Daniel Kish's organisation challenges people to reach beyond their limits

STEVE BROXTERMAN

SOUND AFFECTS

By the time he was just 13 months old, Daniel Kish had had both his eyes removed due to retinal cancer. Yet he's still able to tell you the width of a tree without touching it and even to cycle through traffic. *Whale and Dolphin* meets the man who has harnessed the power of whales and dolphins... echolocation!

On the whole, humans live in a world governed by sight, while whales and dolphins inhabit a world of sound. In this interview *Whale & Dolphin* meets Daniel Kish, an extraordinary human with a rare insight into the sonar environment of whales and dolphins.

Reliance on sound for navigation, finding food, locating friends and family and for social interactions comes with its own set of challenges. The seas, oceans and rivers are becoming increasingly noisy, with boat traffic, industrial development, oil and gas exploration and military sonar activity all creating a cacophony under the waves. This can be catastrophic for whales and dolphins – some mass strandings have been blamed on underwater military sonar, increased noise levels are believed to have driven populations from their homes and in one study in Washington State it was discovered that orcas were having to make their calls longer and louder to be heard above the din of boat traffic, wasting valuable hunting and travelling energy just on trying to communicate.

The underwater world of whales and dolphins is so alien to us that it is hard to really comprehend, but talking to Daniel Kish brings the human experience a little closer.

W&D: At what age did you start clicking with your tongue, and why?

DK I was only about 15 months old. My first memories are of breaking out of the house at night when I was two-and-a -half. It was after midnight and I was bored. I found the fence surrounding our backyard. I remember clicking through the fence and noticing different-sized stuff on the other side. I climbed the fence to see ▶

Daniel uses FlashSonar to find his way round quickly on a bicycle

what was over there, and climbed several subsequent fences into several backyards, before a neighbour discovered me and returned me home to some very bewildered parents.

W&D: Did the idea of using the echo of your own sounds to help you navigate come to you naturally, or were you taught the process?
DK I developed it as a result of how my parents regarded me and treated me. They valued my personal freedom, integrity and dignity, above all things. They saw this before the blindness. The emphasis was never on what I couldn't or shouldn't do as a blind person, but rather on all the possibilities of achievement. They wanted me and expected me to grow up to enjoy the same opportunities for freedom and responsibility that other people enjoy. They reasoned (or perhaps it came naturally) that in order for me to grow up to be like others, I needed to be raised like others, with the same expectations and standards as others, with the same opportunities to engage in the same activities as others growing up around me. I always attended regular schools, had sighted friends almost exclusively, and did pretty much what they did. My favourite activities were actually tree climbing and roughhousing, at which I excelled. I still like tree climbing.

In Germany and many other countries, particularly in Europe where things tend to stay very traditional, blind kids typically don't receive what I would call 'freedom' training, or training in independence, until they're about six, and by then it's late in the game. Until then, they are taught to depend on others for movement – a process I call dependency conditioning through sighted facilitation.

W&D: Could you describe how objects appear to you once located by clicking – for example, a tree?
DK We must realise that, although it is called 'echolocation', it is not strictly about locating targets and stimuli. It is about perception. It is really a matter of scene analysis. Any scene of any complexity, within reason, can be understood. Scenes are broken down into elements and features.

Generally speaking, surfaces are broken down into location (where is it), dimension (length, breadth, height, general contour) and depth of structure (density, absorption, solidity and gross texture).

A tree presents itself as a densely solid, more or less uniform thickness up to a point, then begins to broaden and become less dense. The echo signal is literally diffused or diffracted by leaves and branches, creating a scatter affect. I can hear a muriad of surfaces in different positions, distances, and angles. If I stand back far enough, I can judge how tall the tree is.

W&D: Could you describe how you click?
DK I use what phoneticists call a palatal click, but there are many types of human-produced tongue clicks. It is done primarily with the tip of the tongue applied behind the top teeth, then pulled sharply down and back, producing and suddenly releasing a vacuum. The result is an implosive click resembling a finger snap.

