

Argumentation Step-By-Step: Learning Critical Thinking through Deliberate Practice

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Abstract: In this paper, we offer a method of teaching argumentation that consists of students working through a series of cumulative, progressive steps at their own individual pace—a method inspired by martial arts pedagogy. We ground the pedagogy in two key concepts from the scholarship of teaching and learning: “deliberate practice” and “deep approaches to learning.” The step-by-step method, as well as the challenges it presents, is explained in detail. We also suggest ways that this method might be adapted for other classes.

Critical thinking classes have become a mainstay of higher education in the United States, a fact demonstrated by the dozens and dozens of textbooks that are designed for such courses. Indeed the skills that are central to many such courses are crucial to a democratic society: being able to distinguish persuasive arguments from nonpersuasive arguments, to evaluate claims critically and fairly, and to recognize forms of persuasion not grounded in reason.¹

In this article, we present an innovative method of teaching the argumentative elements of critical thinking. This approach has been inspired by martial arts classes, particularly those wherein students are assessed for a certain belt or level of achievement only when their instructor (*sensei*) determines them ready to do so. In such classes, at each successive level of assessment students are also required to demonstrate that they have maintained the skills they achieved in previous belt levels. Importantly, a decent *sensei* does not award a belt on the basis of effort: whether a student has tried hard to master a certain action is not relevant. The question is, can the student throw the punch?

We have applied these insights from martial arts pedagogy to the goal of achieving argumentative fluency, by which we mean developing the ability to understand, evaluate, and construct arguments in such

a way that one has the skills, habits and dispositions to utilize these techniques across a broad range of contexts. We have structured class management, the use of class time and homework, and grading into a step-by-step process that attends to what each student is learning and when she is learning it. Each step constitutes a discrete but necessary element in developing this fluency, and each student completes the steps at her own pace, rather than by a schedule dictated by a syllabus, a textbook, or by her classmates. The final grade for each student is determined by how many steps that student successfully completes by the end of the semester.

The goal of this article is to explain the step-by-step method as it has been developed in the context of a critical thinking class, and to articulate the scholarly rationale for its use. The article is divided into two main sections. Part One (primarily authored by Stephen Bloch-Schulman) explores the relevant scholarship of teaching and learning that explains why this method is pedagogically effective. Part Two (primarily authored by Ann J. Cahill) presents the method in greater detail, highlighting the assumptions, main strategies, and potential difficulties with this method.

Part One: On Deliberate Practice and Deep Approaches to Learning

While there are many relevant elements of research in the scholarship of teaching and learning that would highlight the reason the step-by-step method is so effective, we will here focus on two interrelated ideas: deliberate practice and deep learning.

It is not unusual to think that the best means to increase student learning is to increase the amount of time students study. However, E. Ashby Plant, K. Anders Ericsson, Len Hill, and Kia Asberg suggest something quite counter-intuitive with regard to the correlation between study time and learning, namely, that beyond a certain amount, time spent studying does not accurately predict learning.² While more studying does initially lead to better learning (a claim that backs up findings of other researchers³), after a certain minimum amount, more study *did not* have significant (or *any*) added benefits.⁴ There is a weak or insignificant relationship between number of hours studying and performance (that is, of course, once one has done the minimum amount needed). Rather, they found that what *did* predict performance improvement was *how* a person studies. That is, what matters most is what a student does as she studies. In describing their research and in justifying their conclusion that there are “clear limits on the benefits of experience,” they offer the following analogy:

Many people know recreational golf and tennis players whose performance has not improved in spite of 20–30 years of active participation. The mere act of regularly engaging in an activity for years and even decades does not appear to lead to improvements in performance, once an acceptable level of performance has been attained.⁵

This explains why my (Stephen’s) twenty-five years of typing has not produced significant improvement. Being sufficiently satisfied with my level of typing competency, I have not focused on becoming a better typist and, unsurprisingly, my thousands of hours of typing have not garnered any improvement.

Plant, Ericsson, Hill, and Asberg also illustrate why performing to win—what we will call “maximally effective performance” (where one is trying to do the best one can at the time)—also does not lead to improvement: “For example, if someone misses a backhand volley during a tennis game, there may be a long time before the same person gets another chance at that same type of shot. When the chance finally comes, they are not prepared and are likely to miss a similar shot again.”⁶ During a game she is trying to win, a tennis player who knows she cannot successfully hit a backhand volley will likely step around this type of shot or avoid coming to the net. When playing to win or when acceptable performance is sufficient (as in my typing case), the goal of the activity is not improvement; in the former case, it is to play as well as one can at the moment, in the latter case, to use one’s skills, not to improve them. Therefore, improved performance is unlikely to occur.

Finally, Plant, Ericsson, Hill, and Asberg contrast maximally effective performance and acceptable performance with the kind of activity done intentionally to improve skills. When practice is targeted at improvement they call it deliberate. In deliberate practice, multiple focused attempts at a complex task are undertaken to improve a skill that does not improve with unreflective repetition. They again use an example from sports:

[A] tennis coach can give tennis players repeated opportunities to hit backhand volleys that are progressively more challenging and eventually integrated into representative match play. However, unlike recreational play, such deliberate practice requires high levels of concentration with few outside distractions and is not typically spontaneous but carefully scheduled (Ericsson, 1996, 2002). A tennis player who takes advantage of this instruction and then engages in particular practice activities recommended by the teacher for a couple of hours in deeply focused manner (deliberate practice), may improve specific aspects of his or her game more than he or she otherwise might experience after many years of recreational play.⁷

The most improvement comes from practicing the activity, or parts thereof, deliberately, which is to say, with the intentional goal of

improving one's ability to perform that activity. Plant, Ericsson, Hill, and Asberg argue that deliberate practice requires a very high level of concentration and effort on the part of the learner. Furthermore, deliberate practice places the learner's focus on what is difficult for her.

