

Developing a Translating Educational Neuroscience Clearinghouse for the Differentiated Instruction of Diverse Learners

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KEY IMPLICATIONS

- This development project is made up of a database comprising neuroscience articles translated into educator language and offers educational implications directly linked to the original research.
- The database provides a resource for developing educator brain literacy.
- The database can be upscaled for teacher professional development.

BACKGROUND

Given that teaching changes the brain, brain literacy (i.e., understanding how the brain learns) can potentially be useful for educators (Walker, Chen, Poon, & Hale, 2017). First, brain literacy can sensitize educators to individual differences in the ability to learn, which can help them differentiate instruction to meet the needs of diverse learners (e.g., Tomlinson, 2014). Second, brain literacy enables educators to consider both brain and behavioural information when designing curriculum and instruction, which may be more beneficial than considering behavioural information alone (Gabrieli, Ghosh, & Witfield-Gabrieli, 2015).

FOCUS OF DEVELOPMENT

This is a development project that aims to develop a database that serves as a resource for developing educator brain literacy. It seeks to improve educator expertise in differentiated instruction in order to meet diverse learner needs and ultimately improve student academic and behavioural outcomes in the classrooms. More specifically, this project translates influential neuroscience research on neurodevelopmental conditions into educator language and where appropriate, offers suggestions for applications based on the findings.

KEY OUTCOMES

The database comprised translations of 325 articles (published from 2007 to 2017 in 20 highly cited cognitive neuroscience journals) that used neuroimaging techniques to examine the brain structure and/or function of children and adolescents with one or more of the following neurodevelopmental conditions: attention-deficit hyperactivity disorder, autism spectrum disorder, dyscalculia, dysgraphia, and dyslexia. See https://libguides.nie.edu.sg/educational_neuroscience_resources for the database.

SIGNIFICANCE OF PROJECT

The database provides a resource for developing educator brain literacy and allows widespread dissemination of brain literacy content. The database provides the foundation for MOE officials, administrators, and teacher trainers hoping to improve student learning outcomes based on the science of learning. The next phase of this development project proposes to upscale the database for teacher professional development based on the feedback from NIE and MOE professionals. It also aims to foster collaboration between neuroscientists and educators to develop strategies to apply concepts about how the brain learns (or does not learn) to facilitate teaching and learning in the classroom.

PARTICIPANTS

Thirty teachers from two primary schools in Singapore participated in a survey and eight of them participated in a focus group discussion to provide feedback to the translation samples.

DEVELOPMENT METHODS

The articles were summarized using simple languages, highlighting the aims, findings, and conclusions. Implications for educators were suggested, when

possible, by making links between neuroscience findings and behavioural interventions. Seventeen translations were reviewed by three neuroscientists, and surveys and focus group discussions were conducted with teachers to collect their opinions on the clarity and relevance of two translations. All translations were revised based on the feedback. They were then reviewed by a special education expert as well as a cognitive neuroscientist to ensure clarity, relevance and accuracy.

REFERENCES

- Gabrieli, J. D., Ghosh, S. S., & Whitfield-Gabrieli, S. (2015). Prediction as a humanitarian and pragmatic contribution from human cognitive neuroscience. *Neuron*, 85(1), 11-26. doi:10.1016/j.neuron.2014.10.047
- Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners*. VA, USA: Association for Supervision and Curriculum Development.
- Walker, Z., Chen, S. H. A., Poon, K., & Hale, J. B. (2017). Brain Literacy Empowers Educators to Meet Diverse Learner Needs. (NIE Working Paper Series No. 10). Singapore: National Institute of Education.

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