

## **The Quest for Uncertainty: Recovering An Appreciation For Truth Through Autobiography**

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### *Preface*

Some of our best-kept secrets are the ways that we teach: what we do and how we do it, and the rationales for doing it. There is also often a distance kept between our classrooms and our publications and research. In philosophy of education, this distance might be worth reconsidering. If teaching has something to do with education—and I think it does—then philosophers of education have fewer reasons to separate their teaching from their research. This is one of the great joys of this particular field of study: we are always already embedded in the object of study, education. Insofar as we educate, we are performing the very thing we seek to understand.

Education, however, is not a simple thing to pin down. It often goes unnoticed in the field of education that there is no single, unifying description of education available. Just as there is no consensus on what philosophy is, exactly, there is also no prevailing common sense that fully understands what sort of thing education is. When there seems to be a general idea about what education might be, we find it exclusively related to schooling. To equivocate between schooling and education, however, is a well-known mistake.

In my philosophy of education courses we read a variety of primary texts with the goal of trying to acquire a rigorous sense of what education is and might be. We distinguish it from schooling but we also consider its relationship to the school. Along the way, we confront the negative term ‘miseducation’ in John Dewey’s *Experience and Education* (1938) and again in Carter G. Woodson’s *The Mis-education of the Negro* (1990). Miseducation is a powerful and vexing concept. On the one hand, it shows the normativity of education and the quixotic ability for this generic notion of education to become either “educative” or “miseducative.” On the other hand, this raises a difficult metaphysical question: “Is *miseducation* Education?” In the end it presents us with a negative notion of education.

One of the uses of this negative notion of miseducation is its relative clarity when compared to the elusive, positive notion of education. We seem to feel surer of ourselves when we describe what is not there than when we must say what *is* there. From the apophatic method of negative theology to the Law of Errors, we can see that it is possible to acquire a descriptive sense of an object by focusing on its absence instead of on its presence. This is the method I use in most of my courses for the final assignment. I ask each student to write a paper entitled “The Miseducation of \_\_\_\_\_.” They insert their name in the blank and write what follows from the title. They give an account of their own miseducation. (You may notice that this borrows from Lauren Hill’s 1998 breakout album, *The Miseducation of Lauren Hill*.)

In many cases, I must admit, this exercise turns out to be more therapeutic than theoretical. But I do think there is a place for catharsis and confession in philosophy and education. What most students seem to understand and gain from the assignment is that education is something they cannot take lightly or treat cheaply. They see its powerful effects *in absentia*. Sometimes clever and bitter students will recount their experience of miseducation in their philosophy of education course, climaxing in an absurd assignment about miseducation. Other times, students admit to having false motivations behind their interest in teaching and declare their exit from the field. A few students have even dropped out of college. Very few students turn in a boring or formulaic paper—they seem to take it very personally, for better and for worse.

In only a few, rare instances, however, does a student break through the sentimental and begin to do philosophy. This article's genesis was one of those exceptions. In what follows, you will read far more than a personal anecdote. Here I think we find a serious philosophical intervention that benefits from coming out of self-disclosure, but also offers more than just a confession for us to weigh and consider. As far as I am concerned, this kind of work, the fruit of my classroom teaching, is as reputable an example of what philosophy of education is and can be as anything I have written on my own. All the credit belongs to the student—an undergraduate at the time he wrote it, and now a high school physics teacher—who took the craft of philosophy seriously and produced the following truly original and interesting piece of educational scholarship.

### ***The Miseducation of Zach Rohrbach***

This article is, first and foremost, an intellectual autobiography—a personal account of my evolution of thought as a result of taking a philosophy of education course. However, I believe that it has something relevant to say to the modern environment of higher education, which—in the name of career training and practicality—often blinds students to the beauty of knowledge understood as something other than instrumental.