Crucial, as well, is the guidance in how and what to practice offered by the tennis coach in the above example. When we teachers fail to distinguish between (i) deliberate practice, (iia) maximally effective performance, and (iib) acceptable performance, we may attempt to improve student learning only by trying to increase the number of hours students spend on their course work and through high stake testing. While a certain number of study hours may be necessary, they are not by themselves sufficient for learning. What our students need from us are structured activities that require not merely more but *deliberate* practice. As Plant et al. argue, "all experiences are not equally helpful and there are qualitative differences between activities loosely referred to as 'practice' in their ability to improve performance."⁸ In courses where every student works at the same pace, the practice experienced in completing assigned homework is appropriate for a few, but too often is either too hard or too easy for others at any given time. By contrast, in the step-by-step method, each student spends her time practicing what she needs to improve, that is, what is hard for her. There is no "busy work," because practice is done only to the extent that it is useful. Once a skill is learned, and continued practice of that skill is no longer useful for a particular student, that student demonstrates fluency by means of a test or other assessment tool and then moves up to practice the next, more complex skill.

Arguing for the use of deliberate practice for teaching critical thinking, Tim van Gelder summarizes some of the key implications of Ericsson and his colleagues' research regarding how students should study, arguing that studying is most productive (that is, results in the most learning) when:

1. It is done with full concentration and is aimed at generating improvement.
2. It is not only engaged in the skill [to be learned] itself but also doing special exercises designed to improve performance in the skill [to be learned].
3. It is graduated, in the sense that practiced activities gradually become harder, and easier activities are mastered through repetition before harder ones are practiced.
4. There is close guidance and timely, accurate feedback on performance.⁹

As we will show in the next section, these implications for the teaching of critical thinking are precisely what our "Argumentation Step-by-Step" is structured to address.

In addition, the step-by-step method is intended to engage students in such a way that a deep approach to learning is transparently needed.

The conception of approaches to learning stems from research begun in the 1970s by examining how students approach their work.¹⁰ As summarized by Ken Bain and James Zimmerman in “Understanding Great Teaching,” this research led to theoretical approaches that focus on what tasks, skills and habits students use to do their work. One powerful way of distinguishing different approaches to learning is to highlight surface, strategic and deep approaches, which are qualitatively different ways students understand and feel about their work and thus qualitatively different strategies students use. In the original studies, some students focused on remembering as much as they could, “trying as best they could to replicate what they had read.”¹¹ This approach was identified as a surface approach to learning and in more general terms, students who take the surface approach in any context are looking to “replicate what they encounter,” and through this replication, to “simply survive.”¹² Thus those who are acting as surface learners are motivated, to whatever extent they are, by a fear of failure.

Other students in the studies “thought about arguments they encountered in the text, and had distinguished between evidence and conclusion in those arguments. They had identified key concepts, mulled over assumptions, and even considered implications and applications.”¹³ This was described as a deep approach to learning.

To this original analysis of different ways students feel and approach their work, later researchers added a third category: the strategic approach.¹⁴ This is characterized by a focus on ends external to learning—on grades and what grades bring—and this means that the student who uses this approach “isn’t focused on understanding or application, only with making high marks.”¹⁵ Thus, those who utilize a strategic approach are likely to be particularly risk-averse, and this is especially a challenge because of what it means for learning. One can add to what one knows without risk, but transformative learning requires risk-taking.¹⁶

In addition to identifying these different approaches, the research shows overwhelmingly—and not surprisingly—that where a student takes a deep approach to learning, the student learns more, remembers more, and transfers what she has learned to new contexts better. Thus, if there is a way to encourage students to take deep approaches, this will have significant impacts on the effectiveness of the classes they take.¹⁷

A few cautionary notes are needed at this point. First, while we may assume that smarter students take a deep approach and others take a surface or strategic approach, research does not bear this out. It is important to recognize that these approaches to learning are not fixed traits of individuals, but are context specific strategies individuals and groups of students may employ.¹⁸ While some students may see all schooling as inauthentic and thus may be unfamiliar—and thus

very unlikely to employ—a deep approach within the classroom, even those who *can* take deep approaches to learning do so strategically: where a deep approach is called for, when they have the time, when it matters to them. A student might take a deep approach in one class and not in another, and may take a deep approach at some times during a course and not at other times. For example, she may feel pressure by the end of the semester to “cram” even in a course that has been rewarding and had been, up to that point, one she approached to gain real understanding. Because taking a deep approach is significantly more work (both in time and in mental energy), as an Institute for the Advancement of University Learning paper puts it: “students will only adopt a deep approach if they are convinced that the learning tasks they are undertaking warrant it.”¹⁹

Second, students come to our classes from their other experiences with learning in schools, and so we must respond to these different approaches not by reproaching those students who do not see schooling as rich and rewarding, but must recognize the complicity of the system in encouraging surface and strategic approaches to learning. This complicity is particularly pronounced because, finally—and crucially for our work here—how a course is structured and how a professor explains, organizes and approaches the course and what the professor thinks learning is has an impact on what approach a student takes to a course and to the various parts of a class.²⁰ In other words, instructors can organize courses so as to encourage deep approaches to learning and discourage (and make useless) superficial and surface approaches to learning. Indeed, that is precisely what we hope—and are convinced—our step-by-step process achieves.

Part Two: Teaching Argumentation Step-By-Step

The challenge posed by the scholarship discussed in the previous section is as follows: how can argumentative fluency be taught through deliberate practice and a focus on deep learning? Our own experience with traditional, text-booked based approaches to critical thinking led us to believe that covering a wide scope and large amount of material (including, for example, the structure of arguments, different kinds of reasoning, dozens of different fallacies, interpreting ethical/aesthetic/political arguments, etc.) over the course of a semester, with an eye toward non-cumulative, externally scheduled assessments, typically fostered at best a strategic approach, and most often a surface approach, to learning. When we taught such classes utilizing more traditional pedagogies, the pace was too fast, and too heedless of each student’s strengths, weaknesses, and approaches to learning to foster a deep transformation of the way students think and approached argumenta-

tion. Because the pace was set by the chapters of a textbook and the syllabus, the students' energies were not focused on what they did not know and on what they needed to learn at that moment, but rather on what an external source had decided should be taught in, say, Week 6 of the course. Even in a case where the course material was obviously cumulative, such that not grasping some crucial concept would render a student virtually incapable of learning whatever material was to follow, we did not act on evidence that a student had not grasped such a crucial skill/concept and thus was not ready to proceed to a more complex skill/concept. The class as a whole moved on. Finally, the chances of students sustaining knowledge and skills learned early in the semester (if in fact they were learned) until the end of the semester seemed unlikely indeed. We would work through most or all of a given textbook and wonder, in the end, how many of our students would leave the course with a tendency to think well and critically about arguments, claims, reasoning, etc. Yes, they had earned a certain grade. But what could we say, with any confidence, that they had learned through the course?

