KPCW Radio Interview

Just appeared on KPCW; this morning in fact. Questions raised have made me think a bit more broadly about October's, "Geomorph – Everything Changes When Mathematics Meets Art," exhibition at the Leonardo in Salt Lake City.

I made a comment on-air that, when we teach mathematics and science, we should go back to the point of invention; to recapture the dynamics of an idea, and to give our students the opportunity to think about the mathematical, or scientific, concepts that we teach, as the inventions that they are. To think about whether the inventions are the best way of thinking, or whether there are better ways of thinking. Is the Earth flat, or is it more like a sphere, or maybe it's like something else that is completely different? A lot depends upon what we're trying to accomplish: to navigate across the ocean, or to try to figure out if there's a gravitational benefit to launching a rocket from one part of the Earth rather than another. Re-captuturing the point of invention, of a mathematical, or scientific, idea, means taking a step back in time to the point of need, or to the point of discovery; to when, for example, we needed to find our way across the oceans, and the ideas explored to do it; and to look at the merits of one idea over another. If nothing else we might learn to appreciate the navigational mathematics that we have but, on the other hand, we might come up with something better, something more dynamic, something that better takes into account changing conditions, such as the wind, and the ocean currents. The Geomorph exhibition is all about approaching mathematics in a new way, and making it a medium of discovery.

I made another comment on KPCW that there are two types of mathematics, "Calculator Mathematics," and "Discovery Mathematics." Where schools mostly teach calculator mathematics. That we're moving towards a time where computers

can really take over the calculator side of things and that we, as humans, can get more involved in the creativeness of logical ideas – so that there is more of a partnership between us and the computers. Emphasis, then, in schools should, I think, be based more on logical problem solving and discovery. That's not to say that we should forget calculator math but rather, re-position it. In fact, in my opinion, all students need to be familiar with calculator math, and we need some students who love calculator math, but also we need some students who question it; who question the underlying principles of computer programs; so that we never become over-reliant on mathematical models that might become obsolete, or limiting, or even destructive, as the the world evolves and new opportunities present themselves.

On the show I made another comment about how numbers don't really exist but are just an abstract idea linking one lot of things with another; for example, matching a number of fingers on your hand with a number of sheep in your field. Mathematics is really all about abstracting ideas and making models of things. Once we ran out of fingers, to "count" things, we learnt to count in groups of ten. But that's just the way our culture handled the problem of counting more than the number of fingers on our hands; some ancient Chinese counted in groups of two, Babylonians in groups of twelve, and Mayans in groups of five. There were many ancient cultures that never got beyond counting up to ten; they just reckoned they had, "lots." There are so many abstract ideas floating around that, because we don't question them, they take on a reality that they do not deserve. Money is a great example. Money is something we're desperate to have; that world commerce completely relies upon, but where the concept is really abstract; where the idea of "money" is, on the one hand, based on the real goods it can be traded for, such as food, water, and a roof over our heads; or on the virtual value based on what something might be valued at, if the equity worth was realized; such as the valuation of stocks, and currency. But

where the value systems are highly variable and where one variable undervalues another, dependent upon the “credit” value or actual, “supply and demand.” Abstract ideas are very useful but also dangerous if we don’t evaluate and recognize them for what they are. Geomorph is all about the evolution of mathematical and geometrical ideas, but also about changing the rules and creating completely new things, new shape-changing structures and new geometries with applications in architecture, new materials, new structures, design, art, …

Hope to see you at the Geomorph exhibition!