

Learnus[®]

MEDIATED WORKSHOP SERIES

Understanding Learning - is it all in the brain?

26th June 2013

18:00 to 20:30

Institute of Education
University of London

MEDIATED WORKSHOP REPORT:

Understanding Learning - Is it all in the Brain?

INTRODUCTION

LEARNUS is a recently formed think tank which aims to act as a bridge between the latest academic research and the classroom and to share our findings with education policy makers. A key element in working towards this objective is the need to provide opportunities for the wide range of interested parties – neuroscientists, teachers, psychologists, policy makers and commentators – to come together to explore the issues and share their knowledge and understanding of the field. This mediated workshop was the first of a series of such events that is being planned by LEARNUS in order to provide such opportunities and inform subsequent developments.

PURPOSE AND STRUCTURE OF THE STAKEHOLDER SEMINAR

Within the context of the overall mission of LEARNUS, the purpose of the mediated workshop was:

- to explore the question in the title – *Understanding learning: is it all in the brain?* – by bringing together a range of stakeholders to share their expertise and understanding of learning;
- to draw out from the discussions key issues which need to be addressed as part of the future dialogue.

The workshop opened with a presentation by Professor Michael Thomas, Director of the Centre for Educational Neuroscience¹, (London) followed by roundtable discussions. Each group of participants included at least one individual with expertise in neuroscience, and one working in the areas of psychology or cognitive science. Other members of each group were teachers from a range of educational settings including mainstream primary and secondary schools and SEN facilities. The number of participants (55 attended) was restricted in order to facilitate focussed discussions but still encourage as wide a range of views as possible.

The purpose of the discussions was to share knowledge and understanding in one or more area of common interest and, importantly, to identify ways of developing the dialogue further. Each group had an identified 'scribe' who noted the key points of the discussion and the points to be made in the plenary feedback session. The programme for the workshop is attached to this report as Appendix 1.

¹ <http://cen.squarevale.com/wordpress/>

Keynote Presentation

Professor Thomas set the scene for the roundtable discussions by considering the question, *How could neuroscience influence education? (and vice versa!)*.

His presentation compared the relationship between neuroscience and education to those between: Biology and Medicine, and Physics and Architecture. In particular he developed the analogy of medicine in relation to improvements in health. While acknowledging advances that have been made with regard to understanding some specific learning conditions, he suggested that in the short-term the benefits of neuroscience are likely to be relatively few and of a general nature for example:

- an initial contribution of neuroscience will be to help understand 'why the educational methods that work do work';
- there will be few magic bullets but rather an accumulation of small improvements leading to an evolution in practice;
- building evidence of factors bearing on brain plasticity, role of diet and exercise, role of sleep, hormones, emotions, vigilance and stress, social hierarchy effects among others.

Professor Thomas then speculated what some of the potential outcomes might be in the medium to long term, some of which may be more unpalatable, for example:

- The better teachers do their job, the more different their students may become.
- Optimal teaching would require full genotyping of children.
- Interventions may have side effects.
- Not all aspects of children's abilities may be as manipulable as educators hope (e.g., motivation).
- In turn these raised issues of ethics, to what extent there might be a 'placebo effect' and, importantly how to establish causal links between interventions and impact on learning. Professor Thomas suggested that the most practical consequence of neuroscience on education would be in the training of teachers.

Outcomes of the roundtable discussions

The groups at each table were invited to consider the points made during the key note presentation and one or more of the following questions:

- Evaluating evidence: how do we know something works?
- Learning through life: does it change?
- Improving memory: how does training help?
- Impact of teaching: how does it affect the brain?
- Subliminal Learning: what role does it play?

It is important to stress that there was no expectation of definitive answers to the overall questions nor to the many subsequent questions that were raised during the evening. There was, however, unanimous agreement that these questions needed to be explored further and that in order to do so there must be interactive dialogue between the different communities of expertise and practice. Although the groups took different approaches to the questions and focussed their specific conversations on a range of topics, several themes ran through the discussions.

1. The use and place of evidence

The need for robust, reliable and valid evidence is an essential pre-requisite for informing improvements in practice, explaining why some existing approaches are more effective than others and to challenge claims made for 'brain-based' interventions and programmes (often referred to as 'neuromyths'). Getting evidence (see 'gathering evidence' below) is one thing but it is only a start and the discussions raised a multitude of questions that require further, sustained consideration and action including:

- What evidence already exists? What are the most trusted sources of evidence?
- What does good evidence look like? Are there any criteria against which the quality, reliability and validity of evidence can be judged?
- How can evidence best be evaluated? Is there any guidance that might be provided?