What would it be like, we wondered, if the student's learning dictated when material was presented, engaged with, and learned? What if failing to demonstrate fluency in a certain set of skills meant not that one got a bad grade and kept soldiering on, but that one needed to learn that set of skills in a different way? What if students were always working on what they couldn't do yet, while also maintaining skills that they had learned earlier? What if the grading system relentlessly focused not on what *should* or *might* lead to learning (attendance, completing homework, etc.), but on the learning that was or was not occurring? What if the student's own learning process dictated the tasks and timeline for each student?

A pedagogy that was framed by these sorts of goals and aspirations, we thought, would provide students with an immediate sense of the meaning of their academic work. It would put the emphasis of the class squarely on student learning, rather than on "covering" the material. Students and instructors would know what students could and could not do yet in a way that was clear and transparent for both students and instructors. It would thus position the instructor less as a repository of expert knowledge and more as a coach, there to help the student learn as much as possible.²¹ By making the learning (and need to learn) transparent for all, it would increase the responsibility of the student, who would know that she could only earn a certain grade by demonstrating sustained fluency in a given skill. At the same time, it would make clear the responsibility of the instructor, who would know better what each student could and could not do, and would force the instructor to help those who struggle with any skill, rather than ignor-

ing this fact, as we had done previously. Thus, the approach would result in an admirable level of metacognition and epistemic modesty: students and instructors would both be able to describe precisely what had been learned and to what degree.

Not all philosophy courses, we realize, may be well suited to such an approach. Critical thinking, however—particularly the elements of the class that focus on being able to understand, evaluate, and construct arguments—is an excellent candidate for an individualized learning process, precisely because so many of the skills are cumulative. Keeping in mind both the scholarship of deliberate practice and deep learning, and non-academic examples of education that focus on learning skills important to the learners themselves (martial arts classes, again, or even driving lessons), we threw out the textbook and the schedule, and came up with ten discrete, cumulative steps, each of which consists of a specific skill crucial to argumentative fluency.²² These ten steps provide the framework of the classwork, but precisely when each student encounters them depends on that student's own process.

So, for example, on the first day of class, the entire class is taught Step 1 (details on each step will be provided below). Having been taught the material by the instructor, students practice the skill by means of exercises, and then share their work with the instructor, who provides feedback with regard to its quality. When an individual student has completed work that demonstrates that she is capable of reliably demonstrating that skill, the instructor allows her to take a quiz for that step. If the student passes the quiz, she earns a certain number of points toward her final grade, and then continues on to learn Step 2, taught to her then (and only then), by the instructor. If the student does not pass the quiz, the instructor again gives feedback, the student practices some more, and another quiz for the same step is administered when the instructor is convinced that the student is ready, with no penalty for having failed the quiz the first time. The quiz for Step 2 requires the student to demonstrate again the skills included in Step 1; the quiz for Step 3 requires demonstration of the skills included in Steps 1 and 2, and so on. This process continues throughout the semester, with the final grades being determined solely by how many Steps the student has successfully completed.

Of course, not long after the first class, students are no longer working on the same material. Some will pass the first steps quickly, while others take longer. Moreover, the same step may present quite different challenges to different students. Soon the instructor is dealing with a one-room schoolhouse, where students are not only engaging with different material, but are engaged in different tasks: some are ready for instruction, others continue practicing a certain skill, while still others are ready to be assessed. We will discuss some of the

challenges presented by such a classroom below, but for now, let us emphasize that such a classroom is motivated and energized by the individual meaningfulness of the work involved. Students are doing X not because it happens to be Week 4; they are doing X as a result of the work they did last week and the week before. They are doing X because X is difficult for them, because they do not know how to do X and because they need to learn how to do X. Thus, not unimportantly, the relationship between doing X and achieving a specific goal (whether that goal is framed by a pure desire to learn, or a desire to do well in the class, or a combination of the two) is both obvious and reasonable. They are engaged, in short, in deliberate practice.

What has been perhaps most striking to us as we have practiced and refined this pedagogy is the refreshing way in which all of the work involved in the class—on both the student and the instructor’s part—is understood as significant. There is no such thing as busy work, and this is clear to students and instructor throughout. The exercises that the students work on prior to the assessment instruments are extremely similar to the instruments themselves, and whether or not the students can perform well on those exercises has an immediate ramification (they will be assessed, or not). Instructors, similarly, are providing feedback that by definition has relevance for the student, and are not evaluating work in which the students are not invested (when a student is trying to pass Step 9, you can be sure she will read the instructor’s advice for how to improve her argument). And if a student misses or sleeps through a class . . . well, that student didn’t “miss” anything. There are no notes to copy from another student, no sense of “catching up.” Missing that class merely means that the student’s learning process was temporarily put on hold, and can only be taken up again when the student re-engages in the work. One of the real advantages of this structure is that it reflects clearly and unambiguously that the student bears a primary responsibility for her own learning: it simply cannot happen without persistent diligence on her part. Which is not to say that the instructor cannot facilitate that learning; but just as a *sensei* cannot learn to throw a punch for you, the critical thinking instructor can only assist the student who is engaged in the work of learning itself.