To begin, the very words that are on this page are a product of miseducation, or at least of the miseducative limits of language. The paragraphs that follow will confirm my thesis: that my miseducation has been in the fact that I viewed the purpose of education as the acquiring of certainty. I contend that this is wrong, because Truth is uncertain. This paper, then, is miseducative because I will be speaking in precise, certain terms about ideas that I maintain are by nature uncertain.

Throughout much of my life, I have been miseducated to believe that education is a “quest for certainty”<sup>1</sup> and that the goal of knowledge is to achieve certain understanding of the world. I contend that such a view of education and knowledge is impoverished because Truth—although not relative—is uncertain; it is not some nice and neat set of axioms and logic that can be fit into one's mind. Truth, I will eventually argue, is something beyond comprehension, and education fails when it pretends—as it often does—that Truth is anything less. To pretend that we can fully comprehend it with mathematical precision is both gravely arrogant and wholly undesirable. But this will not be an indictment of knowledge and education; it will be a subtle defense of it.

I will begin by showing how I believe I acquired this flawed conception of education, knowledge, and Truth, and then I will discuss why I have come to view this conception as incorrect.

I am a scientist at heart. I am the child of a chemistry major-turned-IT manager and an actuary, so I suppose that this makes sense. Growing up, I was fascinated with the way the world works. My favorite storybook was David Macaulay's (1998) *The Way Things Work*. Given this inclination, it is not surprising that I began to gravitate toward science classes during high school. I ended up loving physics the most of all the sciences after I began to realize how it made practical use of one of my other favorite subjects: mathematics.

Math at its core is quite different from science, although in my miseducation I never realized it. Where science observes and draws conclusions about something outside of itself—namely, the natural order—mathematics observes itself and draws its own conclusions. A mathematical theorem can be proven by mathematics, whereas a scientific law can only be “proven” by observation of Nature. Even then, a scientific law is never truly proven. It is only “proven” insofar as it has not been disproven by contradictory observations.<sup>2</sup>

So, in one sense, science is a higher art than mathematics, because science requires the scientist to submit his work to be judged by a higher authority. As Richard Feynman said, “It doesn't matter how beautiful your theory is; it doesn't matter how smart you are. If it doesn't agree with experiment, it's wrong” (qtd. in Sykes, 1993). On the other hand, mathematical ideas can always be right, at least insofar as they are not self-contradictory. For example, the mathematics of string theory is right because it is self-consistent. But string theory is not necessarily scientifically true because it has not been “proven” by experiment.

Let's take this idea a step further. I propose that science is an uncertain discipline whereas mathematics is a certain discipline. Science looks at Nature and prescribes laws that seem to explain Nature most of the time. But every scientist knows that if you take Newton's laws of motion and gravity, you will still have an incomplete understanding of the trajectory of a ball that is thrown into the air. This is because—even at the most basic level—you are probably assuming air drag is negligible, the ball is perfectly spherical, the earth is not rotating, and countless other things that aren't quite true but *do* affect the ball's motion in ways that you are ignoring. And, if you throw the ball again, these effects will not be exactly the same, so the ball will behave a bit differently. So the scientist's knowledge is incomplete and uncertain. Math, on the other hand, is certain. A mathematician knows that, in no uncertain terms,  $2+2$  always equals 4, the derivative of a sine is always a cosine, and a theorem once proven is always correct.

I believe, then, that my miseducation comes first from the fact that I began, at some point, to conflate mathematics with science. This is understandable, considering that the majority of coursework and research in my subject area, physics, tends to apply math to scientific problems. The answer is the answer (at least in classical physics). There is no uncertainty.

But that there is no uncertainty in classical physics is not entirely true. In the lab, uncertainties abound. Uncertainties are the bane of an experimental physicist's existence. They are a pain to analyze and deal with, and they are always too large. Experimental physicists strive to minimize their experimental uncertainty so that (surprise!) they can be more certain about their result. The underlying assumption here is that the theory provides the exact, certain answer to the problem, and that an experiment can “prove” (remember, proof only comes in the form of lack of disproof) this theory if the uncertainty of the experiment agrees with the certainty of the theory. In other words, even the uncertainty in classical experimental physics is not really uncertainty; it

is simply a measure of how far away we are from certainty. So, the way I viewed science, then, was as a “quest” to minimize these uncertainties in order to approach a certainty.

