

My First Teaching Intuition

It's 1975. I'm nervous. I am a first-year teacher at the Waldorf School of Garden City, NY. The class is high school senior physics. Today, the principal of the high school and my mentor, the former teacher of this physics course, will observe my lesson to evaluate me. The subject is optics, the aspect of physics dealing with light. Today's lesson is about the concept of *complementarity*. Complementarity allows that perhaps light is both a particle and a wave - two opposite, contradictory ideas that are supposed to both be true at the same time. This is clearly not an easy concept to grasp with analytic, linear thinking; contradictory ideas require some level of creative, holistic thought. In preparation for today's lesson I have studied the facts and relevant information for a more than usual period of time last night because I want both my lesson and my evaluation to go well. The class is made of a group of really good kids who have been in this Pre-K-through-12 Waldorf school since they were small and are a cross between students and family by now. They love learning and are actually excited to hear and discuss what light is made out of. This is a course required for all students, so it includes some talented and naturally interested in science and some far less so. Therefore, it is going to be challenging to teach to such a wide range of intellectual abilities. I mention this because I want to share here an approach with a broad appeal that came to me intuitively - in real time - right during this lesson.

Although theories of light - how it moves, what it is composed of and the like - have ancient roots, the main part of the lesson today will deal with key discoveries in the 19th and 20th centuries. I have familiarized myself with the principal players, the scientists who advanced the many facets of the theories about

the nature of light. I have also re-loaded my mind with the basic information regarding the physical mechanics of what light does in various experiments. In addition, I have prepared to direct the students' attention to the phenomenon of light as something purely of beauty: the source of experiences that so many painters and poets have marveled over. Waldorf schools are good at encouraging the balancing of mechanical explanations of nature with human experiences that deal more with feelings and an individual's relationship to nature. And, since my principal and mentor will be watching to see how I teach, you can be sure that last night I practiced the delivery of the lesson, besides familiarizing myself with the factual details.

I would not be writing this essay if the lesson had gone as planned, however. What made this day interesting was what happened when I began to teach. It definitely was not normal for that time in my life. It was better than normal. I must say as I look back, that this lesson kicked off my career as what I would call an *intuitive teacher*. It also kicked off my now career-long mission to help transform education as we know it.

The kids come in with the usual high school energy. Maybe there is a little more electricity in the air because they are sensing my nervousness. Then the principal and mentor come in. The kids know an evaluation is going on. The energy definitely rises a bit. However, I like it when the chips are down and a performance is expected. The fear and anxiety are usually worth it for the high level of vitality they generate in me. So, I start talking about light. I set up the controversy between the idea of light as a particle, solid matter, and the theory of light as a wave, a ubiquitous entity that can reach virtually everywhere. I describe the basic experimental evidence that has been assembled to support each theoretical position. "So far, that was pretty good," I told myself "I'm doing ok. Just don't screw up." My inner dialogue has now captured my attention for a moment. It is telling me that I had planned, in the next part of the lesson to

describe how various scientists saw possible explanations of light that are all somewhat different, yet still explain the experimental evidence. But all of a sudden, my mouth is saying something new, something I hadn't planned. I hadn't even seen this part of the presentation as a possibility as I had turned the lesson over and over last night. My mouth is saying, "OK class, you're in a courtroom. Light is on trial. The defendant is trying to prove that light is a particle. But the prosecution contends that it is a wave. Go ahead, pick whether you want to prosecute or defend. Bring a compelling argument from the evidence that has just been presented." My inner voice is now yelling, "Where did you get that from? I never thought of that! Does this fit? Quick, look at the principal. Look at your mentor. Look at the students. Is anyone screwing up his face or laughing? What is going on?" But the fact is that a new energy has just entered the group. Hands are shooting up. "Yes, Preston." (Preston is a great kid and an exceptional athlete, but decidedly *not* a strong student: typically one of the last to speak up in a science class.)

Preston, says, "Well, since that double slit experiment showed light interacting in more than one place at a time, it seems light must be a wave."

My inner voice says, "They like it! It's working!" My outer voice says, "Very good. I guess we just heard from the scientist, Young, who did that experiment. Check your notes class, you should have his name next to that idea. Now, can anyone refute or support Young's, or should I say Preston's thought? Or, how about an alternative?"

Now, Stefan raises his hand and adds, "But that photo effect experiment showed the light hitting that foil hard enough to knock off electrons. That feels like punching and makes me think light is made of hard particles."

"Great. Stefan, you're Einstein. And you just presented the photoelectric effect experiment for us as evidence!" The energy is rising. Stefan was just called Einstein. He usually says even less in class than Preston. Some even thought he wasn't smart. I told you that these kids had been together for years and were more like a family than a regular school class, so you can imagine how they all felt when Stefan contributed, not to mention that he was just called Einstein!

Then the principal gets too excited to wait to be called on. He blurts out, "But you could see it both ways, in some experiments light behaves like a wave, then it turns around and acts like a particle. I think that somehow it is both!"

At this point, one of the students calls out in fun, "Aren't you supposed to raise your hand?" and everyone laughs. I love it - they are engaged ... and having fun with the actual process!