If a student is having difficulty with one step, the instructor cannot ignore that fact, and both the instructor and the student must work together to find an effective way to achieve the skill in question. In a traditional approach to critical thinking, a student (who probably wasn’t ready, for whatever reason, to be assessed for that skill) would fail the quiz, the instructor would record the grade, and the class would continue. Here, *not to have learned* is also relevant: it signifies the need for more, and perhaps a different sort of, work.

Having taught this pedagogy several times over the past two years, we have come to the conclusion that, precisely because of its focus on deliberate practice and student learning, it is far more effective at habituating students to the skills of critical thinking than a traditional textbook-centered approach. A good example of this advantage of the pedagogy is the percentage of students who leave the critical thinking class able to diagram arguments consistently and accurately. While we have done no explicit, quantitative research on this question, Dr. Cahill estimates that when she used a more traditional pedagogical approach, approximately a third of her students never really acquired that skill. Now, no student passes the course without being able to construct such diagrams, and virtually all students, regardless of their ultimate grade, leave the course being able to do so almost intuitively.

Given that, as van Gelder and others have shown, “one semester of instruction based on argument mapping can yield reasoning skill gains of the same magnitude as would normally be expected to occur over an entire undergraduate education,”²³ and given the effectiveness of teaching mapping through the step-by-step method, it is not surprising that teaching in this way has reminded us of how thrilling it is, as instructors, to witness moments of learning, to see our students move from confusion and inability to confidence and fluency. This approach allows us to be constantly present to and aware of our students’ intellectual growth. We’re no longer waiting for that assignment due in the second month of class to see if a given student is “getting it”—on any given day, we know precisely what each student has already learned, and what each student has yet to accomplish. Our critical thinking classes, while occasionally (as will be described below) chaotic, are alive with the hubbub of engaged learning and with the struggles of engaged learners. Suffice it to say that textbooks and traditional critical thinking pedagogy hold little appeal for us after such experiences!

How the Step-by-Step Approach Works

Let us turn our attention to some concrete details regarding this approach. As described above, the pedagogy is framed by ten specific steps, each consisting of a distinct skill. Cumulatively, the steps move from understanding arguments, to evaluating arguments, to constructing arguments (with the logic being that one cannot evaluate an argument that one does not understand, and that to construct a strong and compelling argument requires the ability to evaluate arguments). The ten steps, and the assignments and points associated with each, are as follows:²⁴

To do this step . . .	For exercises and quizzes, students are given . . .	And are then asked to . . .	Passing the quiz or exam in our class earns . . .
Step 1: Distinguishing Arguments from Other Forms of Language	A series of short (no more than 1 paragraph) examples of different kinds of writing.	For each example, indicate whether it is an argument, and articulate the reasoning behind that judgment	5 pts
Step 2: Isolating Conclusions	A series of arguments, ranging from short (2 or 3 sentences) to medium length (2 or 3 paragraphs)	For each example, paraphrase the argument's conclusion	5 pts
Step 3: Diagramming Simple Arguments	A series of arguments, no more than five or six sentences total	Draw a diagram of the argument, which consists of a numbered list of individual claims, and then a graphic representation of how those claims give evidence for the conclusion	15 pts
Step 4: Diagramming Complex Arguments	One or more medium to long arguments (the longest being two single-spaced typed pages)	Draw a diagram of the argument, as above (only bigger!)	25 pts
Step 5: Evaluating Arguments for Acceptability	A series of arguments, ranging from short to medium length	Draw a diagram of the argument, and then evaluate each premise individually on the basis of acceptability, providing an explanation for each evaluation	8 pts
Step 6: Evaluating Arguments for Relevance	A series of arguments, ranging from short to medium length	Draw a diagram of the argument, and then evaluate each premise (either individually or in conjunction with other premises, as needed) for relevance and acceptability, providing an explanation for each evaluation	8 pts
Step 7: Evaluating Arguments for Sufficiency	A series of arguments, ranging from very short to medium length	Draw a diagram of the argument, and then evaluate the premises, grouped appropriately, for sufficiency, relevance, and acceptability, providing an explanation for each evaluation	8 pts

Step 8: Writing Evaluations of Arguments	A series of arguments, ranging from very short to medium length	Write a narrative evaluation of the argument (note: no diagramming at this stage), avoiding any use of jargon	8 pts
Step 9: Constructing Arguments	Nothing (but students are required to read Weston's <i>A Rulebook for Arguments</i>)	Write an original, strong argument	6 pts
Step 10: Engaging in Oral Argumentation	Nothing (but students are required to read Fowler's <i>The Ethical Practice of Critical Thinking</i>)	Participate in a face to face panel presentation with a guest who holds an opposing position to the students'	4–12 pts

In our grading rubric (which is based on a 100-point scale), students who progress through Step 7 earn a C for the course; students who progress through Step 10 earn an A. No student can pass the class without being able to (i) diagram complex arguments and (ii) demonstrate understanding of at least two criteria for evaluating arguments. Moreover, as stated above, the majority of the quizzes explicitly require students to demonstrate that they have maintained previously learned skills. For example, the quiz for Step 6 not only asks students to evaluate arguments on the basis of relevance, but also requires them to diagram the argument and evaluate it on the basis of acceptability. If a student's work indicates that a previously acquired skill has weakened, she is returned to the relevant step and must be evaluated on it again before continuing.

Not all steps are weighted equally. Our experience has been that the skills that involve the most significant cognitive development are those involved with diagramming arguments, perhaps because such skills require students to read and interpret language in a drastically different way. Diagramming arguments necessitates focusing less on what the claims in a given argument *say* (although obviously the content of those claims is significant), and more on what those claims *do*, that is, how they interact with other claims in order to function as evidence or conclusions. Students often struggle mightily to focus only on relationships among claims involving evidence, rather than, say, causality or chronology. Because the two diagramming steps represent a steeper learning curve than other steps, they are worth significantly more than the steps before or after them. Note that, in keeping with the pedagogical philosophy underlying our approach, this disproportionate grading of the steps is directly related to the amount of learning that each step requires, not the amount of effort any particular student expends to complete it.