I’m not here to give an overview of the philosophy of science. But that overview was important to my story. Science had become such a big focus of my life during my undergraduate schooling that my thinking toward science has had an influence on my thinking everywhere else as well. It therefore seemed obvious to me that religion, philosophy, morality, metaphysics, pedagogy, educational theory—or any other area, for that matter—was simply an extension of science. These areas were merely different domains of the same scientific Truth.

And perhaps it *is* true that religion, philosophy, morality, metaphysics, pedagogy, educational theory, and science are merely different domains of the same thing. But for the moment, I am not particularly interested in whether or not this is the case. I am more interested in the fact that I viewed each of these disciplines as an area that, given enough thinking and deliberating, could be explained with certainty. In other words, I was conflating absolute truth with absolute certainty. I believed (and continue to believe) that all of these things are elements in a Truth that is independent of what any observer has thought of them, but I also believed that because this Truth was there, it was necessarily certain. The purpose of education for me, then, was to get as close as I possibly could to this certainty.

Now, I am not convinced that anything that I have said up to this point is necessarily incorrect, but what I *am* convinced about is that my focus was in the wrong place. Burbules (1990), by looking to Dewey, articulates my mistake:

The culprit here is what John Dewey called ‘the quest for certainty,’ the hope for a knowledge that is clear, uncontroversial, and unchanging. From this vantage point uncertainty is seen as bad, as something to get rid of; most people grasp at the nearest plausible rationale rather than struggle with their doubt. Such attitude is, I believe, hostile to the process of education, in which uncertainty and doubt are inevitable.

My miseducation was in that I viewed education and knowledge itself as this “quest for certainty.”

Why is this bad? Dewey (1938) reminds us in *Experience and Education* that freedom is not valuable for its own sake but only if it is oriented to some sort of Good. If we apply this same test to education and knowledge, the question becomes, what Good are education and knowledge oriented towards? Is that Good merely certainty? Well, if we were to gain certainty on the best way to solve world hunger, then that certainty might be Good because it accomplishes Good. But if we were to gain certainty on the best way to ethnically cleanse the Third Reich, that certainty would be bad—or, at the very least, I don’t see how it could be good. Thus, certainty itself is not the Good that education and knowledge are striving for. Good education, then, is not merely, or even necessarily, a quest for certainty. Instead, it is a quest for the Good.

But what is Good? Is Good merely doing what we think is best? Probably not.<sup>3</sup> Hitler had many of his soldiers thinking that by ethnically cleansing the Reich, they were performing an act of charity for future so-called Aryans. Why were these actions not Good? We could debate the precise technical reasons, but the answer—I believe—can be boiled down to the fact that they

were not Good simply because it is objectively true that these were atrocious acts. Good intentions must be informed by Truth in order for the action itself to be Good.<sup>4</sup>

So then we see that a quest for Truth is a necessary part of a Good education because a Good education accomplishes Good, and Good is something that has been informed by Truth.

At this point, it may seem like I have contradicted myself because I earlier said that a Good education is not necessarily a quest for certainty, but now have said that a Good education includes a quest for Truth. But Truth is not equivalent to certainty. As a matter of fact, I want to go a step further and say that Truth itself is *uncertain*—not in a cheap, epistemological way in which we are not sure what the truth is, but in a rigorous, ontological way. To begin this point, let me go back to my discussion about how my perception of science was miseducative.

