Neuroscience in education: 
The challenges of transdisciplinarity

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The recent years of brain research have seen the emergence of a new synthesis between two different disciplines, neuroscience and education. Recent results suggest that a solid knowledge of factors influencing the brain’s maturation- and development-related changes may help to construct optimal learning conditions. It is well known that many different factors may contribute to the brain’s state and receptivity to learning. First, there are special periods in brain development, called sensitive periods, when the brain is capable of undergoing functionally significant changes to a degree that cannot be attained after the periods’ closure. Second, physical, emotional as well as social health has significant influence on the brain’s learning capacity and sensitivity. Third, successful acquisition of the cultural techniques, such as literacy and numeracy, depends on very complex adaptive changes of the human brain that is not developed for this purpose during the Homo sapiens’s evolution.

The presentation will highlight recent results of the cognitive neuroscience providing a deeper insight into brain changes accompanying lifelong learning. First, recent data on a sequential development of different cortical areas and networks underlying plasticity, one of the fundamental brain mechanisms of learning, will be presented. Second, recent data on changes undergoing in the school-age children’s brain becoming literate, acquiring mathematics and becoming literate in music will be shown in detail. Third, significant brain changes occurring in adolescence will also be presented in order to draw attention to this period highly important in the curriculum.

It seems that cognitive neuroscience has already transcended the borders between disciplines and a new collaboration has started between neuroscientists and educators. A cautious interpretation of our newest knowledge on changes in the learning brain as well as the avoidance of misconceptions arising from ill-interpreted data of neuroscience in education could and should inseminate educational practice and policy.

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