Most of the skills are assessed using fairly traditional quizzes, which are given on a pass/fail basis. The quiz for Step 2, for example, asks students to paraphrase the conclusions of a series of arguments. In Step 8, students are given a medium-length argument and asked to evaluate it using the criteria of acceptability, relevance, and sufficiency (without, however, using any language specific to the class: students are instructed to write an evaluation that would be understandable to any reasonably intelligent reader). For Steps 9 and 10, the assessment tools are quite different. In Step 9, students are required to write an argumentative essay (on virtually any topic, as long as research is both possible and necessary), and to keep revising that essay until the instructor is satisfied with its quality. Once the essay meets the instructor's requirements, the student has passed the step.

The most creative assessment is associated with Step 10. Here, students (usually in groups) are required to take a position on a specific topic and then find, and invite to class, one or more persons with a vested interest—and a very different position than the students'—in that topic. The guest(s) must come from outside the university community. The students and the guest(s) then present a debate to the whole class. This is the only assignment that is not graded purely on a pass/fail basis: different amounts of points can be earned depending on whether the students did a merely acceptable or outstanding job (and no points are earned if the students do a particularly poor job). In addition, on this assignment students are not merely assessed for whether they deployed well the informal logic they had learned. They are also assessed on their ability to engage in argumentation in a good faith, productive manner. Grounded primarily in Martin Fowler's book *The Ethics of Critical Thinking*, this step focuses on the ethics of argumentation.²⁵ The focus is on the skills associated with being able to argue in a way that respects the topic, the participants, and the community within which the argument takes place. This is a demanding, challenging assignment. It is not easy to get an A in this course!

Exercises are provided to the students for each step, and students may work on these exercises either in or out of class. Neither homework nor class attendance is required: students are free to share as much or as little of their work with the instructor as they wish. However, if students miss a significant number of classes, without a documented and reasonable explanation, the instructor may not be willing to schedule out of class meetings with that student (the logic here being that, in the absence of mitigating circumstances, if the student has opted not to avail herself of the instruction available during classtime, the instructor is not obligated to provide an alternative to that classtime). The overarching principle is this: students are provided with opportuni-

ties and support to make as much progress as possible, but they only received credit for actually passing steps.

There is one major reason in favor of attending class, however (in addition, that is, to maintaining the possibility of out-of-class meetings), and that is that new material is only taught face-to-face directly by the instructor. This course functions entirely without a textbook (with the exception of two very short books recommended for Steps 9 and 10, respectively: Weston's *A Rulebook for Arguments*²⁶ and the Fowler text mentioned above), and there is no reading assigned to the students between classes. Instead, all the material is presented directly from the instructor to the student. We find that this method of communicating new material imbues the instructor-student interaction with an authentic urgency. Students are clear that they need to understand this material and apply it well, and so are far less likely to sleep or text-message through instruction than in other classes. In addition, the directness of the method allows instructors to perceive whether individual students really seem to be grasping the concepts, and to reiterate or reapproach the material as needed.

As mentioned above, the first day of class involves whole-class instruction: all the students start with the first step. Very quickly, though, the number of students receiving instruction at any given time becomes much smaller, allowing for more effective and individualized communication. As the semester continues, the instructor will teach the same material multiple times (sometimes even multiple times during the same class period), but always to students who are prepared intellectually and feel ready to learn that material and always in a way that addresses the particular needs of the student(s) being taught at the time. The opportunity to teach the same material multiple times has another benefit: occasionally a student would benefit from hearing the instructor's presentation on a certain step multiple times, a need that is easily accommodated.

Challenges of the Argumentation Step-By-Step Method for Instructors and Students

As we've stated above, we believe there are many advantages to teaching argumentative fluency via the step-by-step method. However, this pedagogy does present its own distinct challenges, and in this section we will discuss some of the challenges we have found in our teaching context and present some of the ways we have addressed those challenges.

A bit of background will provide some context for the following comments: we teach in a private, liberal arts-focused Masters level university with bright students. They are students who average roughly 1800 on their SATs and two-thirds of them rank in the top 25 percent

of their high school classes. There are about 5,300 students on campus, and the university is deeply committed to excellent and engaging teaching. Each of our critical thinking classes is capped at thirty-three, and the average is more like twenty-four or twenty-five students. We have taught this to as few as ten, and as many as twenty-six. One additional important note: All of the classes at Elon are four-credit classes, and we have typically taught this class with a twice a week, 100 minute per meeting schedule.

We have found that in our institutional context, perhaps the most acute difficulty in adopting this pedagogy is classroom management, particularly the problem of the logjam. Given that each student needs feedback on the work she is doing, and that feedback must be given individually, it is not unusual for students to have to wait their turn in line. Students may also need to wait in order to have their quizzes or homework evaluated by the instructor.

We have found that two strategies are particularly helpful in keeping such logjams to a minimum (although it should be noted that we have not found it possible to eliminate them entirely). First, even though homework is voluntary, we require those students who would like feedback on their homework to hand it in to the instructor at least twelve or twenty-four hours in advance of class, as determined by the instructor. The instructor commits to having that homework evaluated prior to the beginning of class, which allows students to get feedback and to proceed right from the start of the class period. It also ensures that the instructor is not greeted at the beginning of class with a stack of work to be evaluated. (Those students who do not make the deadline are not precluded from receiving feedback, of course—they will merely have to wait during the class period until the instructor is free to evaluate that homework.)

Second, we have found that it is helpful to keep careful track of which students will be taking quizzes in a given class period, and which will need instruction. Dr. Cahill usually begins class by having the former group start its quizzes. Next she hands back any work that has been evaluated. Then she moves on to providing whatever instruction is necessary (starting with whatever group has the most students in it). By the time the necessary instruction has been provided, students who have been using class time to practice their skills have usually produced some work to be evaluated. (Note that students are not explicitly grouped according to what step they are working on, although some do opt to work together at certain points, and we encourage that. Instead, different areas of the classroom are designated for the three stages that occur at every step: learning, deliberate practice, and assessment.)

