

Accelerated Learning Impact Report: Fluency Project (January-March)

Project Overview: Elementary Numeracy was allocated **\$12500** to improve teacher capacity around strategy-based instruction and assessment practices in fluency (specifically addition). Fluency in basic facts is a prerequisite for success in mathematics. A total of 40 teachers (Prime and Immersion) and 641 students from Belleisle Elementary, Forest Hills and Sussex Elementary participated in this project.

Method: Participants were asked to complete Math Running Records for all students (Grade 2-5), embed strategy-based small group instruction targeted to student's individual level of development and to attend PLC meetings focused on improving teacher capacity and student achievement.

Funding:

All teachers were provided:

- Coaching support to complete Math Running Records
- Dedicated onsite coaching support
- Coach facilitation of all PLC meetings
- A copy of supporting resource **Figuring Out Fluency (\$1280 Kelly Adams covered some of the cost of books for Immersion teachers).**
- One full release day for collaboration and resource prep (**\$5612**)
- Funding (based on the number of teachers) to purchase manipulatives and materials needed to implement strategy-based instruction (**\$5800** - Sussex: \$2600, Belleisle \$1600, Forest Hills \$1600)

Impact:

Impact on **teacher capacity** was measured with a self-assessment administered via MS Forms pre, mid and post assessment. Based on these submissions, considerable capacity was built in several areas related to fluency instruction and assessment, curriculum knowledge and understanding of best practices for teaching and learning in elementary mathematics (see *Appendix Page 5 for more detailed breakdown of results*).

Highlights:

- **100% of teachers** now have a good or better understanding of what it means to be *fluent* from (74%).
- **100% of teachers** now have a good or better understanding of curriculum expectations for fluency at their grade level(s) from (66%).
- **87% of teachers** now have a good or better understanding of evidence-based practices related to fluency instruction from (34%).
- **84% of teachers** now have a good or better understanding of evidence-based practices related to fluency assessment from (34%).
- **97% of teachers** now teach fluency through a differentiated strategy-based approach some or all of the time from (87%).

Impact on **student achievement** was measured through administration of Math Running Records in January and March. This tool is an evidence-based measure used to assess students' acquisition of foundational and derived addition facts, both of which are necessary to achieve fluency-efficient, flexible and accurate recall of facts. Research has shown that students who do not acquire operational fluency over-extend their cognitive load solving basic facts, diminishing the mental energy remaining to engage in more complex tasks. **Fluency in addition and subtraction facts within 18 is an end of Grade 3 expectation as per the NB Curriculum.**

Highlights:

- Growth was demonstrated in all strategies across grade levels.
- Students in grades 2 and 3 are close to fluent in strategies up to within 10, and with continued targeted strategy-based instruction gains will continue to be made toward fluency (an end of grade 3 outcome).
- Results in grades 4 and 5 are concerning as a significant gap remains between their present level of performance and fluency. This poses significant concerns as deficits in operational fluency impede acquisition of grade level skills beyond grade 3.

The table below summarizes the data for all students in all schools. It is important to note that the early strategies (e.g., within 5 and 10) are foundational for acquisition of later strategies, such as bridging. **There was overall a moderate increase in the number of students fluent in each strategy from January to March.**

Summary of all 641 students:

Addition Strategy	January % 4	March % 4	% Increase
Add 0	78%	90%	12%
Add 1	68%	88%	20%
Add within 5	53%	77%	24%
Add within 10	45%	70%	25%
Make 10	42%	61%	19%
Add 10 to a number	43%	63%	20%
Add Doubles	44%	59%	15%
Add Doubles +/- 1	37%	47%	10%
Add Doubles +/- 2	18%	34%	16%
Bridging 9	31%	40%	9%
Bridging 7/8	28%	36%	8%
All Schools Grades 2-5			

The summary data below is separated by grades 2 and 3, and grades 4 and 5 as curriculum expectations for these grades differ. Students in grades 2 and 3 are moving toward fluency (expected by the end of grade 3). By grades 4 and 5, these strategies would be considered pre-requisite skills to grade level outcomes.

Addition Strategy	January % 4	March % 4	% Increase
Add 0	78%	93%	15%
Add 1	71%	94%	23%
Add within 5	53%	80%	27%
Add within 10	45%	71%	26%
Make 10	37%	58%	21%
Add 10 to a number	37%	60%	23%
Add Doubles	34%	50%	16%
Add Doubles +/- 1	28%	38%	10%
Add Doubles +/- 2	11%	26%	15%
Bridging 9	21%	31%	10%
Bridging 7/8	19%	26%	7%
All Schools Grades 2&3			

The growth in strategy proficiency levels in Grades 2 and 3 is encouraging, especially up to adding within 10. Continued exposure to targeted strategy-based instruction will help these students master the remaining strategies and move into upper elementary equipped with the foundation skills needed to be successful with grade-level outcomes.

