

Miscellaneous commentary

MOOCs: wheels come off the bandwagon (January 2019)

[Massive open online courses](#) (MOOCs for short) first mooted in 2006, surfaced with something of a pop in 2012. Intended to be open to all with Internet access, they promised a renaissance of higher education with the 'best' professors, educational technologies and materials, flexibility, innovative assessment and accreditation (if chosen), no entry requirements, and very low cost at a time of relentlessly rising fees for conventional study. And they did not require attendance, although certificates of successful completion may be a currency for acceptance in conventional HE. They could be about literally anything at a variety of levels and involving a range of study times. By the end of 2016 MOOC programs had been set up by more than 700 universities worldwide, and around 58 million students had signed up to one of more courses. The general business model is described as 'freemium'; i.e. a pricing strategy whereby a product or service is provided free of charge, with a premium charged for certification. There are innumerable variants of this model. The top providers are mainly consortia linking several universities and other academic and cultural entities. Futurelearn, although wholly owned by the formerly world-leading distance-learning distributor the British Open University, has 157 partners in Britain and globally. Its venture into the field involved its investing several tens of million UK pounds at start-up, which some believe was the source of its current financial difficulties.

The 11 January issue of *Science* published a brief account of the fortunes of a range of MOOC providers (Reich, J. & Ruipérez, J.A. 2019. The MOOC pivot. *Science*, v. **363**, p. 130-131; DOI: 10.1126/science.aav7958) using data from edX that links Harvard University and MIT. The vast majority of learners who chose MOOCs never return after their first year. Growth in the market is concentrated almost entirely in affluent countries, whereas the model might seem tailor-made, and indeed vital, for less fortunate parts of the world. Completion rates are very low indeed, largely as a result of poor retention: since 2012 drop-out rates in the first year are greater than 80%. In the data used in the study both enrollments and certifications from 2012 to last year rose to peaks in the first three years (to 1.7 million and 50 thousand respectively) then fell sharply in the last two years (to <1 million and <20 thousand, respectively). Whatever the 'mission' of the providers – was it altruistic or seeking a revenue stream? – the MOOC experience seems to be falling by the wayside. Perhaps many students took MOOCs for self-enlightenment rather than for a credential, as their defenders maintain. Well, the figures suggest that few saw fit to continue the experience. Surely, if knowledge was passed on at a level commensurate with participants requirements in a manner that enthused them, a great many would have signed up for 'more of the same': clearly that didn't happen.

The authors conclude with, 'Dramatic expansion of educational opportunities to underserved populations will require political movements that change the focus, funding, and purpose of higher education; they will not be achieved through new technologies alone.'

Should you worry about being killed by a meteorite? (December 2019)

In 1994 Clark Chapman of the Planetary Science Institute in Arizona and David Morrison of NASA's Ames Research Center in California published a paper that examined the statistical hazard of death by unnatural causes in the United States (Chapman, C. & Morrison, D. 1994. Impacts on the Earth by asteroids and comets: assessing the hazard. *Nature*, v. **367**, p. 33–40; DOI:10.1038/367033a0). Specifically, they tried to place the risk of an individual being killed by a large asteroid (~2 km across) hitting the Earth in the context of more familiar unwelcome causes. Based on the then available data about near-Earth objects – those whose orbits around the Sun cross that of the Earth – they assessed the chances as ranging between 1 in 3,000 and 1 in 250,000; a chance of 1 in 20,000 being the most likely. The results from their complex calculations turned out to be pretty scary, though not as bad as dying in a car wreck, being murdered, burnt to death or accidentally shot. Asteroid-risk is about the same as electrocution, at the higher-risk end, but significantly higher than many other causes with which the American public are, unfortunately, familiar: air crash; flood; tornado and snake bite. The lowest asteroid-risk (1 in 250 thousand) is greater than death from fireworks, botulism or trichloroethylene in drinking water; the last being 1 in 10 million.

Chapman and Morrison cautioned against mass panic on a greater scale than Orson Welles's 1938 CBS radio production of H.G. Wells's [*War of the Worlds*](#) allegedly resulted in. Asteroid and comet impacts are events likely to kill between 5,000 and several hundred million people each time they happen but they occur infrequently. Catastrophes at the low end, such as the 1908 Tunguska air burst over an uninhabited area in Siberia, are likely to happen once in a thousand years. At the high end, mass extinction impacts may occur once every hundred million years. As might be said by an Australian, 'No worries, mate'! But you never know...



Michelle Knapp's Chevrolet Malibu the morning after being struck by a stony-iron meteorite. Having bought the old car for US\$ 300, Michelle sold it as a curiosity item for US\$ 25,000 meteorite fetching US\$ 50,000 (credit: John Bortle)

How about ordinary meteorites that come in their thousands, especially when the Earth's orbit takes it through the former paths taken by disintegrating comets? When I was a kid rumours spread that a motor cyclist had a narrow escape on the flatlands around Kingston-upon-Hull in East Yorkshire, when a meteorite landed in his sidecar: probably apocryphal. But Michelle Knapp of Peeskill, New York, USA had a job for the body shop when a 12 kg extraterrestrial object hit her Chevrolet Malibu, while it was parked in the driveway. In 1954, [Ann Hodges of Sylacauga, Alabama](#) was less fortunate during an afternoon nap on her sofa, when a 4 kg chondritic meteorite crashed through her house roof, hit a radiogram and bounced to smash into her upper thigh, badly bruising her. For an object that probably entered the atmosphere at about 15 km s^{-1} , that was indeed a piece of good luck resulting from air's viscous drag, the roof impact and energy lost to her radiogram. The offending projectile became a doorstop in the Hodge residence, before the family kindly donated it to the Alabama Museum of Natural History. Another fragment of the same meteorite, found in a field a few kilometres away, fetched US\$ 728 per gram at Christie's auction house in 2017. Perhaps the most unlucky man of the 21st century was an [Indian bus driver](#) who was killed by debris ejected when a meteorite struck the dirt track on which he was driving in Tamil Nadu in 2016 – three passengers were also injured. But that is disputed, some claiming that the cause was an explosive device.