Another challenging aspect to this pedagogy is that its success relies heavily on the instructor's ability to give very quick, effective

feedback. There just is not enough time, usually, to take ten or fifteen minutes to explain to a student exactly where a diagram went wrong. The instructor needs to hone in on the most salient mistake, articulate it quickly, and be sure that the student understands it. It is not that unusual, either, for the instructor to leave class with more work (either practice work or quizzes) to evaluate. In that case, it is helpful to email the students with feedback between classes—the sooner, the better, so that a student who has not passed a quiz, for example, knows why and can continue practicing.²⁷

While we have not been successful in eliminating completely the need for some students to have to wait for the instructor before moving forward, we hold that the authenticity of the work that students do more than makes up for the occasional impatience or frustration. Whether the instructor is giving feedback, or the student is doing her work or taking a quiz, the work is precisely what is needed at the time. Where in a traditional class a student may have to wait for much of a class to arrive at that issue or problem that she wants discussed, in the step-by-step method, whatever work the student is doing, it is what is most relevant to her. So even when a student must wait during class for the instructor to get to her, when the instructor does, the student gets to focus on just what is needed. Observation from others who have sat in on the class reveal that roughly 65 percent or 70 percent of students are actively engaged in their work at any point during Dr. Cahill's class, an impressive level of engagement for many college-level courses, particularly for a 100-minute class period. And, most importantly, they are engaged in work that is precisely appropriate for their level of skill and understanding.

The lack of external structure in this class can also present difficulties for students, some of whom, it seems, would be happier with required homework and scheduled assessments. Some recognize quickly that persistence, focus, and hard work are necessary to doing really well in the course. Others flail for several weeks before settling down. Still others do not really get serious until the end of the semester is in view.

Although we hold that increased student responsibility emphasizes the fact that the learning is theirs to do (or not), and is thus a valuable pedagogical tool itself, it is clear that this level of responsibility is relatively foreign to many students. We are also convinced that by giving them more responsibility students are achieving not only the traditional goals often associated with critical thinking, but also crucial epistemological virtues that are often ignored in critical thinking classes, including epistemological persistence, taking responsibility for their own learning, and discipline. These are habits that, when practiced and honed, are necessary for self-authorship and for becoming not just a person who has the intellectual skills for critical thinking,

but a person who has the dispositions and habits of mind that are also necessary to live life as a critical thinker.²⁸ They are the hallmarks of deep learning.

That same lack of external structure can also mean that students are often unclear as to whether they are making satisfactory progress in the course. After all, there are no external landmarks indicating when certain steps should be completed, and because students will need different amounts of time to complete different steps, only the most general of advice can be given as to where one “should” be. We have discovered that individual class cultures can be enormously influential here. If there is a critical mass of students who begin working diligently at the very beginning of the semester, then other students will assume that such diligence is necessary, and a strong communal work ethic develops. However, if the class as a whole gets off to a slow start, then students may falsely assume that one can pass the class with relatively little effort. As we gain more experience with teaching in this mode, we find ourselves better equipped to give good advice to students as to what success requires by articulating some general patterns (reviewing the achievements of previous classes may, for example, allow us to say that many, although certainly not all, students who received a certain grade had passed a certain step by mid-semester).

It is also important to note that the class culture that develops has a profound impact upon the workload for the instructor. If one is teaching a class where all the students are doing homework regularly, and moving through the steps fairly quickly, the instructor can have a significant amount of evaluation to do during and between classes. If the students are less productive, then the workload for the instructor can be quite low. While this situation makes the amount of time the instructor needs to devote to the class somewhat unpredictable, it does ensure that the instructor is only working hard if the students are working hard: an admirable trait of any pedagogy, in our opinion.

In addition, regardless of how diligent the students have been through most of the semester, as the semester draws to a close, out-of-class meetings with students become more frequent and more harried. Indeed, the pedagogy described here is particularly well suited to out-of-class meetings with individuals or small groups of students. Although they may be frequent when students are being diligent, our experience is that most of the meetings are not onerous. If a student needs to take a quiz, for example, the instructor need only proctor that quiz, and the instruction associated with any particular step rarely takes longer than twenty minutes. Furthermore, during a semester when we were both teaching our own sections of Critical Thinking in this way, students were able to meet with either of us, which made it possible to increase the number of hours students could come for help without

increasing the number of hours either of us was available. Nevertheless, the instructor should expect to be scheduling several meetings with students per week, particularly as the semester comes to a close. To this end, we set and make clear to the students the limits on the number of hours we are willing to meet out of class.

Finally, there is the matter of a student who becomes really “stuck” on a step. This tends to happen at the diagramming stage. Learning to perceive, and then graphically represent, relationships of evidence among claims is a cognitive leap that many students find profoundly challenging. For most students, the regular techniques that we have developed about this step eventually suffice. For those students for whom this form of instruction does not, we have developed other ways into the same material. For example, we ask them to “reverse engineer” an argument, where the instructor writes a diagram, and has the student come up with an argument that matches it. We have yet to meet the student who, while practicing deliberately and with due diligence, could not grasp the concept of diagramming. We believe it is a virtue of this method that the instructor is called upon to transform the instruction as necessary to facilitate the students’ learning.

A final note: we recognize that teaching in this way means that our students will not be exposed to some content that might frequently be included in a critical thinking course. Most notably, students leave our course not knowing the names of any fallacies, either formal or informal, and having done no formal logic at all. It would be clearly possible, however, to include more of the traditional material of critical thinking classes into the step-by-step method. This brings us to one of the other advantages of this method, which is its flexibility. The step-by-step method could be used throughout an entire course, or some smaller part of it could be used. For example, it is possible to have students only go through Step 8, and, instead of working on their own research paper and presentation they could turn to informal fallacies, which could be taught either through the step-by-step approach or in other ways. This method could also easily be adapted to other types of courses. For example, Dr. Bloch-Schulman used a modified step-by-step method for the research paper in a methods class in the fall semester of 2010.