Grades 4 and 5 All Schools:

Addition Strategy	January % 4	March % 4	% Increase
Add 0	79%	88%	9%
Add 1	64%	83%	19%
Add within 5	53%	74%	21%
Add within 10	45%	68%	23%
Make 10	47%	63%	16%
Add 10 to a number	49%	68%	19%
Add Doubles	55%	68%	13%
Add Doubles +/- 1	46%	55%	9%
Add Doubles +/- 2	25%	42%	17%
Bridging 9	41%	50%	9%
Bridging 7/8	37%	46%	9%
All Schools 4&5			

Ideally, we would see 100% in all strategies for students in Grades 4 and 5. There is evidence of growth; however, entering the third term, many students in grades 4 and 5 are **not** fluent in basic addition strategies, skills critical to the acquisition of other grade level outcomes in mathematics. Even though these skills are not grade-level outcomes at 4 and 5, students need to continue to receive the explicit instruction and regular exposure to rich opportunities until they become fluent. **The significant number of students failing to acquire this foundational proficiency beyond Grade 3 creates a sense of urgency around the continuation of this work and the need for ongoing professional development for teachers.**

Summary and Analysis:

The growth in teacher capacity is the most significant early indicator of impact from this project. It is also reasonable to expect that impact from a change in teacher practice would take some time to become evident in student achievement results. Developing teachers' understanding of fluency and curriculum expectations for fluency at all grade levels, knowledge of best-practices in instruction and assessment of fluency, and their ability to implement strategy-based instruction targeted to students' current level of development is critical to improving student achievement in fluency. As a result of this funding, teachers are now equipped with the pedagogical knowledge, instructional resources, and manipulatives to be able to continue this critical work. While much work is left to be done, teachers now know exactly which strategies students have mastered and which strategies need to become the focus of rigorous daily instruction.

There were two significant challenges that should be acknowledged in the interpretation of this data. The short timeframe (January-March) and the time of year was not optimal. The allocation of funding in late December made it difficult to recruit schools and adequately evaluate their readiness to fully commit to the work. There was an intense sense of urgency to get schools onboarded so the work could begin when teachers returned from Christmas break. Having to

report on impact in April gave a very short window to see growth. It takes time to gather baseline data, build teacher capacity and implement new practices. While there is evidence of immediate impact, the true impact of this work, especially on student achievement, will take longer to determine. Ideally, this work would begin in the Fall and growth captured over the course of the school year.

Teacher resistance was the other significant barrier. While resistance to change is expected, the degree of resistance in some instances was detrimental to the impact of the work. Specifically, an unwillingness to implement practices, complete assessments, utilize supports and to collaborate with coaches limited what was possible. The short timeframe of the project exacerbated anxieties and made overcoming resistance more challenging. Even the most resistant teachers acknowledged the merits and value of the work itself, which bodes well for moving practice forward in fluency instruction and assessment.

Detailed summary reports are being provided to all participating schools, along with offers to review data and discuss options for next steps.

Appendix

Summary of Teacher Self-Assessments: Pre, Mid & Post Project

What best describes your current understanding of what it means for students to be fluent?			
Rating	Pre-Project	Mid-Project	Final
Fair/Limited	24%	11%	0%
Good/VG/Exceptional	74%	89%	100%

What best describes your current understanding of the curriculum expectations for fluency for the grade level(s) you teach?			
Rating	Pre-Project	Mid-Project	Final
Fair/Limited	34%	14%	0%
Good	53%	63%	59%
VG/Exceptional	13%	23%	41%

How would you describe your current understanding of evidence-based practices related to fluency instruction?			
Rating	Pre-Project	Mid-Project	Final
Fair/Limited	66%	23%	13%
Good/VG/Exceptional	34%	77%	87%

How would you describe your current understanding of evidence-based practices related to fluency assessment?			
Rating	Pre-Project	Mid-Project	Final
Fair/Limited	66%	31%	16%
Good/VG/Exceptional	34%	69%	84%

How would you describe your current understanding of Math Running Records?			
Rating	Pre-Project	Mid-Project	Final
Novice/Basic	76%	37%	19%
Intermediate/Advanced/Expert	24%	63%	81%

Currently I teach fluency through a differentiated strategy-based approach			
Rating	Pre-Project	Mid-Project	Final
Rarely	13%	2%	3%
Some of the Time	69%	69%	66%
All of the Time	18%	29%	31%

Do you feel you have access to adequate resources and manipulatives to ensure your students develop Concrete-Pictorial-Abstract understanding?			
Rating	Pre-Project	Mid-Project	Final
No	37%	17%	17%
Yes	63%	83%	83%

Do you currently explicitly teacher students how to check for reasonableness?			
Rating	Pre-Project	Mid-Project	Final
No	58%	26%	25%
Yes	42%	74%	75%

