# *Teaching Philosophy Statement*

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Until now I have never explicitly contemplated my own 'teaching philosophy'; I have always taught others how I learned best. That is to say, give me the tools I need and let me figure it out. And it is the concept of 'tools' that was my guiding principle while I developed this CTFP.[1]

For me, experimental labs are meant to teach the craft of research. And, like any craft, teaching should focus on the *hows* and *whys* and not the *whats*. Think of any other craft, say carpentry. You don't teach a woodworker to build a chair. You teach them how to use a saw, construct the right joinery, etc. and students use this knowledge to build a chair. This differentiation may seem pedantic, but by focusing on the process and not the outcome, you can quickly transition to new projects, whereas if all you're taught is how to build a chair, chairs are all you're going to build. To me, it's the same in chemistry. We shouldn't be teaching how to write a chemistry lab report, we should be teaching how to write. Likewise, we shouldn't be focusing on the specifics of any given lab but emphasizing numeracy and graphicacy. At the end of the course students should have developed tangible skills, not simply reinforced theory from lectures.[2]

I went through the same types of labs taught to students today. The deficiencies in the 'results'-based approach hit me hardest when I first started 'real' research. Often, as is the point of research, theories would crumble before reality and I had no clue how to conduct an autopsy. Alternatively, I would reject valid data because it wasn't as close to the target I had in mind, like in my undergrad labs. The later is easily observed in undergrad answers to the classic "Explain the source of error" question in most every lab report. Students are quick to throw their results — and themselves — under the bus when in reality a deviation of 50% may be the norm. I believe labs should embrace and explore uncertainties and deviations to better prepare students for the reality of research, and all of it's implications. This includes an increased focus on numeracy and graphicacy, exploring negative results, hypothesis testing and data-driven labs over reaffirming lectures.

While the final iteration of *Experiment 1* was decided by Dr. D'eon in consultation with other CHM 135 faculty, the core of the exercise is true to my teaching philosophy: students learn skills related to data analysis. The best possible outcome for this lab is all students get the same high marks. This would mean that they all learned the skills[3] and they should be able to apply them elsewhere i.e. upcoming labs.

[1] Implemented in the Fall 2020 CHM 135 session as *Experiment 1: The Chemistry of Air Pollution*

[2] A good example of this complimentary is the skills-centered CHM 136 labs which are disconnected from theory driven lectures.

[3] I understand the realities of academia, but I believe their shouldn't be a grade beyond pass/fail for labs; your drive test score isn't on your licence, you either have it or you don't.