Discussion forum

Scepticism is not enough

Paul A. Howard-Jones*

Graduate School of Education, Bristol, UK

Educators play an important role in developing the minds and brains of their learners. Little wonder then, that most have a natural enthusiasm to learn about concepts from neuroscience and apply them in their classrooms. Such enthusiasm may be fundamentally misplaced if neuroscience can make no practical contribution to education. Yet many areas of practical educational concern are being informed by neuroscientific research, including adolescent development, development in mathematics and reading, and understanding of the contribution of sleep and nutrition to learning (Howard-Jones, 2007). Increasingly, there is also an expectation for teachers to differentiate their approach according to the needs of individual learners, and this includes a growing proportion of pupils in mainstream classes identified as suffering developmental disorders. A recent meta-analysis suggests 4–10% of school-age children suffer from ADHD, which is often controlled with powerful psychoactive drugs (Skounti et al., 2007). It seems unreasonable to suggest that an understanding of this disorder, in terms of the mind and the brain, cannot inform teachers in their approach. Teachers’ common-sense notion of the importance of the brain in education is further supported by the growing numbers of neuroscientists whose claims for the educational significance of their ideas extends well beyond their grant applications. Some neuroscientists refer to educational implications in the titles of their scientific publications (Posner and Rothbart, 2005), write books aimed at educators (Blakemore and Frith, 2005), produce articles for educational journals (Kaufmann, 2008) and even develop educational products (Wilson et al., 2006).

Neuroscientists who make contact with the educational community, however, may be surprised by some of the ‘neuroscientific’ concepts they find already there. Decades without formal interdisciplinary communication have allowed many unscientific ‘brain-based’ ideas to become established in the classroom. Common educational practices and ideas presently include categorising students in terms of their hemispheric dominance, attempting to repattern their brains through co-ordination exercises and ensuring they drink 6–8 glasses of water a day to prevent brain shrinkage. To a neuroscientist, such ideas may even provide amusement, but valuable time and money, both of which schools often lack, is being spent in obeisance to these myths.

Who should take responsibility for the popularity of neuro-myths? Undoubtedly, one contributory factor is the enthusiasm of teachers to understand more about learning, including at biological levels. Although such enthusiasm may not need excusing, when coupled with a lack of information about the brain in teacher training, it has made teachers a soft target for pseudoscience. Educators seeking out fresh ideas may have been undiscerning and uninformed when they have turned to neuroscience, but has neuroscience also been institutionally complacent in policing interpretations of its concepts by non-specialists?

An important feature of most neuromyths and unscientific brain-based learning programmes is that they often begin with some element of valid science. In other words, the original source of educational neuromyth is not education, but neuroscience. To take a case in point, educational kinesiology (sometimes marketed as Brain Gym®) was developed to ‘balance’ the hemispheres of the brain so they can work in an integrated fashion and thus improve learning (Dennison, 1981). The idea of cerebral dominance as a cause of learning difficulty can be traced back to Orton who considered reading difficulty was due to mixed cerebral dominance (Orton, 1937). Perhaps surprisingly, recent fMRI evidence confirms a shift from bilateral to left hemispheric activity with reading development, and that this shift is delayed in poor readers (Turkeltaub et al., 2003). However, Brain Gym® is also founded on theories of neurological repatterning and, more specifically, the Doman–Delacato theory of development (Dennison and...
Dennison, 1994). This proposes that efficient neurological functioning requires the acquisition of specific motor skills in the correct order (Doman, 1968), on the basis that ontogeny recapitulates phylogeny. Remedial exercises are recommended that repattern neural connections appropriately, and thus improve academic progress. It is difficult to test such a theory directly, but reviews conclude it is unsupported, contradicted or without merit (Chapanis, 1982; Cohen et al., 1970; Cummins, 1988; Robbins and Glass, 1968) and associated interventions appear ineffective (American Association of Pediatrics, 1998). Brain Gym® also draws on ideas about perceptual-motor training, i.e. that learning problems arise from inefficient integration of visual, auditory and motor skills. Again, training programs aimed at ameliorating learning difficulties through exercises that rehearse integration skills were shown to be ineffective by studies in the 1970s (Arter and Jenkins, 1979; Bochner, 1978; Cohen, 1969; Hammill et al., 1974; Kavale and Forness, 1979; Bochner, 1978; Cohen, 1969; Hammill et al., 1974; Kavale and Forness, 1987; Sullivan, 1972). However, these specialist articles failed to compete with the efforts of educational consultants who found repatterning appealing and could promote it in the language of teachers. Educational kinesiology took off in the 1980s and has been flourishing within education ever since. Perhaps reflecting this popularity, a paper was published as recently at 2003 in the respected journal Dyslexia that proposed the value of perceptual-motor training for reading difficulties (Reynolds et al., 2003). This article provoked a flurry of critical responses claiming a range of fatal methodological flaws (Rack, 2003; Richards et al., 2003; Singleton and Stuart, 2003; Snowling and Hulme, 2003; Stein, 2003).

What appears most noteworthy about the continuing success of many ‘brain-based’ educational ideas is not just the poor quality of their scientific basis. It is how long ideas can be erroneously marketed as neuroscience, provided there is no accessible interdisciplinary dialogue, expertise or forum to foster and communicate scrutiny. Sceptical communication between scientists, it would seem, is not enough and the value of interdisciplinary communication needs to be recognized by institutions within both education and neuroscience, if appropriate understanding is to be promulgated.

REFERENCES


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Climate change scepticism. 'Reform conservatism' is not enough reform on global warming. Efforts to reform conservative American policy still fail to address our greatest threat: global warming. Dana Nuccitelli. Unfortunately, in terms of conservative climate policies, that’s not an accurate statement. When it comes to global warming, today’s conservative American policymakers most often deny the scientific evidence that climate change is a problem to begin with. When discussions are able to move beyond the stage of science denial, conservative policymakers will generally assert without any supporting evidence that climate policies will kill jobs and cripple the economy. It does not mean that experts are always even mostly wrong. It only means that when humanity does take a step ahead, that step naturally concerns something that prideful experts didn’t know before. Over the generations, this lesson has been gradually absorbed into the scientific world. Money is not enough. Academic freedom sometimes seems like a gratuitous anachronism, but climate science is the very thing it was made for. Fortunately, some academic organizations, such as the American Meteorological Society and the University of Delaware, have taken a principled position on this. Scepticism is not enough. Authors: Paul A Howard-Jones. Please type a message to the paper’s authors to explain your need for the paper. Paper: Scepticism is not enough. To: Paul A Howard-Jones. From (Name): E-mail: Only shared with authors of paper. Please enter a personalized message to the authors. More detailed explanations for your need are more likely to get a response. Send Request. Load Form Load Form.