

## The Scientific Method of Practicing With Dr. Timothy Hagen

Over my 16 years of teaching, I have had countless students who did not know how to practice effectively. Sometimes, I had been their only flute teacher, and other times, I had inherited them. This experience taught me that I was not thinking and talking about practice methodology often enough or clearly enough and that there was room to begin a conversation about it with my community of colleagues (hence, this workshop). As the ideas in *The Scientific Method of Practicing* began to coalesce, some (specifically those in “securing the parameters”) grew from practicing and teaching, while others came from reading about the psychology and neuroscience behind high-level performance.

The precepts of *The Scientific Method of Practicing* are rooted in **mindfulness**, which has been proven to increase effectiveness and enjoyment. We can encourage a state of mindfulness by continually questioning ourselves and reflecting upon our work as we follow four basic, scientific principles, outlined below.

- **Secure the Parameters:** Detectives secure a building before searching, and scientists establish controls. Both groups are drawing boundaries to ensure effectiveness. Likewise, effective practice contains boundaries: **clear goals and vivid images of what those goals look/sound like**. Two primary goals are **where to practice** (exact place in the music) and **what to practice** (exact nature of a problem). When possible, these should be set before practicing, though sometimes a new goal becomes clear when we are in the midst of practicing. Questions to mindfully foster boundaries:
  - Should I practice a small or large section?
  - Did my playing match the vivid image in my mind?
  - What, precisely, is the problem here?
  - Am I isolating the problem?
  - What passages line up with the fundamentals I am working on?
- **Exploit the Unexpected:** Most of us hate mistakes, but according to acclaimed pianist William Westney, **avoiding mistakes is the biggest mistake of all**. In our practice, comfort, physical freedom, expression, and mistakes should emerge. When a mistake occurs, it is the result of the body acting freely. Moreover, according to Dr. Bob Duke at The University of Texas, **mistakes prime the brain for learning**. Mistakes are therefore not bad; instead, **they are the portals to improvement**. Once made, a mistake can be consciously fixed while maintaining comfort, physical freedom, and expressive playing, causing mistake-free passages to become natural instead of forced. **The scientific method (observation, hypothesis, testing, conclusion, and repetition) is an excellent template for processing mistakes**. Questions to mindfully foster healthy processing of mistakes:
  - Am I avoiding a mistake?
  - Do I really know what/where the mistake is?

- What is my body telling me with this mistake?
- Am I holding tension anywhere in my body during this passage?
- Have I successfully processed the mistake?
- **Get Stuck on Repeat**: Repetition tells you if a mistake has been processed. **Aim to repeat a passage 15-20 times**, matching your vivid image. In the process, according to Dr. Bob Duke and olympian and author Matthew Syed, **habit strength will develop, and the brain will chemically transform itself into a more powerful processor**. Questions to mindfully foster effective repetition:
  - Did these performances match my goal?
  - Am I able repeat this passage without physical tension?
  - If I leave this passage now, will it haunt me later?
- **Walk the Road to Well**: Your mindset is as important to effective practice as your actions. Recognize, as Stanford psychologist Carol Dweck has proven, that **continued effort is more important than current ability**. You will create a better practice environment if you **reject value judgments and instead celebrate your successes and use your failures to learn**. Questions to mindfully foster a healthy attitude:
  - Did I play what I intended?
  - Am I putting in enough effort? The precise kind of effort required?
  - Am I making time to celebrate successes?

It is up to each of us to decide where, when, and how to use these principles. As such, *The Scientific Method of Practicing* is not a template onto which we can simply map our practice but rather a set of logical, healthy behaviors and attitudes meant to make our practicing increasingly satisfying. In other words, enjoy putting on your musical goggles, turning your practice space into a laboratory, and experimenting with these ideas!

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