2. Issues in gathering evidence

Following on from the first theme, several issues were raised concerning the way in which evidence is collected, analysed and interpreted. In part this was raised specifically in relation to the different methodologies that are used to gather data including the use of quantitative and qualitative evidence, the conducting of random controlled trials (RCTs) and observational studies. The complexity of the learning process and the environments in which it takes place (physical and social, formal and informal, etc.), was discussed at some length as were the challenges faced by the ethical implications of conducting experiments and trials.

3. Maximising the value and use of evidence

Translation of experimental and other research data into effective practice was also considered. In particular the question was raised of how to move from strong evidence of an effect demonstrated in the laboratory under highly controlled conditions to the use of that technique (or at least the lessons from it) in the classroom context. In some respects the process of translation of research findings through to sustainable and effective practice is potentially the biggest challenge to be overcome.

4. Improved communication between science and education

It was unanimously agreed that an important component of any solution /answer to the various questions was a much improved dialogue between those involved in the various sciences and education. Such dialogue needs to include the development of a greater shared understanding of the meaning of terms, better defined questions which address the needs of the learner as well as meet the desire to investigate the basic science. Extended dialogue between the different communities sustained over time is crucial but it needs to go beyond just words and be translated into joint actions working towards improved solutions and answers. Importantly it must be seen to be a genuine partnership between the different parties in order to ensure that the 'problems' are considered from different perspectives and that the questions raised are both practice and research led.

5. Value of the 'medical' analogy

Although the 'medical' analogy was felt to be useful, it was widely accepted that it had limitations in explaining the relationship between neuroscience and education. Many of these concerns were based on the sheer complexity of the learning process and its interaction between the biological functions of the brain, the environmental factors and the social interactions that influence the way in which individuals appear to learn. However the fundamental premise that there is a growing realisation and need for more robust evidence to inform teaching and thereby improve learning broadly was accepted.

6. Challenges to existing ideas / areas of knowledge

Several examples of what are widely referred to as 'neuromyths' were referred to throughout the workshop. This underpinned the call for improved knowledge and communication about which approaches:

- are supported by robust evidence (and so can be adopted with some confidence);
- have been demonstrably shown to be unsupported by evidence (and so should be avoided);
- have some evidence, either for or against or both (and so should be treated with some scepticism and need further investigation);
- have no evidence either way (and so require research into them).

It was also noted that there are approaches to teaching and learning that 'experience' suggests 'work' and are effective. In practice these are important to the teacher and learner and should be continued but there is probably much scope for examining them more closely in order to try to identify why they work and so enable them to be adopted even more widely and with greater confidence.

1. Role of technology

Although not considered in great detail, the role of technology was considered to be potentially very significant from several perspectives. Advances in technology will determine, among other things, the rate at which understanding of the physical structure and function of the brain can be studied and the level of specificity that can be achieved in relating events in the brain to particular actions by the individual and vice versa. At the other extreme technology and its applications will play an increasing role in the provision of learning experiences either directly as a resource for modelling concepts and simulating scenarios, or a means of interaction between learners and their teachers. Although some research is available notably on the impact of gaming there is still much to be addressed in this area in order to identify not only the ways in which technology might enhance learning but also the ways in which it might restrict understanding or diminish the quality of the learning experience.

2. Context for learning

As indicated above learning rarely takes place in isolation and the discussions repeatedly returned to questions about the context in which learning takes place. Factors contributing to the physical environment as well as to the social and cultural atmosphere were felt to influence the effectiveness of learning. Similarly the health and well-being of the individual learners was recognised to have a role and some evidence exists to support a few of these ideas. In particular there was interest in how emotional states affected learning and to what extent these may or may not predispose someone to learn more effectively.

In summary

The workshop demonstrated that there is a healthy interest in exploring how, by bringing neuroscience and education together, our understanding of learning can be improved further. At one level it could be argued that 'it is all in the brain' but that is too simplistic as an interpretation of the situation. There are a multitude of factors involved and there is a great need for more reliable and valid evidence of not just what works but for how it works. These conversations are only a small but important contribution to the growing debate in this field.

Thanks

LEARNUS wishes to thank Professor Michael Thomas for the thought provoking presentation and to all the workshop participants for their willingness to share their ideas and experience so willingly. Thanks also go to everyone who helped to organise the workshop and we hope to see as many as possible at future events.

Derek Bell
Director of Learnus
10th July 2013