Confusing constructions

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February 25, 2022

Abstract

Confusing metaphors that are popular in use can have disastrous consequences and put science on the wrong track for a long time. It may well be that the fact that in-depth theoretical research is making little progress is caused by the continued use of confusing metaphors.

Humans

Although people are intelligent, to be able to think about or discuss things, the subject in question must be given a name and a compact reliable description. Try doing it without these tools! Pointing and observing can sometimes serve as an alternative. The curious thing is that our living environment can function excellently without the subjects having a name and a compact description. This curious limitation plays intelligent human beings a part in the application of our thought processes and in communicating with each other. In addition, we need to capture our ideas to preserve them for the future. In this way, confusing metaphors can cause long-lasting and even lasting damage.

Example

An example is formed by the quaternions. These were discovered in the mid-nineteenth century by Rowan Hamilton. These numbers would have played a major role in physics were it not for the fact that Hamilton divided the quaternions into a real number part and a vector. At the time, vectors were already a well-known concept, and those vectors differ from the non-real part of the quaternions. The square of a real number is equal to zero or it is positive. The square of the non-real part is equal to zero or it is equal to a negative real number. This does not apply to vectors. The fact led to a scandal and resulted in the quaternions ending up in oblivion at the turn of the century. Willard Gibbs and Oliver Heaviside proposed a different method based on complex numbers. For that reason, quantum mechanics was developed without the quaternions. The non-real part of a complex number is called an imaginary number. This now also applies to the non-real part of the quaternions. This name is confusing because the imaginary numbers are just as realistic as the real numbers. A better name would be spatial numbers. They are not vectors. Still, they show great similarities in their behavior with both vectors and real numbers. Both number systems can change in a continuum by adding the limits of all converging series. Thus, both the complex numbers and the quaternions potentially include two continuums. Continuums can change geometrically. Differential calculus can tell exactly how these continuums change. For no reason, a continuum does not change. Even more important is the fact that if a continuum has changed, this medium does everything it can to regain its unchanged state. This is especially true for the three-dimensional spatial continuum. Differential calculus describes this curious behavior.

Physics

In physics, this special behavior plays an important role. The annoying thing about this is that human intuition hardly offers any guidance. We, humans, are misled by our intuition. The differential calculus tells a more reliable story. But even that story still has to be interpreted in the right way. Not everyone can read the formulas that differential equations offer as their solutions. It turns out that the solutions in mathematics have been known for a long time, but because the solutions are too confusing, in several situations, to physics these solutions have not led to useful conclusions.

References

The demise of quaternions has mainly influenced the applicability of Hilbert spaces. New insights place Hilbert spaces in a completely different light.

Look at "Advanced Hilbert Space Technology"; https://vixra.org/abs/2201.0009

https://en.wikipedia.org/wiki/History_of_quaternions#cite_note-1 concerns the scandal that banned the quaternions. If you want to read this story, choose

http://entsphere.com/pub/pdf/rotations/Hamilton,%20Rodrigues,%20and%20the%20quaternion%20scandal.pdf.