

Love, science and TOK

John Sprague looks at the redefinition of the kilogram in terms of theory of knowledge (TOK)

The last of the SI units that was still grounded on a genuine artefact has been recalibrated to a universal constant.

Up until now, '1 kilogram' was defined as the weight of *Le grand K*, formally known as the International Prototype Kilogram, a piece of platinum-iridium metal. However, it was been found that *Le grand K* has in fact lost weight due to natural deterioration. It doesn't amount to much weight lost: it's lost less than the weight of an eyelash over the last 130 or so years. However, if the definition of 1 kg has dropped, then everything else in the universe has gained weight, which doesn't seem right.

All the other SI measurements, from distance (a metre), to time (a second), and even to **luminous intensity** (how bright something is), used to be defined by some object or process in the world. The metre was defined by a stick of metal, and the second was defined as a fraction of the time it took for the Earth to rotate around the Sun.

However, basing these measurements on things undergoing change raised real problems, as the things kept changing. The definitions shifted to natural constants in an effort avoid these changes and fluctuations. Today, a metre is defined relative to how



ALEXIMX/ADOBE STOCK

far light travels over a certain time in a vacuum. This is a natural *constant*: it's the same everywhere and for all time because these constants are written into the physical laws of the universe.

From March 2019, a kilogram will be defined against certain natural constants in the field of electricity (the *Planck constant*), and these will never change.

TOK and constants

In terms of TOK, this highlights the deep assumption in the natural sciences that measurements are meant to be as everlasting as possible and illustrates that the previous methodology of science (measuring things) was deeply relative. The consequence of this was profound: the objects weren't any different, but the process of measuring them was changing. All the data were the same, but the *meaning* was different.

I have just finished teaching a section on the different approaches towards romantic love taken by the natural sciences (e.g. biology and neuroscience) and the arts (e.g. Shakespeare's sonnet 130, 'My Mistress' eyes are nothing like the sun'). I used two TED talks by Helen Fisher, who explores the nature of romantic love through her chosen medium and intersperses her talk with love poetry. The underlying assumption, however, is that the brain states are in a sense the *real phenomenon*: 'I began to realise that romantic love is not an emotion. In fact...it's a drive. It comes from the motor of the mind, the wanting part of the mind, the craving part of the mind.'

Fisher seems to be reducing the nature of romantic love to brain activity, shifting the definition, as it were, from the *experience* of love to some *objective* event in the brain. There are parallels with the drive to ground the definition of measurement units in natural constants. In each case we have an initial definition that we accept as universal but that will inevitably change: individuals will differ in their experience of love, and objects that define measurement will deteriorate and change.

To avoid this subjectivity, why not shift the definitions to something less prone to changing or to interpretation? So weight becomes tied to universal forces of nature rather than objects, and love becomes tied to objects (brains) rather than subjective emotion. This links to the 'Methodology' part of the TOK knowledge framework.

Objects vs individuals

However, while this sort of reduction towards certainty and objectivity might be appropriate in the sciences, why are facts about our brains relevant when we think about our loved ones? One of the essential features of the arts (under 'Scope and application') is to explore what is *individual* in our experience: what it is like to be me, right now, at this point in time.

Hearing a love poem helps us find our common *humanity* rather than, as neuroscience might have it, our common *biology*. I already know that our brains are quite similar, but I will learn so much more about us



SHEDIVA/ADOBE STOCK

both as *individuals* once you use a poem to share your experiences with me.

Whereas science treats the things in the world as objects, subject to the same universal physical laws, the arts treat humans as *individuals*. This creates space for our differences and opens up space where we can enter into a community and find the connections that matter. Both the type of things being studied and the methods being used to study them are significantly different.

Beware applying scientific reductions as a model for all experience and phenomenon. In love's case, the neuroscience seems to miss the point. I take comfort that my distant ancestor's understanding of a kilogram matches mine, but when Valentine's Day comes around, I'd rather receive a poem than a brain scan.

Further reading

Chen, S. (2018) 'Kilogram redefined: the metric system overhaul is complete', Wired,

www.tinyurl.com/yb5ad4uz

Fisher, H (2006) 'Why we love, why we cheat', TED,

www.tinyurl.com/gqbczpp

Fisher, H. (2008) 'The brain in love', TED,

www.tinyurl.com/zwn2v7s

Find out more about our full range of magazines and online archives of back issues at www.hoddereducation.co.uk/magazines

Did you like this article?
Tell us what you think