Learnus Annual Lecture 2023

Report by Jane Emerson, Learnus Council Member.

Professor Stanislas Dehaene is a French Cognitive Scientist who holds the chair of Experimental Psychology at College de France in Paris and Director of Neurospin, France's brain imaging research centre. The topic was 'How We Learn: Why brains learn better than any brain…for now.'

His lecture with explanatory slides, included looking back to his book Reading in the Brain (2009) and to How We Learn (2020).

He explored the main principles of brain plasticity and learning to learn. He explained that all learning changes the brain when nature and nurture combine. As a specific example of these processes, he showed that the acquisition of reading creates changes by recycling existing cortical developments for new purposes.

He went on to explain four pillars of learning which can be utilised to create new learning pathways.

Brain plasticity can be exploited in early childhood because the brain of a two-year-old has twice as many connections as an adult brain. So new learning is easier at an early age. So, learning a second language is easier at that stage. The infant's brain is highly structured from birth so new information can be stored effectively. Cultural inventions such as alphabetical and numerical symbols are laid down in brain circuits inherited during our evolution. In adulthood, spoken and written language converge into the same auditory and visual brain areas for adding in symbolic meaning. As reading is acquired, certain parts of the brain can be repurposed and changed.

Dehaine went on to explain that brain plasticity does have its limitations, and that even small brain lesions can cause significant deficits that might partially rebuild, but acquired conditions such as dyslexia may remain.

Developmental dyslexia can arise from brain differences which may affect aspects of reading acquisition and development.

The lecture went on to discussing the pedagogy of reading acquisition, and he stated that the systematic teaching of letter sound correspondences is the essential approach to acquire efficient and accurate reading skills. He recommended then, that systematic and explicit grapheme to phoneme conversion rules, referred to in English as phonic teaching, is the main evidence-based method for teaching reading. Frequent practice and careful left to right guidance with a finger (or a pencil from above a line) is an essential decoding tool for success.

He added that teaching alphabet symbols with their names (ABC etc.) may confuse young learners and are better introduced later. Symbol to sound connection have been found to produce more successful readers.

Finally, the main pillars of learning were explained. A brain that can control and modulate and have active engagement in learning as well as receive feedback about errors, can achieve a transfer of new material from explicit to implicit knowledge. If pedagogy includes retrieval practice, transfer of new information can transfer into long term memory.

Automatization of this new knowledge is transferred to non-conscious areas, so that the resources of the prefrontal cortex can be freed up for new learning to take place.

Finally, the importance of education to be based on scientific principles involving teacher knowledge of the brain's optimum potential to bring about successful learning so that pupils can reach their learning potential through evidence-based pedagogical approaches that research has shown to be successful was reiterated.

This was a hugely popular lecture with many attendees and the fascinating slides that accompanied it, can be found on the Learnus website as well as on the Learnus YouTube channel.