I jump on the fact that the principal is so engaged in the lesson, and I quickly announce, "Class, Compton has just entered the courtroom. Mr. Leaf (the principal), you are Compton. Take this down in your notes everyone. Mr. Leaf has just offered the Compton Effect as evidence that high energy waves of light both scatter electrons and act like particles. He is going to get the Nobel Prize for that, you know." I think I remember the principal being pleased about that part. I know I remember the class continuing at this high level of enthusiasm. Students are now clamoring to get on the witness stand. They are coming up with theories and even proposing experiments to test out if light is a particle, a wave, or even both at the same time. The lesson is a success.

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After it is over, the principal remarks how he was stimulated, and asks how I came up with the courtroom analogy. "It just came in fresh," I said. A look came over his face that pretty much matched my inner state at this point. The look said something like, "Wow!" He later told the headmaster of the whole school, John Gardner, about my lesson. Mr. Gardner called me down to his office a couple of days later. He was also impressed and told me that being open to and responding to a creative idea like that – especially one that is coming in spontaneously - is probably the best thing you could do as a teacher in a Waldorf School.

So, how exactly did I do it? I still don't know. But I have made it a goal, ever since, to create such teachable moments. The best I can guess is this. Sometimes ideas that I have never consciously thought before can come to me spontaneously. They may be prompted by what the students need – perhaps in combination with my enthusiasm for the subject. I do not really know where they come from and I do not know definitively how to cause them to occur to me. I do know that now, at the age of 65, I can say as I look back, that these spontaneous ideas have come quite often in my career as a teacher. And the effect they have on my students has usually been surprisingly good. They almost always have made the lesson considerably more vivid and effective than what I had planned. Now, whenever I teach, I always keep a part of my speaking ready to come out as an improvisation - a jazz composition. I always stay awake in my mind - present to the students and the moment - ready to hear a new idea that I had not prepared.

I have learned to expect, trust, and act on such intuitive moments. They often prompt me to more innovative teaching and communicating than I had planned. I have since taught adults in many of the Fortune 500 corporations, alternative students in a high school where most students were called 'emotionally disturbed', incarcerated adults in both men's and women's prisons, and children of virtually every age in private and public schools. And, yes, I have become able to replicate the experience of having a brand new idea come into my mind right while I'm teaching. In fact, recently, as I hit the age of 60 years old, I went back to college to get a Ph.D. in education, so that I might better try to encourage this intuitive form of teaching. I believe many teachers have such exhilarating teaching moments, but are not often taught to value them. I further believe that you can teach students how to receive intuitions. I know, because I do it. When I am teaching, I always run a transparent dialogue parallel to the lesson, in which I tell the students - whether adults or children - what is happening to me inside. Many, many times I say, "Did you hear that? What I just said, did you hear that? Wasn't that good? Well, that's the first time I ever heard it!! That was an awesome idea! I'm hearing it fresh, just like you." This can have a beneficial effect on a class: creating a sense of aliveness or even a form of adventure, the possibility of the appearance of the unexpected.

As I took courses for my Ph.D. work a few years ago, I wondered if the university would expressly tell us to try to be intuitive when we teach. They didn't, but I wished that this could be a major part of teacher training courses generally. Though intuitions have long caused some of the best teaching moments we teachers have, I question whether education courses adequately recognize and emphasize this reality. For me, spontaneous, intuitive insights have been the main cause of my capacity to transform students – children and adults, alike. In fact, listening for intuitions has taught me to be more like a child. Children are intuitive, aren't they? Children receive ideas left and

right while they're talking, don't they? Children are growing, changing, able to become new and fresh and different, even if the new contradicts or doesn't seem to make sense with the old. That's where my normal, unintuitive adult-self gets stuck. My boring adult-self needs everything new to go with everything old. But, much of what comes out of children's mouths does not derive from, or agree logically with, prior experiences, does it? Isn't that why we have the saying, "Out of the mouths of babes ..." What comes out of the mouths of babes? Wisdom, right? Good stuff. Stuff that is often wiser than the adult would have said. I often imagine becoming like a child again and being able to receive fresh ideas. In any case, I take heart from this passage by John Dewey:

“Children, if they could express themselves articulately and sincerely, would tell a different tale; and there is excellent adult authority for the conviction that for certain moral and intellectual purposes adults must become as little children. The seriousness of the assumption of the negative quality of the possibilities of immaturity is apparent when we reflect that it sets up as an ideal and standard a static end. The fulfillment of growing is taken to mean an accomplished growth: that is to say, an Ungrowth, something which is no longer growing. The futility of the assumption is seen in the fact that every adult resents the imputation of having no further possibilities of growth; and so far as he finds that they are closed to him mourns the fact as evidence of loss, instead of falling back on the achieved as adequate manifestation of power. Why an unequal measure for child and man?” (Dewey, 1916/2005, Chapter 4: Education as Growth, para. 3)

If only I could measure myself by a standard that includes children and their ability to receive intuitive ideas, maybe I might learn to entertain more readily truly wise ideas. I would like to turn my inner disposition spontaneously - as a child would - in order to grow in new directions. I would love to be able to entertain more reliably and express more frequently ideas that come to me intuitively. Maybe this is what is needed to move the frontier of the science of light forward. Perhaps if adults, like children could entertain ideas they do not yet understand – even if they are contradictory – we will someday more fully understand, and even surpass, the idea of complementarity.

References

Dewey, J. (1916/2005). *Democracy and education: An introduction to the philosophy of education*. New York: Cosimo Classics.