Additional Thoughts

We remain convinced that our step-by-step method is a vast improvement over the traditional textbook-based teaching method we were using earlier. In part, this conviction rests on how we experience our interactions with students. Students cannot practice habits and approaches that surface learners use, because the main activities of surface

learning—memorization and reiteration—are obviously not going to work in this context. Instead, we see them working on material that is challenging for them, we watch as they struggle to learn to do what they cannot yet do, we see as they come to understand and gain fluency in argumentative skills, and we experience their frustration and growth along-side them. We have a much better sense for what each student can and cannot do than we did when we used a traditional pedagogy, and we are able to tailor our interactions with students to meet their needs. We are also convinced that this method pushes towards maximizing the amount of deliberate practice students do, and therefore, its efficacy is supported by the most current and relevant research in the scholarship of teaching and learning.

Finally, one of the key elements we find compelling about this pedagogy is its transparency. By focusing so relentlessly on student learning, and by having every element of the class structure reinforce that focus, the approach does away with the related problems of busy work, lack of student engagement, and ineffectual use of the time of both the student and the instructor. Students know exactly what they're working on at any given moment, and they know why that is, they know when they have achieved fluency in a particular skill and when they still need to practice more to achieve that fluency, and they very quickly understand how the skills relate to each other.

Which is not to say that the pedagogy always goes down smooth. The penultimate section of this paper focused on challenges that the pedagogy poses for instructors, but did not address at length the challenges it poses for students. We continue to work on enhancing even further the transparency of the pedagogical goals of this approach, and the transference of the skills it focuses on to other situations.

The step-by-step method is still a relatively new pedagogy for us. We would be excited to hear from others who choose to adopt this method to their own context, or are already doing something that is a close analogue. We still have much learning to do about the strengths and challenges of this method for instructors and students, and we hope to be in conversation with others about it in the future.

Notes

We would like to thank David Concepción and Maggie Castor for their exceptionally helpful comments.

1. We are not suggesting that all discourse that is not grounded in reason and argument is not worth taking seriously in a democracy, only that it is important to be able to recognize the extent to which argumentative speech is or is not built on solid reasoning. For an argument against rejecting non-argumentative speech in democratic decision-making, see Iris Marion Young, "Inclusive Political Communication," in her *Inclusion and Democracy* (Oxford: Oxford University Press, 2000), 52–80.

2. E. Ashby Plant, K. Anders Ericsson, Len Hill, and Kia Asberg, "Why Study Time Does Not Predict Grade Point Average Across College Students: Implications of Deliberate Practice for Academic Performance," *Contemporary Educational Psychology* 30:1 (January 2005): 96–116; on deliberate practice, see also K. Anders Ericsson, Ralf Th. Krampe, and Clemens Tesch-Römer, "The Role of Deliberate Practice in the Acquisition of Expert Performance," *Psychological Review* 100:3 (1993): 363–406; and K. Anders Ericsson, "The Influence of Experience and Deliberate Practice on the Development of Superior Expert Performance," in *Cambridge Handbook of Expertise and Expert Performance*, ed. K. Anders Ericsson, Neil Charness, Robert R. Hoffman, and Paul J. Feltovich (Cambridge: Cambridge University Press, 2006), 685–706.

3. Robert L. Williams and Susan L. Stockdale, "High Performing Students with Low Critical Thinking Skills," *The Journal of General Education* 25:3 (2003): 200–26.

4. Howard Schuman, Edward Walsh, Camille Olson, and Barbara Etheridge, "Effort and Reward: The Assumption that College Grades are Affected by Quantity of Study," *Social Forces* 63:4 (June 1985): 945–66, cited in Plant, et al., "Why Study Time Does Not Predict Grade Point Average," 97. Thought there have been questions about how widely these findings from Schuman et al. transfer across context, Plant et al. argue that the findings still have general acceptance among researchers looking at these issues; see Plant, Ericsson, Hill, and Asberg, "Why Study Time Does Not Predict Grade Point Average," 97.

5. Plant, Ericsson, Hill, and Asberg, "Why Study Time Does Not Predict Grade Point Average," 98.

6. Ibid.

7. Ibid. References in this quotation are to K. Anders Ericsson, "The Acquisition of Expert Performance: An Introduction to Some of the Issues," in *The Road to Excellence: The Acquisition of Expert Performance in the Arts and Sciences, Sports, and Games*, ed. K. Anders Ericsson (Mahwah, N.J.: Erlbaum, 1996), 1–50; and to K. Anders Ericsson, "Attaining Excellence Through Deliberate Practice: Insights from the Study of Expert Performance," in *The Pursuit of Excellence Through Education*, ed. Michel Ferrari (Hillsdale, N.J.: Erlbaum, 2002), 21–55.

8. Plant, et al., "Why Study Time Does Not Predict Grade Point Average," 98.

9. Tim van Gelder, "Teaching Critical Thinking: Some Lessons from Cognitive Science," *College Teaching* 53:1 (Winter 2005): 43.

10. Ken Bain and James Zimmerman, "Understanding Great Teaching," *Peer Review* 11:2 (Spring 2009): 9–12. According to numerous sources, it was Marton and Säljö's two foundational pieces that initiated this line of inquiry: see Ference Marton and Roger Säljö, "On Qualitative Differences in Learning I: Outcome and Process" and "On Qualitative Differences in Learning II: Outcome as a Function of the Learner's Conception of the Task," both in *British Journal of Educational Psychology* 46:1 (1976): 4–11 and 115–27, respectively.

11. Bain and Zimmerman, "Understanding Great Teaching," 9.

12. Ibid.

13. Ibid.

14. Among many others, Bain and Zimmerman count the strategic approach among the other approaches to learning; however, it should be noted that Noel Entwistle, an exceptionally influential researcher in the approaches to learning field, views the strategic approach as an approach to studying, and thus sees it in a different category than the deep and surface approach to learning; see Noel Entwistle, "Promoting Deep Learning

through Teaching and Assessment: Conceptual Frameworks and Educational Contexts,” paper presented at the Teaching and Learning Research Programme Conference, Leicester, November 2000, retrieved May 26, 2011, from <http://www.tlrp.org/acadpub/Entwistle2000.pdf>. It is not clear, however, that this distinction makes a difference for our work here.

