died from pulmonary edema. Now, I can explain it to her."

The next student had sketched the capillary pressures in full-color with the caption, "Ernest Starling, will you marry me?" (Clank, you did not see that coming.)

The last student in line hung back. She said, "I'm your hives person. I've always been terrified of pressures. I hated them in college physics and hoped to be done with them forever. Please help."

So, what was the verdict on capillaries? Were the capillaries that have been mainstream medical education for more than a century a setup for boredom? It seems not—with new students to engage, terrified students to convince, one tough concept, a marriage proposal, and the responsibility to move all students forward with confidence. Capillaries easily passed the boredom check.

Refuting Clank was going to be a breeze.

Kidney physiology is harder

To be fair, though, what would happen with a tougher topic? Would it also survive the boredom test? I checked it out with the kidney.

Kidney physiology can mystify even the best medical students. Hardest of the hard kidney topics is the concentrating mechanism. In a nutshell, this is how we make the urine concentrated when we are deprived of water, and make the urine dilute when we are drinking water. The bottom line is strikingly simple; the difficulty is in the details.

I checked for boredom in my lecture to first-year medical students on the concentrating mechanism that I'd taught dozens of times. I prepared notes in advance, gave reading assignments, and found comfort in recalling those earlier times. I tipped my hat to the centerpiece of the mechanism—a standing chemical gradient—that can be accessed on demand to make the urine concentrated on a hot day or disregarded when the urine doesn't need to be concentrated. Brilliant! This trip down memory lane already felt like a pass on the boredom check.

The lecture went smoothly. The tempo was calculated so that students could ask questions. The experience felt stable and regulated. Stable and regulated are good with difficult topics.

Then a hand went up in the back.

"Dr. Costanzo, this is bothering me. How do kidney cells survive when they're surrounded by that standing chemical gradient? Wouldn't the cells lose water to the gradient and die?"

"Wow, you have asked the question!" I said. "That question hasn't been asked in all my years of teaching this topic!"

This was not a see-me-after-class question. This was a stop-everything question.

I went on. "Absolutely, the cells would lose water! Are you willing to speculate why?"

I took a chance by putting the student on the spot.

She was willing to try. "Could the cells manufacture chemicals to prevent the water from leaving?" She went on to propose that these manufactured chemicals would be impermeable and thus hold water within the cells.

When she finished, I witnessed a once-in-a-teaching-lifetime event. Her fellow students applauded.

At that moment, the question, "Am I Bored Yet?" seemed officially ridiculous.

Too easy

Still, the boredom tests I'd chosen were suspiciously easy. I had cherry-picked examples to make my case. There had to be more to Clank's whispered advice.

As a medical school teacher, my skills had been honed over years of trying, revising, and trying again. I had prayed for the day when teaching would feel easy. (Early on, I would have settled for easier.) Finally, one day I entered the classroom and something felt different in the air. I found I was less concerned that my planned lesson wouldn't work, less fearful of unexpected questions from students. Comfort! I rejoiced (privately) and paused to reflect on badges I'd earned along the way:

- The badge for finding the right level of rigor (oh my, that took years).
- The badge for making hard concepts fun (no, seriously).
- The badge for welcoming left-field questions (scary, just plain scary).
- The badge for rebounding from a bad teaching year (nearly quit).
- The badge for overcoming fear of acid-base (a happy ending).
- The badge for finding a perfect analogy for lung elasticity (okay to brag on this one).

Surely I was entitled to relish the hard-earned comfort. The badge collection, a sort of teaching portfolio, might even suggest I was all set.

But my scientist nose smelled trouble. I'd been around long enough to know that comfort's poor cousin—complacency—lurks ominously. I recalled being too comfortable on occasion, and the result was not my best. To give Clank a fair test, I needed to poke around in those dark corners.

Poking broke the seal. It turned out there were several basic physiology topics that I no longer enjoyed teaching. Exposed! Take the nerve action potential. After years of polishing, it was too comfortable. I'd ironed out the tricky parts, leaving behind lessons that were competent but drier than dirt. "Snap out of it, amp it up, your students deserve better," I'd say, but the self–pep talk was unconvincing. Reconciled, I had settled for a competent action potential, with apology to the students for the slog ("We made it. Tomorrow will be more fun").

The example seemed innocent enough, but that was precisely the tipping point. That was the point where comfort could teeter into complacency. ("I've got this, no worries, good enough.") Complacency, hardly noticed, could snowball into boredom. ("The action potential, you again so soon?") Unchecked, boredom could spread and harden into end-stage teaching apathy—devoid of curiosity and filled with resentment.

Clank himself was Exhibit A.

Was I at risk of becoming Exhibit B?

The creep of good enough

It was a shock to confront this in myself. It turned out that I, who brimmed with teaching enthusiasm, had pockets of boredom brewing. When I dug deep, there they were. No one, including me, would have ever suspected.

The truth was out. But now what?

By itself, the action potential was disappointing but not alarming. What alarmed me was the specter of

complacency-creep. The good enough mentality from the action potential could spread and infect other topics.

It's best to assume that no teaching is resistant to the creep of good enough. Not prime clinical topics like Starling or chart-toppers like kidney concentrating mechanism. Not even my precious acid-base, which merited a badge for overcoming the fear of it. All are susceptible, and Clank hovered dangerously close. I sprang into intervention mode.

Take acid-base physiology. It has all the ingredients to challenge a teacher forever: counterintuitive terminology, logarithms, anti-logarithms, endless clinical cases, and acid-base phobic students to win over every year. To become a teacher of acid-base, I had to overcome my own misunderstandings and fears. Even as my experience grew, I lived on the edge. Would I choke on an explanation? Would a student's question derail me? Slowly, surely, it fell into place and became my most beloved subject to teach. When I taught acid-base for the umpteenth time, the ingredients were finally well-oiled. Comfort!

But wasn't that the tipping point? The point where comfort could slip into good enough and from there into complacency and boredom? Acid-base was the perfect model for an intervention.

The intervention would be to intentionally create discomfort. To intentionally renew the challenge—even when all appeared to be well. I dug through unusual cases and found a report of prolonged vomiting and diarrhea that resulted in three simultaneous acid-base disorders. Why three? What was the physiology of each disorder? How did they interact, or did they? Using principles of physiology, could I untangle the solution? The exercise didn't need to make it into the classroom, it simply needed to push me out of equilibrium.

That was it, that was the trick! It was a simple model that I could use for any topic!

I imagined cycles of comfort and discomfort. Periods of comfort would allow me to stabilize and practice learned skills. I would then intentionally create discomfort to hone the edge and restore the healthy fear of falling short. The cycles would repeat, comfort and discomfort.

The accidental truth

Thirty years ago, I took a job in medical education. Since then, there have been several iterations of the initial job, with unexpected twists and turns. There have been countless cycles of inspiration, boredom, and re-inspiration. The cycles have played out over decades, and continue to this day.

Clank warned that all teachers eventually become bored. How easy it would have been to dismiss him! But something in his words rang true. I now believe that Clank yearned for legitimacy as a teacher, without the skill or temperament to pull it off. Hardened into a caricature of his own dire prediction, he accidentally spoke the truth he knew. Wise counsel it was, and from the unlikeliest source.

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