There to see the sights?

I'm a physician and psychiatrist who happens to be blind. I had the wonderful opportunity to attend the AHEAD conference in Dublin this past March. When that finished, my wife and I visited the cliffs of Moher. We set out north with the Atlantic Ocean roaring to our left, and then we stopped to take it all in.

To a more distant observer, perhaps peering through a telescope, this may have looked a bit crazy—something a psychiatrist can say with some certainty. A blind man, perched three feet from a disastrous fall. **There to see the sights?** As a person with a disability, I encounter that tension, between the observer and their expectations, and my experience of the reality of the situation. We all see the world through our own lenses. As educators and the educated, we need to be keenly aware of this fact and have strategies to address it.

The viewer at the other end of the telescope, who is already relying on vision to assess the situation, might try to put themselves in my place, with no visual input, and conclude this is folly. But what this observer neglects to realise is that I've had years to accommodate to my disability. Move closer and one will see my white cane trailing over the edge. The cane, like the dog guide, is a common, familiar tool of the blind. It's something I've trained with, and it's as comfortable for me as your favorite pair of trainers. I may not see the edge, but believe me, I know it's there too.

Beyond the fact that I've learned skills to accommodate for my disability, it turns out that my brain may actually be different from the observer's. Neuroplasticity is a process by which the brain can make certain changes to itself in response to new demands or injury.

Imaging studies, for example, show that, in a person who is blind, the part of the brain usually devoted to interpreting visual information can be activated by reading Braille, or that auditory cortex can be active while a person who is deaf is lip reading. Our brains are different, and thus, we can do different things with them. The observer might also conclude that appreciating the cliffs must be a visual process. Yet, without vision, I took in the sounds of the birds and the surf far, far below. I smelt the salt and felt the breeze in my face. I could hear the space, the absence of buildings and modern mechanical noises other than an accordion playing far off. Visiting the cliffs didn't need to be a visual experience. When we assume that how we think about something is actually how it is, we are falling into the 'model trap.'

The model trap

In my career, I've needed to evade the model trap repeatedly. When studying biochemistry, the standard paradigm is that we understand protein structure by looking at pictures. However, proteins are so tiny that no one could actually see one because they are smaller than the wavelength of light that we'd try to see them with. Instead, people have seen pictures derived from more fundamental data, which is usually just a list of atoms and their coordinates in three-dimensional space, but they assume that this is what a protein 'looks like.' When it came time for me to study protein structure, I needed to acknowledge this assumption if I would have any chance of challenging it.

I took stock of the resources that I had to tackle the structure challenge. I had experience with computer programming and music, and there were freely available programming modules to help with sound and graphics. I was blessed with the support of my thesis advisor, Katrina Forest, and I had a crystal structure of a protein that I needed to understand.

I set to work. I developed a way to describe a small piece of the protein using text and speech output, and used musical cues to indicate its spatial location. However, my program still didn't say anything about the overall shape of the protein, which is critical to its function.

I mentioned my problem to a lab mate, who was a former punk rocker, and he said, 'Why don't you play the protein?' **Why don't I play the protein?** It was a great question, and this was one of those 'why not?' moments that was a turning point in my life. When you're avoiding traps, it's best to think broadly. So, I tweaked the software to step along the protein's backbone, playing musical tones as it went. Hearing the protein's music told me, and a sample group of people when we tested it, about its shape. Finally, I added graphics routines so that a colleague and I could work together, each of us understanding the structure in our own way.

As educators and those seeking education, we must avoid these conceptual traps. First, we must acknowledge our biases, by asking what are we bringing with us? What have been our prior experiences with disability and confronting challenges, and what does our culture say about it? Then, we define the fundamental goal as precisely as we can. For example, for me, being a psychiatrist is about accurately assessing a patient, building a treatment alliance, and making sound medical decisions. My goal has nothing to do with a visual inspection of the patient. We need to draw deeply and broadly from our experiences and those around us. One of the best ways to do so is direct dialogue. Perhaps, as I'm feeling the breeze in my face and listening to the sea birds, the observer realises the distance between us, puts down his telescope and walks over to engage with me.

The sound of the surf echoed in my memory as the bus rumbled away. Like the waves straining against the shore feet below, the cycle of straining against limits goes on. As eventually, the gentlest of waves wears away the hardest of rock, so too, over time, with awareness and dialogue, we can break down barriers between people with disabilities and the education they seek.

Timothy Cordes M.D., Ph.D.

University of Wisconsin

Timothy Cordes is a Clinical Assistant Professor in the Department of Psychiatry, University of Wisconsin - Madison, USA. Dr. Cordes is also a Ph.D in biomolecular chemistry and graduate of the Medical Scientists Training Program at the University of Wisconsin - Madison, earning both a Ph.D. in Biomolecular Chemistry and an M.D. He is believed to be the only blind person ever to obtain these dual degrees. He has written computer software that uses sound to help sighted and blind individuals understand the structure of proteins.