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Failing in Front of Your Peers: A New Pedagogy of Logic

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Few other classes in the traditional undergraduate philosophy curriculum engender as much fear and anxiety as introductory logic—among both students *and* teachers! Students are anxious about learning techniques that are so different from traditional philosophical methods, while teachers, many of whom are not logicians themselves, have to balance responding to this anxiety with their own uncertainties.

Very little literature exists on the pedagogy of logic; yet, teaching logic, especially in a philosophical context, involves unique pedagogical issues that are present neither in the teaching of philosophy nor the teaching of mathematics—logic's two closest disciplines. The discipline brings together students ranging from those who suffer from math-anxiety, induced by the heavy symbolic notation, to those who are most happy mired in math and now need to grapple with critical skills requiring a deep understanding of how language works: a unique pedagogical challenge.

Two common barriers to learning logic that students commonly face are (a) lack of application and (b) fear. I used to call (a) laziness, but I'm no longer convinced that this is actually a thing. But logic is a cumulative endeavour that cannot be done without regular practice, and a lot of undergraduate students do not have much experience with working hard, over and over, at something until they learn how to do it, and so do not realize just how important it is to *continue trying*. Many people who do poorly in introductory

logic classes do so simply because they never devoted enough time to it. While this is a problematic barrier, it's not insurmountable. On the other hand, (b) is a significant barrier. Many undergraduate philosophy students are negatively predisposed to anything that smacks of math. Many haven't done any math since high school or secondary school, when they often did poorly. The method of learning something via definitions and rules is foreign to the usual practice of philosophy, a practice that undergraduate students are predisposed to, because otherwise they wouldn't be doing philosophy at the university level. The use of unfamiliar symbols and things from the Greek alphabet can be very off-putting.

Both lack of application and fear need to be counteracted in order for students to be able to succeed in a logic course. In my more than twenty years of teaching logic, I have developed an approach that address both of these barriers that focuses not so much on teaching my students *logic* but on teaching them one key skill:

How to fail in front of their peers

The way to master logic is to work through lots of problems, especially ones that push your ability; the only way to do this is to be willing to make mistakes and fail. But logic is best pursued in a joint, collaborative setting, which means that you have to be willing and able not only to fail but to *fail in front of your peers*. Thus, the method of failing in front of your peers addresses both (a) and (b).

Failing, or being seen to fail, is an incredibly difficult thing for people to do, which means that I have to set expectations from the very start that are conducive to an atmosphere where failure is not a barrier. This involves two key components: An expectation that everyone participates, and an expectation that anyone can decline to participate at any moment with absolutely no judgement. This may sound contradictory: How does this work in practice?

The classes I teach are generally structured around weekly lectures plus weekly small group meetings (ten to fifteen students). Every week, students are given an exercise sheet that they are expected to complete in advance of their small group meeting. Due to scheduling vagaries, quite often I have to assign the first problem sheet *before* the first lecture, which means that I have to give them a set of exercises that don't require any actual knowledge of

logic to complete. So the first set of questions is one that anyone can answer: I ask them to name three logicians who lived before 1000, three who lived between 1000 and 2000, and three who are either still alive or died after 2000. They are then instructed to pick one from each category and do a bit of further research on them. During the first small group meeting, I ask everyone to name the nine people they've chosen, and I put all the answers on the whiteboard in a rough general timeline. Then, I ask each student to pick one of the three they've done further research on and tell the rest of the class two to three sentences about that person.

This establishes the expectation that everyone will participate in class, but without any fear of failure, because there is literally no way to get this exercise wrong. At the most, I will get people who are uncertain whether a particular person counts as logician—but this is exactly the type of conversation topic I want sparked. This exercise also lays the foundation for addressing barrier (a) by establishing appropriate pay-off structures: I have to make it cost more for the students not to do work regularly than to do it. I need to give students the right motivation to do it, and they can get this from two things: care and expectation.

