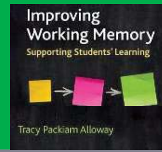
Supporting the Spatial Working Memory Abilities of Students with Dyscalculia: An Aspiring Outlook on Neuroscience-informed Instructional Strategies and Math Intervention

Suzy Viragh (Masters in Education in Special Education; Specialization in Learning Disabilities, University of British Columbia) email: s.viragh@alumni.ubc.ca

a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA



April 3, 2013

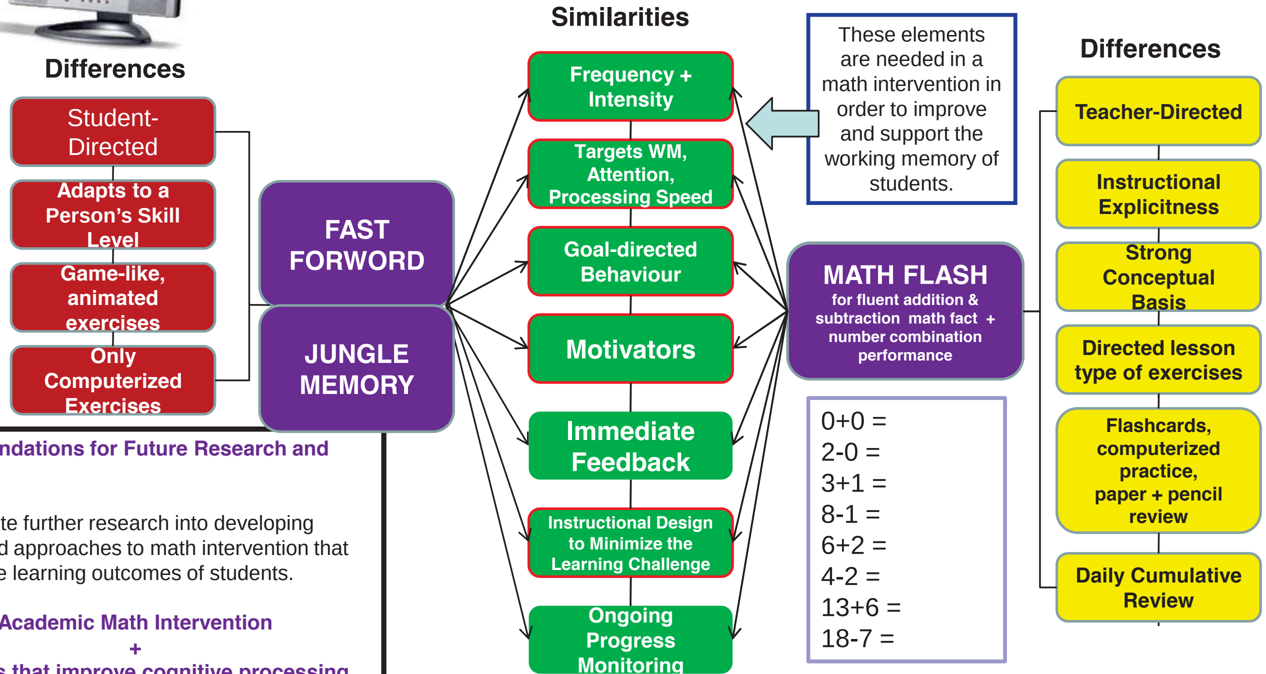
Can we use computerized interactive working memory training to address the problems of dyscalculia and support mathematical learning?

How can we use what we know from brain research and neuroscience-informed strategies to improve mathematic instruction in educational settings?

Research findings:

- Students with dyscalculia have poor executive and spatial working memory skills which inhibit their ability to hold, manipulate, store and retrieve numerical information and representations. As a result, they are unable to learn basic mathematical concepts that subsequently build on each other.
- Current innovations in neuroscience and the slow merge of neuroscience and education provides educators the opportunity to discover new approaches and strategies that could complement traditional teaching methods in addressing dyscalculia.
- Existing neuro-scientific evidence promotes a brain-based approach to intervention for students who are struggling to read.
- Brain-based and literacy-based computerized training rogrammes like ***FastForword*** and ***Jungle Memory*** (Alloway) have been proven to improve the working memory and other cognitive processes of students with learning disabilities.
- There has been little attention given to neuroscience-informed instructional strategies that focus specifically on math intervention.

Interactive Computerized Cognitive Training Programmes vs. Intensive Remedial Math Intervention: Finding a Parallel



Recommendations for Future Research and Teaching:

- To promote further research into developing brain-based approaches to math intervention that will improve learning outcomes of students.

Academic Math Intervention
+
Methods that improve cognitive processing (WM, Attention, Processing Speed)

- Lessons like **Math Flash** demonstrate that it is possible for teachers to structure math interventions in a way that supports and strengthens the poor executive and working memory of students with dyscalculia.

Selected References:

Alloway, T.P., Bibile, V. & Lau, G. (2012). Computerized Working Memory Training: Can it lead to gains in cognitive skills in students? *Computers & Human Behavior.*

Borman, G. D, Benson, J., & Overman, L. (2009). A randomized field trial of the fast forword language computer-based training program. *Educational Evaluation and Policy Analysis*, *31*, 82-106.

Fuchs, S. L., Fuchs, D., Powell, S. R., Seethaler, P. M., Cirino, P. T., Fletcher, J. M. (2008). Intensive Intervention for Students with Mathematics Disabilities: Seven Principles of Effective Practice. *Learning Disability Quarterly, 31(2), 79-92.*