W&D: Do you use identical clicks for all circumstances, or do you vary the tone/style depending upon where you are?
DK The timbre of the click remains the same. I vary the repetition rate, volume and direction depending on circumstances. Soft clicks are used in quiet environments when targets are close by. Louder clicks are used in noisy places, or when I need information about targets that are far away. Rapidity depends on how quickly I am moving, the familiarity of the environment and the dynamics of an environment. If I am running or riding my bike, I click faster.

W&D: Does the clicking work equally well indoors and outside?
DK The clicking works under pretty much any circumstance. However, I prefer to teach new students mostly in outdoor environments, because there are fewer distracting surfaces,

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and less reverberation, which can cause interference for the novice.

W&D: Do you use any other sounds to echolocate?
DK One is always using a variety of sounds. All sounds reflect, so even sounds incidental in the environment can be useful. However, one's own self-generated click appears to produce the most reliable, clearest, sharpest results. We call this FlashSonar.

W&D: Have you ever tried clicking under water? If so, did you find that it works, and if not, do you think it would?
DK When one opens one's mouth to click under water, one's mouth fills with water. It doesn't work. However, I know of blind people who have echolocated under water by clicking pebbles together.

W&D: What does echolocating help you to do in life that would otherwise be much harder?
DK Well, there are many blind people who move about very well, including some who do not echolocate. However, some research has shown a correlation between echo skills and movement competence. In my case, echolocation facilitates literally everything I do. I suppose bicycling or finding my way quickly around somewhere I've never been are made possible with FlashSonar.

W&D: Whales and dolphins are heavily reliant upon echolocation for a number of reasons. Interference from other sounds can therefore cause them great problems. Are there circumstances in which noise pollution causes you problems, and confuses your skills?
DK Noise levels always interfere with echolocation, but it takes a great deal of noise to render it impossible or even impractical. Whales and dolphins are trying to detect targets and communicate for many miles, so noise pollution would be catastrophic. I do sympathise from very personal experience.

W&D: Based upon your own experiences, do you feel that more should be done to protect whales and dolphins from noise pollution, such as military sonar?
DK Absolutely. I would be fully supportive.

W&D: I've read that you believe that, as for whales and dolphins, echolocation is latent within us but, unlike them, largely untapped.
DK Toothed whales and many species of bats are raised in cultures of which echolocation is a natural part. It is expected and taught. Thus, all bats and toothed whales learn it. However, echolocation is not an integral part of human culture. Consequently, very few humans have access to it, even blind humans for whom it would be indispensable.

I have found that humans, especially blind humans, are easy to teach at least the basics of echolocation. We often see critical differences happening in just a few hours, and decisive impact in a day or two. It is easier than learning another language, and easier than learning to play an instrument. I'm convinced that the hardware is already in us. We just need to activate it.

W&D: Could you tell us about your organisation, World Access for the Blind, its achievements, and its aims for the future.
DK World Access for the Blind is a non-profit organisation that facilitates the self-directed achievement of people with all forms of blindness, and increases public awareness about the strengths and capabilities of blind people.

We have provided technical consultation to universities, the entertainment industry and corporate enterprises, and we have helped over 7,500 students in over 35 countries. We are a dedicated team who lead by example, as most of us are blind! Our unique, scientific method teaches blind people to see in new ways by activating the brain to gain images of the world through sound and touch – like lighting a match in the dark. We are known for our No Limits attitude, as we do not settle for the minimum requirements of functioning, but instead challenge ourselves and our students to reach beyond their limits.

W&D: Finally, people often say that whales and dolphins are more like us than we often imagine. Based on your experience, do you have any thoughts on that concept?
DK Well, they're clearly intelligent, artistic, social creatures with a highly developed language. They deserve better than to be made into circuses for human interest. ■