15. Bain and Zimmerman, “Understanding Great Teaching,” 9.

16. David Concepción and Juli Eflin, “Enabling Change: Transformative and Transgressive Learning in Feminist Ethics and Epistemology,” *Teaching Philosophy* 32:2 (June 2009): 177–98.

17. See Bain and Zimmerman, 9–10, and Keith Trigwell, “An Analysis of the Relations Between Learning and Teaching Approaches,” in *Lifelong Learning: Concepts and Context*, ed. Peter Sutherland and Jim Crowther (New York: Routledge, 2006), 110–11.

18. See Bain and Zimmerman, 10, and Entwistle, “Promoting Deep Learning,” n.p.

19. The Institute for the Advancement of University Learning, “Students’ Conceptions of Learning,” retrieved on June 6, 2010, from <http://www.learning.ox.ac.uk/files/Student%20Conceptions%20of%20Learning.pdf>.

20. See Bain and Zimmerman, 9–10, and Keith Trigwell, Micheal Prosser, and Fiona Waterhouse, “Relations between Teachers’ Approaches to Teaching and Students’ Approaches to Learning,” *Higher Education* 37:1 (1999): 57–70.

21. Keller argues, in a similar vein, that the distinction between trainer and teacher in this type of pedagogy is blurred; see Fred S. Keller, “Good-bye, Teacher . . .,” *Journal of Applied Behavior Analysis* 1:1 (Spring 1968): 79–89, esp. 84. For more on Keller’s work, see note 23 below.

22. There are some surface parallels between our step-by-step method and the self-paced method that Carlsson describes; see P. Allan Carlsson, “Self-Paced Instruction in Introductory Logic: A Report,” *Teaching Philosophy* 1:1 (1975): 42–45. In particular, in both, the pace is set by the student, and different students therefore arrive at different sections of the course at different times. There are, however, significant differences; most importantly, in the course Carlsson describes, there is no attention to the cumulative nature of the course. Like in a traditional instructor-led course, in his course, a student who does not understand crucial concepts can and has incentive to continue moving through new material, and thus, there is no need for the kind of deliberate and deep practice the step-by-step method requires.

A note: Late in our process, we found descriptions of what is often referred to as the “Keller plan” or the “Keller format,” which has many similarities to our step-by-step method; see Keller, “Good-bye Teacher.” Keller describes a self-paced procedure for a psychology class whereby students read a textbook chapter and perform a laboratory exercise, answer some preparatory questions, and take a test to determine if they have learned the material sufficiently. An undergraduate proctor examines the student’s answer, determines if she has a sufficient mastery of the work, and, if so, the student moves on to new material; if not, the student returns to the material she has been studying and takes another iteration of a test on the same material. The parallels between the Keller plan and the step-by-step method are many. One crucial difference is in our reconceptualizing the content of the logic course, and thus, the way the step-by-step method leads to deliberate practice and deep learning. In Keller’s plan, the units remain traditional (he describes a class having thirty units over the course of the semester), and the content remains the same (in kind and amount) as in a traditional psychology class, see Keller, “Good-bye Teacher,” 81. In contrast, in our method, by highlighting exclusively argumentative skills rather than traditional content (which in our context would likely include, for example, informal fallacies), our method may actually more fully blur the distinction between teaching and

training than what even Keller was able to achieve and may more fully arrive at deliberate practice and thus at deep learning.

Our method also has some, though much less, in common with the method described by John Bender in his “Teaching Introductory Logic in the Self-Paced Keller Format,” a paper presented at the *Critical Thinking Skills in College Academic Enrichment Programs Conference*, Los Angeles, February 5–6, 1987, available through Education Resources Information Center (ERIC). Though Bender uses a self-paced pedagogy that does have pass/fail tests, and though he describes his method as using the Keller format, in important ways, he breaks from Keller in ways the step-by-step method does not. For example, in Bender’s class, students have only three opportunities to pass a test, and if they do not, they move on to other material, and if they have extra time at the end of the semester, they can go back to earlier material, see Bender, “Teaching Introductory Logic,” 3. Thus, his method is also not intended to be cumulative to the same extent as the step-by-step method, and, we argue, is thus less likely to produce deliberate practice (because where a student really has a hard time learning a particular skill, in Bender’s method, the student can simply continue; in the step-by-step method, there is nothing to do but learn that particular skill).

23. Van Gelder, “Teaching Critical Thinking,” 45.

24. These steps are largely based upon the approach of Trudy Govier in her *A Practical Study of Argument*, 7th ed. (Belmont, Calif.: Wadsworth Publishing Co, 2010), although we have made some significant changes.

25. Martin Fowler, *The Ethical Practice of Critical Thinking* (Durham, N.C.: Carolina Academic Press, 2008).

26. Anthony Weston, *A Rulebook for Arguments* (Indianapolis: Hackett Publishing Co., 2009).

27. There is a significant amount of scholarship indicating the value of timely feedback on student work; see Nancy Sommers, “Responding to Student Writing,” *College Composition and Communication* 33:2 (1982): 148–56; and Erika Lindemann and Daniel Anderson, *A Rhetoric for Writing Teachers*, 4th ed. (Oxford: Oxford University Press, 2001). Although we recognize the general value of responding to student work quickly, regardless of the structure of the class, it’s important to note that this particular pedagogical approach provides an intrinsic motivation to quick feedback: that is, both the instructor and the student is acutely aware of the fact that no progress can be made unless and until the student receives effective feedback to her work. It is simply not possible for an instructor to wait a week to provide feedback on student work—even two days seems an unusually long interval!

28. On the notion of self-authorship, see Marcia Baxter-Magolda, *Making Their Own Way: Narratives for Transforming Higher Education to Promote Self-Authorship* (Sterling, Va.: Stylus Publishing, 2001).

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