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MIND, BRAIN, AND EDUCATION: AN EMERGING TRANSDISCIPLINARY FIELD OF LEARNING AND DEVELOPMENT

ZİHİN, BEYİN VE EĞİTİM: ÖĞRENME VE GELİŞİMİN BELİREN TRANSDİSİPLİNER BİR ALANI

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Abstract

The future of neuroscience needs an innovative outlook on the study of brain by scientists coming from various disciplines and traditions. The field of Mind, Brain, and Education (MBE) is a meeting point for researchers and scientists in psychology, biology, and education. Unlike the one-way information sharing from psychology to education as in educational psychology or from neuroscience to education as in educational neuroscience, MBE is credited with its two-way flow of information between the three fields. The transdisciplinary initiatives between neuroscience, psychology, and education, as in the case of MBE, offer an increased optimism not only for the treatment of biological and neurological diseases but also for the realization of optimal outcomes in effective learning and positive development.

Keywords: Neurosciences; mind, brain, and education; educational psychology; educational neuroscience; learning; development

Özet

Nörobilimin geleceği, beynin çeşitli disiplin ve geleneklerden gelen bilimciler tarafından çalışılmasında yenileşimci bir bakış açısına ihtiyaç duymaktadır. Zihin, Beyin ve Eğitim (ZBE) alanı psikoloji, biyoloji ve eğitimdeki araştırmacı ve bilimciler için bir buluşma noktasıdır. Eğitim psikolojisindeki gibi psikolojiden eğitime ya da eğitim nörobilimindeki gibi nörobilimden eğitime tek yönlü bir bilgi paylaşımının aksine, ZBE üç alan arasındaki iki yönlü bilgi akışıyla takdir edilmektedir. ZBE olgusundaki gibi, nörobilim, psikoloji ve eğitim arasındaki transdisipliner girişimler, sadece biyolojik ve nörolojik hastalıkların tedavisi için değil aynı zamanda etkili öğrenme ve pozitif gelişimde en uygun sonuçların gerçekleştirilmesi için daha fazla umut vaat etmektedir.

Anahtar Kelimeler: Nörobilimler; Zihin, Beyin ve Eğitim; eğitim psikolojisi; eğitim nörobilimi; öğrenme; gelişim

1. Introduction

Neurosciences have attracted a great deal of attention in the past decades and continuing to do so. Starting with the designation of 1990s as the Decade of the Brain by the United States President, neurosciences were seen as the key to human mind and behavior. In their letter to the editor in *Science* magazine, 10 US scientists (Albus et al., 2007) proposed a multidisciplinary research agenda for a Decade of the Mind to understand, heal, enrich, and model the mind. The year 2013 has been the start of grand research projects on human brain with the BRAIN Initiative of the United States and the Human Brain Project of the European Union. These projects aim to revive the past efforts and complete the mapping of human brain for a better understanding of its structures and functions.

Even though this interest and support for neuroscience is promising a great deal of hope for the brain diseases

and other unknowns of the mind, critiques find these initiatives narrow in focus and premature in analysis. In his *New York Times* op-ed, Dr. Gary Marcus (2014) from New York University states that neuroscience needs a breakthrough, like the DNA in biology, to understand the link between neurological structures and cognitive processes. He also highlights the need for better data analysis in the processing of large datasets collected by these grand projects. The future of neuroscience needs an innovative outlook on the study of brain by scientists coming from various disciplines and traditions. I would like to draw attention to a young field of science that brings together knowledge and methods from different scientific disciplines and practices.

2. Mind, Brain, and Education

The field of Mind, Brain, and Education (MBE) is a

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meeting point for researchers and scientists in psychology, biology, and education. The field, as shown in the Figure 1 below, is the child of a transdisciplinary marriage between neuroscience, education, and psychology, all of which have relatively recent backgrounds in the scientific arena (Tokuhama-Espinosa, 2010). Researchers in the field study a diverse range of topics, including but not limited to, bilingualism, cognitive skills, dyslexia, educational testing, math anxiety, and sleep cycles. The transdisciplinary MBE field is also a cross-cultural one due to the international collaborations with common standards and values. Researchers around the world are working on various issues in relation to human learning and development with the advanced knowledge and expertise in neurosciences and genetics.

