

Learnus[®]

MEDIATED WORKSHOP SERIES

Understanding Learning - is it all in the brain?

8th October 2015

18:00 to 20:30

Goldsmith' College
University of London

MEDIATED WORKSHOP REPORT:

Lessons from Neuroscience for Music Learning

INTRODUCTION AND PURPOSE

This workshop forms part of the LEARNUS 2015 series of mediated workshops which explore how our understanding of the brain might inform our understanding of teaching and learning. Within the context of the overall mission of LEARNUS, the purpose of this event was to bring together a range of stakeholders to share their expertise and understanding of learning with specific reference to research on neuroscience and music learning.

The opening presentation from Professor Lauren Stewart was followed by round-table discussions and a plenary session. Prior to the workshop a paper co-authored by Professor Stewart was sent out to participants in order to help familiarise them with some of the issues. Forty five participants attended the workshop.

Sixty participants attended the workshop.

KEYNOTE PRESENTATION

Professor Stewart reminded the audience that experiences and skill-learning bring about changes in the brain through modification of neurons and the networks they develop. Making music is often referred to as a 'super skill' in that it involves the use of memory, complex integration of a range of sensory information and fine muscular co-ordination. It also requires the continuous monitoring of the performance for errors and the conversion of visual inputs into intricate motor programmes. Finally making music successfully requires practice which is intense, prolonged and typically for accomplished musicians starts at an early age. Such a complex activity requires the co-ordination of several areas of the brain which often need to respond instantaneously and at the same time. Add to this that fact that music can evoke emotional responses regardless of whether the individual is making or just listening to the sounds being created offers great potential for studying the functioning of the brain.

Drawing on examples from her research Professor Stewart reflected on four issues:

1. Differences between musicians and non-musicians in response to musical notation. Specifically it was noted that even after a relatively short period of musical training the brain's response to musical notation was changed. The modified behaviour shown by the 'embryonic' musicians in this study is supported by neuroimaging evidence which indicates that the changes in brain activity show that musical training causes notes to acquire a significance that cannot be suppressed. The same changes were not detected in adults who had received not musical training.

2. Ability to listen to music. Making the distinction that 'playing an instrument' or 'being able to sing' is not the same as the ability to appreciate music, Professor Stewart outlined the complexity of the processes going on in the brain that determine the way in which we respond to music. She particularly highlighted the way in which very young children are able to recognize the 'rules of music'. Infants up to the age of 6 months are able to recognize irregularities in different types of music (e.g. Western and Balkan) but at the age of 12 months they, like adults, are more able to detect changes in the music of their own environment (Western rather than Balkan). However, following additional exposure to the other form of music the 12 month old infants, unlike adults, are able to respond in the same way as 6 month old infants to both forms of music. This suggests that perceptual abilities are not irreversible but are intimately related to environmental input.
3. The state of the evidence in support of claims for music as part of a wider education. There are many claims that learning music has wider benefits for other aspects of children's cognitive development including speech processing, verbal recall, mathematical and spatial skills. Although such near and far transfer effects are very attractive, Professor Stewart sounded a note of caution as to the quality and quantity of evidence on which such claims are based. In particular she pointed out that the number of studies with controls is very small and that it was difficult to generalize from the findings. However, there was great potential for further studies in order to test some of the ideas more robustly.
4. Areas for consideration as part of educational practice. In the final section of the presentation Professor Stewart outlined some interesting areas of current research such as the potential role of music in improving social bonding and in supporting cognitive and physical rehabilitation. See closed by suggesting some ways in which music might be used in the classroom, bearing in mind, of course, that more evidence and research is needed in order to understand more fully the role of music learning in our lives.

ROUND TABLE DISCUSSIONS AND PLENARY

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

1. To what extent do current practices in teaching and learning of music reflect understandings gained from neuroscience?
2. What evidence do we have that particular strategies work?
3. To what extent do you consider music enhances other aspects of learning? Does evidence from neuroscience support your view?
4. In the light of the presentation in what ways might you review your current practices as a teacher / counsellor / researchers? What questions does the presentation raise for you? The very lively discussions that ensued inevitably raised many more issues ranging from matters relating specifically to the way in which music learning takes place and its contribution to the wider education of young and old alike. Although there was inevitably a great deal of cross-over in topics, it is possible to identify 6 themes running through the roundtable discussions and the questions that were raised with Professor Stewart during the plenary.
 - a. Transfer effects. Surprise was expressed at the level of evidence available to demonstrate a causal relationship between music tuition and wider aspects of cognitive development and behaviours. Despite this all groups explored the issue in some depth from two perspectives: first that of justifying the place of music in the curriculum for all children and second that of

the brain processing which takes place when we engage with music both as music makers and as recipients of music. Thus use of memory, identification of tonal variations, the recognition of patterns in stimuli (visual, auditory and spatial) and the way in which the brain handles expectations were all discussed at some length across the groups.

- b. Self-esteem of the learner. The labelling of learners was seen as a potential issue for learners in music especially those who have been described as 'tone deaf' implying not only that they had no ability to make music but also that they were unable to appreciate music in any form. Conversely, for learners having some ability music was seen to contribute to improved self-esteem and therefore to overall confidence. It was suggested that good musicians tended to want to challenge themselves further to take their playing to a higher level - echoing the idea of having a growth mind-set approach to learning.
- c. Emotional responses. There was wide interest in the emotional responses to music both in the general sense of how individuals react when they hear a particular piece but also in the impact on motivation, social bonding and intergenerational music. There was a general feeling that music has a positive effect but there were many questions as to how any benefits might be demonstrated.
- d. The impact of technology. Although this was not a major theme in the discussions, the role of technology was considered to have an important role in music learning and that there is much to be done in order to understand how it might be used most effectively.
- e. The role of practice. Considerable periods of practice are an accepted part of becoming a musician but there was discussion around the extent to which it is possible to become a highly accomplished player through practice alone or is there a necessity for natural talent? No conclusion was forthcoming but there was general agreement that natural talent alone does not ensure high level success.
- f. Future directions for research in music learning. Many participants raised further questions that require consideration in order to try to fill some of the gaps in evidence that currently exist. These included: "Is there cross-over in the development areas of the brain where someone is naturally gifted at many instruments?" "To what extent might music be used in managing behaviour of children in a classroom?" "How does teaching / learning music through the use of technology in early years (3-7 years old?) affect brain development?" "Practically, how can we bridge the gap currently existing between neuroscience and music education - which types of studies / findings would be most effective and applicable for education today?" "Where and how do we start implementing this work?" Clearly questions and many others such as these need refining in order to move to the next level of understanding in this domain.

IN SUMMARY

Based on the evidence presented during the workshop, there are findings from neuroscience which can inform teaching and learning in music and there is potential for the future and increased interaction between researchers and practitioners. Inevitably there are caveats, notably that there are still many unanswered questions and, importantly that the findings should not be taken in isolation of other evidence - especially when they are applied to classroom practices.

THANKS

LEARNUS wishes to thank Professor Lauren Stewart for her thought provoking presentation and responses to the questions and to all the workshop participants for their willingness to share their ideas, experience and expertise. Thanks also go to everyone who helped to make this workshop possible, especially Dr Alice Jones Bartoli and Goldsmith's University of London Education Society for all their support.

Derek Bell
Director of Learnus
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