ASCL Association of School and College Leaders

Leader This article was first published in ASCL's Leader magazine. www.ascl.org.uk/leader

Educational neuroscience draws evidence from several fields of study to deepen our understanding of learning and teaching and debunk some 'neuromyths'. Educationalists **Professor Derek Bell** and **Richard Newton Chance** explain the latest thinking about thinking.

DEEPER UNDERSTANDING

Interest in the relationship between neuroscience and education has grown significantly in recent years. Labelled variously as 'brain, mind and education', 'educational neuroscience' and, more recently, 'the science of learning', the field has sparked much attention and debate.

At one extreme, it is argued that neuroscience has nothing (or very little) to offer to education; at the other, it is seen as the ultimate solution to maximising learning. As with so many debates in education, the truth lies somewhere between the two.

The key benefit, from our perspective, is that educational neuroscience is putting a sharper focus on the mechanisms of learning and the implications for teaching practices. As a multi-disciplinary field of research, it draws evidence from biological and imaging studies of the brain as well as from behavioural studies more commonly associated with psychology, and strives to reconcile the evidence from all the relevant disciplines. Although there is still much that we do not understand, educational neuroscience is already influencing the way in which we think about learning and teaching.

First, it has challenged some existing practices. In particular, it questioned so-called 'brain-based' approaches that had been built on false claims, the 'neuromyths'. Some of these myths are demonstrably wrong but others are more plausible, partly because they contain a glimmer of scientific fact that suggests that there might be some truth in the claims.

No evidence for 'learning styles'

'Learning styles' is a high-profile example of how a neuromyth can develop. It was based on the fact that processing of visual, auditory and sensory stimuli are associated with different regions of the outer layer of the brain (the cortex). It was suggested, therefore, that some students respond more readily to information presented in a particular way – their 'preferred learning style'. So, went the argument, in order to maximise their learning, students should be taught using their preferred learning style.

It is a very attractive idea, but it is not supported by the evidence; on the contrary multi-sensory approaches to learning appear to be more effective[1].

Second, educational neuroscience has contributed to putting learning and what affects students' progress into a much wider context. We now know a great deal more about the many factors that affect learning, including biological factors such as sleep and exercise; socio-cultural influences, especially socio-economic status; and emotional factors such as interest, curiosity, aspiration and resilience.

It has led to policy changes at both national and local level with more attention now given to ensuring that students have improved levels of exercise, addressing the needs of disadvantaged students, and mental health and wellbeing. Some of the factors can be addressed within school or college, but a key message is that managing all these factors positively requires schools and colleges to work in partnership with parents and carers, and the wider community.

Why 'wait time' matters

Third, educational neuroscience suggests there is much that teachers can do day to day in class with subtle changes to their practice that can bring about incremental improvements in students' learning.

One example relates to the time teachers wait for an answer to a question. More than 40 years ago, a study investigated[2] what was called 'wait time'. It was found that most teachers waited less than a second but if they waited three to five seconds, the accuracy and quality of the answers was significantly better. Talking to teachers and going into many classrooms today we find that the 'wait time' still hasn't really changed much. Now, however, neuro-imaging studies[3] are beginning to show why the extended 'wait time' is important: it allows the brain to process the information and make appropriate connections before responding. Obvious, perhaps, but this new evidence demonstrates the real value of 'wait time' to the way the brain processes information

In another example, which is relevant to the wider curriculum, ▶▶

FIND OUT MORE

Learnus is an educational think-tank and community dedicated to bringing together educators and those who specialise in the study of the brain, the mind and behaviour, in order to use the insights gained from high-quality research to improve and enrich learning and teaching. Understanding how we learn is at least as important as what we learn. For further information about Learnus and its activities go to **www.learnus.co.uk**

neuro-imaging studies[4] show that we use the whole of our brain by making connections between brain cells (neurons). The neural pathways and networks that are created control our thinking, behaviour and emotions; together they are the learning. In particular, it is clear from this that learning takes place by making links between existing ideas, new experiences and fresh ideas. It suggests that learning is fundamentally domain-specific because the connections are made within particular contexts.

What this means for teaching is that we cannot assume that students will transfer or apply ideas and skills to new situations and problems automatically. We need to take more deliberate and explicit steps to help students make links across subjects and situations.

A school-wide discussion

Although individual teachers can start to make a difference, schools and colleges as a whole would benefit from factoring these new insights on learning and teaching into their planning and professional development programmes. At the very least, encouraging a school-wide discussion on the issue would help to shift the balance towards a better understanding of how we learn as opposed to what we have to cover to get through the scheme of work.

Crucially, in our view, the debate needs to go further. There is still a great need for teachers to interact with researchers in the field of educational neuroscience. Bridging the gap is not straightforward but, as the evidence builds, not only will educational neuroscience provide a better focus on the science underpinning learning and teaching, it will also provide better solutions. ASCL

Professor Derek Bell
Director of Learnus
@LearnusUK
www.learnus.co.uk

Richard Newton Chance
Ex-headteacher and former ASCL Funding Specialist

FURTHER READING:

HOW THE BRAIN WORKS.
Available at: **https://tinyurl.com/y9l8228f**

NEURO-HIT OR NEURO-MYTH?
Available at: **https://tinyurl.com/y9glqodk**

1 For example, see discussion by Shams, L., & Seitz, A. R. (2008). Benefits of multisensory learning. Trends in Cognitive Sciences, 12 (11), 411-417. Available at: **https://tinyurl.com/yd823am7**

2 See discussion by Rowe, M.B. (1986). Wait time: Slowing down may be a way of speeding up! Journal of Teacher Education, 37, 43-50. Available at: **https://tinyurl.com/ya9xscrb**

3 See discussion by Mareschal, D. (2016). The neuroscience of conceptual learning in science and mathematics. Current Opinion in Behavioral Sciences 10, 114-118. Available at: **https://tinyurl.com/yb48q6y9**

4 See discussion available at: **https://tinyurl.com/y7zkynbh**

We're here for **you**

One of the key reasons school and college leaders join ASCL is to tap into the individual support and advice offered by the Association's Member Support Department, which has 40 staff based across the UK. The department includes 6 Hotline Officers, 11 Regional Officers and 12 Field Officers, all of whom work very closely with ASCL's Legal Team comprising 4 Solicitors. The Member Support Department is led by Director Richard Tanton with support from Deputy Director Mike Smith, and Rachel Bertenshaw is Hotline Leader.

Knowing that there's someone on the other end of the line who truly understands education leadership issues, and knowing someone is there to listen, no matter what the topic or concern, is reassuring for our members, especially in a constantly evolving education system.

Contacting the Hotline: ASCL members who are concerned about leadership issues should call **0116 299 1122** or email **hotline@ascl.org.uk**

Five facts about the ASCL Hotline:

ASCL provides members with a dedicated telephone Hotline service, 365 days of the year.

During the last full academic year (Sept 2017-Sept 2018), the ASCL Hotline dealt with a massive 6,487 enquiries from members.

On average, that's 30-40 calls each school day.

Some of the most frequent topics for the enquiries that our Hotline takes from members, relate to conditions of service, and disciplinary and capability issues.

ASCL Hotline is staffed by an experienced team who were all previously school or college leaders, on standby, to help with your enquiries.