I made the claim before that I perceived physics as an attempt to minimize uncertainties so that we could arrive with certainty at a physical law. This cannot be true when you start talking about quantum mechanics. One of the foundational principles of quantum mechanics is the Uncertainty Principle—the fact that we cannot simultaneously know for certain a particle's position and momentum. Actually, the Uncertainty Principle says something stronger than that: it not only states that we cannot know for certain a particle's position and momentum; it also states that the absolute reality of the situation is that the particle *does not even have* a certain position and momentum. So, at its very foundation, the physics that I took to be a quest for certainty is in reality uncertain! Uncertainty is built into Nature; it is not merely a byproduct of human imperfection.<sup>5</sup>

But just because the true position and momentum are uncertain, that does not mean that they are relative. Quantum theory *does* give an objective and absolute account of where you would be likely to find the particle and a range of possible momentum values that it can have. Quantum theory also does tell us where the particle cannot be located and what momenta it cannot have. There is still an objective reality, even if the objective reality is uncertain.

I posit that Truth in general behaves in this way. For example, it is absolutely wrong to neglect a child. But there are many ways to do Good to that child: you can feed him well, play games with him, read to him—and therefore Good is uncertain. You can do Good with two parents, with a parent and a grandparent, with a single mother or father, or through adoption or foster care. You can discipline the child by spanking, or you can opt for less corporally severe methods. These are superficial examples of what William James (1962, p. 13) points out (the scare quotes [“”] are mine):

The [“]science[”] of logic never made a man reason rightly, and the [“]science[”] of ethics (if there be such a thing) never made a man behave rightly. The most such [“]sciences[”] can do is to help us to catch ourselves up and check ourselves, if we start to reason or to behave wrongly; and to criticize ourselves more articulately after we have made mistakes. A [“]science[”] only lays down lines within which the rules of the art must fall, laws which the follower of the art must not transgress; but what particular thing he shall do positively within those lines is left exclusively to his own genius. One genius will do his work well and succeed in one way, while another succeeds as well quite differently; yet neither will transgress the lines.

There is not, James is telling us, one certain pedagogical method, one certain moral action, or one certain answer to a given situation.<sup>6</sup> However, that is not to say there are no such things as absolute education, absolute morality, and absolute Truth. We can use the Truth that we discover through pedagogical research to tell us what we should not do in a classroom and to give us ideas of what we might do to teach our students. But we will never be able to boil this down into one right answer. Likewise, we can use Truth as reasoned through natural law to help us learn the difference between right and wrong, but there will not be an easy, certain decision to make when we come into a complex moral dilemma. Truth does not bow to the mortal man's intellect by merely giving way to simple certainty. Truth is much more subtle and beautiful than that.

You will notice that in the quote from James above, I added scare quotes around the term "*science*." I did this because the way in which James is using the term is quite different from how I have been using it in this paper. Remember that I said science gets confirmation from nature, whereas math gets confirmation from itself. In this definitional framework, then, James's "sciences" of logic and ethics are really more mathematical than scientific in nature, just as Newton's "scientific" laws of motion are mathematical. They only become science insofar as they conform with something outside of themselves: Truth. So if James were to use this same terminology that I am using, he would say that the genius is the one who recognizes the inherent mathematical nature of these "sciences" of logic and ethics, and is able, without transgressing their theorems and parameters, to reach out beyond them into the Truth that is utterly more complicated and uncertain than what can be entirely expressed by any mathematical description. The genius to whom James refers is a true scientist. He uses mathematics, but he doesn't take mathematics to be the sum total of the Truth, which is infinitely more beautiful, subtle, and uncertain than what the mathematics can approach. Good education, then, is in part the formation of a scientist. Education as the formation of a mathematician is incomplete.<sup>7</sup>

So, then we get back to the question of my own miseducation. As a child, I said before, I had a fascination with how the world works. In other words I had a fascination with Truth. I was a scientist. But at some point along the line, my fascination with and awe for reality were packaged and sterilized into a desire to discover the certainty that supposedly governs Nature. I became a mathematician. My awe of nature was transformed into a vain faith in some sort of order that saw Truth as merely something that could be contained within my own intellect—or at least collectively within the intellect of the human family. And, as such, I viewed education to be this acquiring of the total understanding of Truth.