Care: You've got to care. Even interesting content can be rendered awful by a teacher who doesn't care about their subject. If you are enthusiastic about what you are teaching, it will infect your students. Unfortunately, for many people, logic hardly counts as "interesting content"; and often times the people teaching introductory logic are not themselves career logicians, and they may not care about the subject as deeply and passionately as I do.

But that's okay, because the subject matter is not the only thing you can care about. You can also care about your students. If they know that you are truly rooting for them to do well in this class, they will be more motivated to prove you right. (They'll also be more comfortable asking you questions, coming to your office hours, etc.) There is one very easy way to show you care about your students: Learn their names. In a large class, this can be difficult, especially for people, like me, who suffer from mild prosopagnosia. But if you have a small discussion group, that's doable, even if it takes a few weeks. Begin by using people's names regularly in the small group context; but don't just use them there, also use them in lecture. When someone asks a question or volunteers an answer, call on them by name. Even if you don't know every student's name, they will see that you at least know some of them. They will see that you cared enough to learn them. And they may *also* see you modeling "trying-and-failing"!

My method for learning names in the small group classes is tied to my method for motivating them to do the weekly exercises. Each week, I assign at least as many exercises as there are people in the biggest group, sometimes with an exercise or two left over, ending up with ~thirteen to fifteen per week. That's a huge amount of practice, especially since the exercises are cumulative and often repeat and build on what was done the previous week, and anyone who does all of them will become pretty proficient pretty quickly. I then create an expectation, starting with that first week, that each week every person is expected to give their answer to one exercise on the board in front of everyone else. The first few weeks, I call on people randomly—sometimes I walk around the room, sometimes I go down my attendance list alphabetically, sometimes I pick names randomly. I do this until I have learned everyone's names, after which point the expectation was well enough established that I could start letting them volunteer to answer; one advantage of this (which they quickly realized) was that they could volunteer to answer a question they were confident they had an answer to—or, as the difficulty increased, about which they had a specific question about their answer or their method.

But the only way this expectation works is if it tempered with another expectation, that not everyone is going to be able to answer every question every week. Some questions may be harder than others. Some students may have external contributing factors some weeks and not others. They have to know that it is okay to fail—to admit that they don't have an answer, or that they have a wrong answer—and that it is okay to fail in front of their peers. This is a tremendously scary thing to do, and many have probably never done it before.

My goal as the teacher is to ensure that no one ever feels uncomfortable for having tried but still failing to come up with an answer. This means that the moment I call on someone and they show *any* signs of reticence or hesitation, I swiftly and without comment move on to the next person. This establishes that "I'm not comfortable sharing my answer to this question" is a completely reasonable reaction to being cold-called—and it also helps set them up to be comfortable to volunteer when they *do* feel comfortable answering. When people are comfortable with the idea that it is not the end of the world to stand up in front of class and bumble around, they will become much more comfortable with attempting difficult things that they would otherwise have maybe thought previously "too hard." Thus, not only are they learning logic, they are learning how to go about doing something

difficult, knowing that this is difficult, that I don't expect them to find this easy, and that I expect them to go wrong-headed sometimes because that's how you learn.

I also (sometimes accidentally!) model this for them in my teaching. I once accidentally set my class an unanswerable question, asking them to demonstrate that one particular syllogism could be reduced to another. The question had an error in it, which I didn't recognize until too late, so I turned it into a "teachable moment." I asked my students how long they spent working on it before they gave up. Answers ranged from "10 minutes" to "until I'd exhausted all the possibilities" to "until I heard from one of the other students that his tutor said it couldn't be done." And I let them know that my usual rule of thumb is 20–30 minutes. If I'm trying to prove something and after 20–30 minutes of solid work I'm not getting anywhere, that's where I reverse and start trying to find a counterexample instead!

I've been consciously using this method for teaching introductory logic for the last six years; only recently have I learned that many of the techniques that I use are in fact known, discussed techniques in broader pedagogical circles, falling under the umbrella term "trauma-informed pedagogy." For anyone who wants to learn more about how the techniques I've discussed in this piece could be used in other contexts, I recommend taking a look at this class of literature.