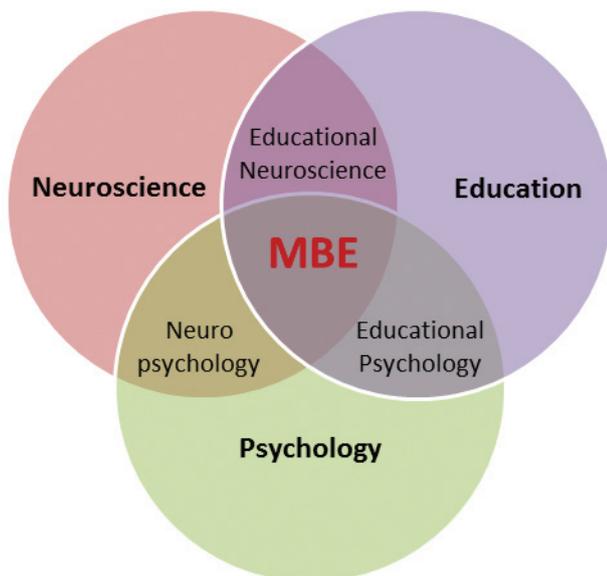


Figure 1: The transdisciplinary field of Mind, Brain, and Education (MBE) (adapted from Tokuhama-Espinosa, 2010)

In short history of the field, there has been a tremendous interest and advancement. Spearheaded by Dr. Kurt Fischer from Harvard Graduate School of Education, the International Mind, Brain and Education Society was founded in 2004. The society then launched its flagship journal, the *Mind, Brain, and Education*, in 2007. While the society holds biannual conferences, all of which were held in the United States so far, the journal is published quarterly by the Wiley Periodicals.

In their inaugural article in *Mind, Brain, and Education*, editors of the journal stated that "It is time for education, biology, and cognitive science to join together to create a new science and practice of learning and development" (Fischer et al., 2007, p. 1). The field and the journal are envisioned to serve a mediatory role in transferring practical knowledge from biological sciences to educational practices. The articles published in the MBE journal showcase the multidisciplinary nature of the studies in the field. A quick word count in the titles and abstracts of the articles reveal the most frequent concepts as learning, education, brain, and neuroscience.

Two of the most frequently cited articles in the MBE journal can provide a closer look at the depth and breadth of the studies in the field. In their review article, Robert Plomin and colleagues (2007) discuss the genetic factors

on learning behavior. They assert that the identification of generalist genes, which are responsible for the genetic influence on learning abilities and disabilities in reading and mathematics, would be very instrumental in the understanding of the mechanisms and associations between genes, brain, and behavior. In another review article by Immordino-Yang and Damasio (2007), the concept of emotional thought is introduced and discussed for its implications on learning. Authors point out the intertwined nature of human cognition, emotion, decision making, and social functioning and call for more research and innovation in educational environments to make use of recent findings in neuroscience.

The long discussed relationship between learning and development is now expanding to better integrate biological sciences in this relationship. Thanks to the enhanced knowledge base about the structures and processes of brain and genetics, MBE can help to design and implement better educational programs and interventions. Educators and practitioners in MBE also provide information and lessons learned to psychological and biological scientists. Unlike the one-way information sharing from psychology to education as in educational psychology or from neuroscience to education as in educational neuroscience, MBE is credited with its two-way flow of information between the three fields (Tokuhama-Espinosa, 2010).

3. Conclusion

The interest and investment in neurosciences is fueling the need for more interdisciplinary and innovative research programs around the world. The transdisciplinary initiatives between neuroscience, psychology, and education, as in the case of MBE, offer an increased optimism not only for the treatment of biological and neurological diseases but also for the realization of optimal outcomes in effective learning and positive development.

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