Summary of School Growth Grades: 2-3

Forest Hills

Addition Strategy	January % 4	March % 4	% Increase
Add 0	75%	86%	11%
Add 1	70%	89%	19%
Add within 5	50%	71%	21%
Add within 10	46%	64%	18%
Make 10	38%	51%	13%
Add 10 to a number	38%	50%	12%
Add Doubles	36%	42%	6%
Add Doubles +/- 1	30%	34%	4%
Add Doubles +/- 2	11%	20%	9%
Bridging 9	28%	30%	2%
Bridging 7/8	30%	29%	0%
FHS 2&3			

Belleisle

Addition Strategy	January % 4	March % 4	% Increase
Add 0	76%	95%	19%
Add 1	70%	95%	25%
Add within 5	67%	92%	25%
Add within 10	59%	89%	30%
Make 10	32%	78%	46%
Add 10 to a number	35%	70%	35%
Add Doubles	30%	57%	27%
Add Doubles +/- 1	32%	43%	11%
Add Doubles +/- 2	22%	41%	19%
Bridging 9	14%	38%	24%
Bridging 7/8	11%	24%	13%
Belleisle 2&3			

Sussex

Addition Strategy	January % 4	March % 4	% Increase
Add 0	80%	98%	18%
Add 1	72%	97%	25%
Add within 5	52%	85%	33%
Add within 10	42%	72%	30%
Make 10	38%	60%	22%
Add 10 to a number	37%	65%	28%
Add Doubles	35%	56%	21%
Add Doubles +/- 1	27%	42%	15%
Add Doubles +/- 2	8%	28%	2%
Bridging 9	17%	29%	12%
Bridging 7/8	14%	26%	12%
Sussex 2&3			

Summary of School Growth: Grades 4-5

Forest Hills

Addition Strategy	January % 4	March % 4	% increase
Add 0	69%	71%	2%
Add 1	60%	60%	0%
Add within 5	62%	63%	1%
Add within 10	55%	61%	6%
Make 10	58%	62%	4%
Add 10 to a number	56%	58%	2%
Add Doubles	58%	60%	2%
Add Doubles +/- 1	37%	41%	4%
Add Doubles +/- 2	20%	28%	8%
Bridging 9	34%	38%	4%
Bridging 7/8	29%	33%	4%
FHS Grades 4 and 5			

Belleisle

Addition Strategy	January % 4	March % 4	% Increase
Add 0	91%	98%	7%
Add 1	71%	98%	27%
Add within 5	63%	84%	21%
Add within 10	59%	82%	23%
Make 10	50%	71%	21%
Add 10 to a number	44%	91%	47%
Add Doubles	63%	80%	23%
Add Doubles +/- 1	70%	84%	14%
Add Doubles +/- 2	45%	66%	21%
Bridging 9	70%	82%	12%
Bridging 7/8	63%	71%	9%
Belleisle 4&5			

Sussex

Addition Strategy	January % 4	March % 4	% Increase
Add 0	80%	94%	14%
Add 1	64%	90%	26%
Add within 5	43%	77%	34%
Add within 10	33%	66%	33%
Make 10	38%	59%	21%
Add 10 to a number	46%	65%	19%
Add Doubles	48%	66%	18%
Add Doubles +/- 1	41%	51%	10%
Add Doubles +/- 2	20%	40%	20%
Bridging 9	34%	44%	10%
Bridging 7/8	33%	42%	9%
Sussex 4&5			

Summary of School Growth: ALL Grades

Forest Hills

Addition Strategy	January % 4	March % 4	% Increase
Add 0	73%	79%	6%
Add 1	65%	76%	11%
Add within 5	55%	68%	13%
Add within 10	50%	63%	13%
Make 10	46%	56%	10%
Add 10 to a number	45%	53%	8%
Add Doubles	45%	50%	5%
Add Doubles +/- 1	33%	37%	4%
Add Doubles +/- 2	15%	24%	9%
Bridging 9	31%	34%	3%
Bridging 7/8	30%	30%	0%
Forest Hills All School			

Belleisle

Addition Strategy	January % 4	March % 4	% Increase
Add 0	85%	94%	11%
Add 1	70%	94%	24%
Add within 5	61%	88%	27%
Add within 10	57%	82%	25%
Make 10	41%	65%	24%
Add 10 to a number	39%	81%	42%
Add Doubles	47%	66%	19%
Add Doubles +/- 1	52%	70%	22%
Add Doubles +/- 2	34%	70%	36%
Bridging 9	45%	72%	27%
Bridging 7/8	40%	43%	3%

Sussex

Addition Strategy	January % 4	March % 4	% Increase
Add 0	80%	96%	16%
Add 1	68%	94%	26%
Add within 5	48%	81%	33%
Add within 10	38%	69%	31%
Make 10	38%	59%	21%
Add 10 to a number	41%	65%	24%
Add Doubles	41%	61%	20%
Add Doubles +/- 1	34%	46%	12%
Add Doubles +/- 2	14%	34%	10%
Bridging 9	26%	37%	11%
Bridging 7/8	24%	34%	10%
Sussex All School			