Early Numeracy Screening – Why, What and How?

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Presentation

In this workshop we discuss numeracy screening for children in Kindergarten through to grade 3. We begin with a brief review of early numeracy and the critical foundations for number learning; these are the skills you want to screen for. Using lessons learned from literacy research, Heather will review what is involved in a numeracy screening program. Core considerations for selecting a screener and how to find a suitable screener will be part of the conversation.

The early math assessment tool (EMA@School) is a research-based numeracy screener that has been tested with over 30 000 students. The assessments focus on students' understanding of numbers and how they are related. For students in kindergarten, the assessments are done individually and include measures of their counting skills, knowledge of cardinality, digit naming and comparing, and their accuracy placing numbers on the number line. Older students are assessed as a full class. The tasks for older students will vary depending on their grade. However, all students in grades 1 to 3 will do speeded number comparisons (what is bigger 5 or 4), write numerals, estimate numbers on number lines (0-100 to 0-1000) and timed single digit arithmetic.

This battery of tasks in the EMA tick off the boxes on what to look for when selecting a screener. Specifically, the EMA is normed to a Canadian sample, it is developmentally appropriate, it has construct validity (i.e., the measured skills are predictive of math achievement), it is reliable, it can be used to differentiate students based on their number skills and, it is fast and easy to administer. Using the list of core considerations as a rubric – the EMA@School is good but still needs some tweaking to earn an A+. Our work to improve the screener is ongoing.

A numeracy screener, however, is only one part of a comprehensive screening program. Once students who need extra support are identified, evidence-based responses need to be in place. Ongoing assessments can be used to monitor student progress and instruction and intervention can be targeted accordingly. In summary, a comprehensive screening program can help educators intervene appropriately, so students' early math difficulties do not blossom into later ongoing difficulties.

Facilitated, small group discussions will allow you to share your experiences and to learn from your peers. The session will close with a discussion of future plans and opportunities for you to get involved in research with the EMA@School.

Questions for Discussion

1. What is the value of screening students for early numeracy?
2. Are you currently using a numeracy screener, if so, what is it?
3. How would (or do) you respond once a student has been identified as at-risk?
4. Review the key considerations checklist for selecting a screener; Is it comprehensive? Is it useful? Try rating a screener.
5. What do you need to help facilitate an early numeracy screening protocol?

Key Ideas

- Fundamental math skills are, like reading skills, entirely within reach for most students.
- Screen early to identify students who are underperforming, then intervene to help them avoid current and future problems.
- Screening should be part of a comprehensive, long-term approach to improving student outcomes.
- To select a screener that meets your needs, use the core considerations checklist (see link below).

Resource Links:

Information about screeners:

- The EMA@School: www.carleton.ca/ema (still under construction).
  Email ema@carleton.ca

- Core considerations for selecting a screener (produced by improvingliteracy.org but the criteria are the same for numeracy screeners).
  https://improvingliteracy.org/sites/improvingliteracy1.uoregon.edu/files/briefs/considerations-for-selecting-a-screener.pdf see also https://improvingliteracy.org

- The Science of Math: https://www.thescienceofmath.com/universal-screening-in-mathematics

- National Center on Intensive Intervention Screening Tools Chart.
  https://charts.intensiveintervention.org/ascreening

Information about math interventions

- National Centre on Intensive Intervention: https://intensiveintervention.org/training/course-content/intensive-intervention-mathematics
- Assisting Students Struggling with Mathematics: Intervention in the elementary grades (Practice Guide) https://ies.ed.gov/ncee/wwc/PracticeGuide/26

- 10 Key Mathematics Practices for all Elementary Schools: https://meadowscenter.org/files/resources/10Keys_ElemMath_Web.pdf