And, even now, I have presented this (hopefully!) rousing defense of the uncertainty of Truth, but to what end? This defense has done nothing but advance a mathematical theorem. Is it right? I believe it to be right, but the only way to be sure is to do my own "experiments" by living to see if this is anything more than a cutesy intellectual exercise. Then, perhaps, I can call myself a scientist in this regard. But even if it is right and I do become a scientist, I am still not a Good person. If I am Good only insofar as I accomplish Good, then a scientific understanding of Truth is entirely meaningless—or perhaps even of negative value—if it does not do anything Good. This last step of doing Good is something that cannot be accomplished merely by writing a paper; it is something that must be lived.

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## Notes

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<sup>1</sup> *The Quest for Certainty: A Study of the Relation of Knowledge and Action* is the title of John Dewey's 1929 Gifford Lecture. I became interested in it while reading Nicholas C. Burbules's "The Tragic Sense of Education" (1990).

<sup>2</sup> For example, if someone were to say that the earth is flat, and he were to perform a thousand experiments that gave solutions that made sense for a flat earth, he would have "proven" that the earth is flat. Then, when he got on a boat and sailed around the world he would have disproven that the world was flat. But he could still reasonably say that the world is shaped like a sphere or a donut or a Möbius strip. He has not proven any of these theories in the strongest sense of the term. He has not settled the question beyond any further dispute in the same way that Pythagoras has for all time settled the relationship between the sides of a right triangle in Euclidean space.

<sup>3</sup> Ivan Illich (1968) addresses this question in his essay "To Hell with Good Intentions." In it, he criticizes U.S. missionaries who want to help out the poor in Mexico. While he does not doubt their sincerity in wanting to help out, he notes that their presence is harmful: it attempts to impose Western Capitalism and Individualism on a culture that does not need or want it. Despite their good intentions, the missionaries are not doing Good.

<sup>4</sup> Benedict XVI (2009) calls this "*caritas in veritate*" or "charity in truth."

<sup>5</sup> Of course, I am speaking in terms that are a tad too strong. The fact that uncertainty is built into nature is not, strictly speaking, a proven fact any more than any other scientific "fact" may be. It is simply—as discussed earlier—a scientific understanding that has not yet been disproven by contradictory observations.

<sup>6</sup> Richard Feynman (1974) suggests this when he derides what he calls "cargo cult science." He complains about certain things that "are said to be scientific. We study them. And I think ordinary people with commonsense ideas are intimidated by this pseudoscience. A teacher who has some good idea of how to teach her children to read is forced by the school system to do it some other way—or is even fooled by the school system into thinking that her method is not necessarily a good one. Or a parent of bad boys, after disciplining them in one way or another, feels guilty for the rest of her life because she didn't do 'the right thing,' according to the experts."

<sup>7</sup> Even in *The Quest for Certainty* Dewey (1929) himself, although he started along this train of thought, does not entirely progress from the realm of math to the realm of science. Dewey quite rightly notices that the objects of mathematics do not entirely correspond to the objects of reality. (That's why, for example, Dewey notes in his chapter on "Ideas at Work" that a red ball and a blue ball—two very different and distinct real objects—are treated exactly the same in projectile dynamics.) Thus, he touches on the idea that Truth is bigger than man's mathematical description of it. However, his response to this realization is to advocate a position toward reality that he calls "pragmatic instrumentalism." The purpose of studying reality is "to conceive



of both knowledge and practice as a means of making goods—excellences of all kinds—secure in experienced existence” (p. 49). Thus, although Dewey has given up on the idea that we reach certainty about the metaphysical structure of reality, he nevertheless is still on his own quest: a quest for the reasonable certainty of security, a certainty that—although admittedly temporary and pragmatic instead of permanent and metaphysical—is nevertheless certainty. He rightly gives up on metaphysical mathematics, but he is still a phenomenological mathematician; he has not made that extra step to science.