

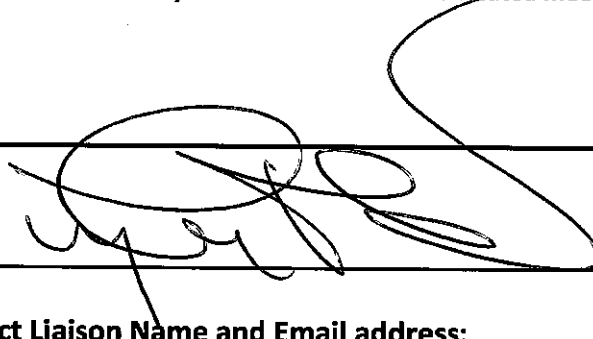
**Ottawa Region- Managing Information for Student Achievement (MISA)  
Projects 2015-16  
Teacher Collaborative Inquiry  
Final Report**

**HOW DO WE KNOW WE ARE CLOSING THE GAP?  
PUTTING THE EVIDENCE INTO ACTION**

The Ottawa Region MISA Professional Network Centre (PNC) will be funding inquiries that utilize evidence-informed decision-making (EIDM). Your inquiry will align with the Ministry 'Achieving Excellence' document, local Capacity Building Priorities and/or Board Improvement and School Improvement plans.

Focusing on building teacher capacity, the inquiries will provide release time for teacher collaboration to study strategies that bring EIDM to the classroom, change teacher practice and most importantly close the gap in student achievement for those subgroups identified by the Ministry. Up to \$10,000 will be provided for inquiries that engage in activities directed at using evidence-based decision-making to improve student achievement. Funds may be used for release and related meeting costs but not capital expenditures.

Director's Signature

 June 28.11

Board Contact /Project Liaison Name and Email address:

Rick Soudant rick.soudant@cdsbeo.on.ca

Please e mail this Final Report, with a scanned page of your Director's signature, to David Fox, MISA PNC Coordinator.

**A. INQUIRY TITLE: Promoting a Growth Mindset in Math**

**B. INQUIRY ALIGNMENT**

**Which Ministry area does your inquiry address?**

Applied Mathematics

**What aspect(s) of your School Improvement Plan and/or Local MISA Capacity Building Priority does your inquiry address?**

Students Achievement in Intermediate Mathematics

**C. INQUIRY QUESTION**

**What initial ideas do you have for a possible inquiry question? This question will be refined at the regional orientation day.**

**Remember that this year's focus is on *How Do You Know You Are Closing The Gap?***

How has our collaborative approach toward creating a growth mindset in mathematics impacted the attitude and achievement of our students and staff?

**D. INQUIRY DESCRIPTION:**

**What strategies will you use to build a culture of collaborative inquiry in your work?**

School leads for this project had the opportunity to come together to work on this project at a system level. There will also be opportunities for staff in schools to collaborate through CPLCs, staff meetings and small group discussions. Teachers will have collaboration opportunities with grade partners, divisions, and schools to co-create a bank of lessons, activities, strategies, assessments, etc.

**Outline who will participate, and the activities, products/deliverables.**

Students, teachers, school administrators, Board consultants and MISA Research Coach will all be involved with the project. The leads for this project will consist of a Teacher and Principal or Vice Principal from each of the seven schools involved in the project. Additional staff will be involved at each school which will be dependent upon the school and their entry point in this project.

The following are activities that will be undertaken during year three of this project:

- Develop and implement surveys to collect Teacher and Student thinking with regards to mindset in mathematics.
- Develop pilot "Thinking Classrooms" that use vertical, non-permanent surfaces.
- Continue to develop classroom lessons/activities/units for students on brain development and mindset

- Continue to build capacity by involving more staff and more students in the project.
- Develop/Extend a sharing space for resources, lessons, videos, activities, assessments, rubrics, questions, tasks, strategies, etc.
- Use the Collaborative Inquiry Model for sharing and collaboration between teachers from different grades, divisions, and schools.

**What are the entry and exit measurement indicators for your inquiry (e.g. surveys results, student artefacts, report card marks, attendance statistics, EQAO scores,)?**

Schools will complete surveys to collect student/teacher voice on attitudes in mathematics. Survey will be conducted at the end of this school year as a post measurement. We will also be looking at report card and EQAO results at the end of years 2 and 3 to determine to effectiveness of our gap closing.

**What data/evidence will you collect to guide your inquiry?**

In Year 1 of this project, we gathered data/evidence from report cards, EQAO, student/teacher surveys on attitudes in math and Resiliency surveys. The focus of Year 1 was to analyze and reflect on this information to inform the direction and actions we would take. In Year 2, the focus was on training staff and students and implementing Growth Mindset practices and language. In Year 3, the focus is to consolidate our learning and build capacity by extending the knowledge by involving more teachers and students. We will compare data from report cards, EQAO, and student/teacher surveys from all three years of the project.

**How will you collect evidence of student growth? (e.g., journals, portfolios, observation, interviews, student voice)**

Student growth will be measured using student artefacts, report card and EQAO results, interviews, anecdotal observations, common rubrics and assessments, and surveys.

## E. BUDGET PLAN

The main focus of the budget should be on teacher face-to-face collaboration. Budget items may include teacher release, along with some **non-capital materials** (not hardware) and support in developing resources and the production of a final report to support the collaboration. (Please provide itemized costs for the inquiry---funding will not exceed \$10,000).

Item	Purpose	Cost
Materials for vertical, non-permanent surfaces	To create Thinking Classrooms in various locations (white boards, markers, attachment hardware)	\$500
Teachers Release Time	Release teachers to collaborate within their schools and with other schools.	38 days @ \$250/day = \$9500

## F. INQUIRY REPORTING

The final report is due Thursday, June 30, 2016.

*See following pages from project schools for Outcomes and Lessons Learned.*

Budget spending/allocation		
Item	Purpose	Cost
Teachers Release Time	Release teachers to collaborate within their schools and with other schools.	28 days @ \$250/day = \$7000
Teacher Release Time	The Thinking Classroom project is going to expand to two more classrooms in the pilot school and to two additional schools next year. The remaining funds will be used in September to facilitate a workshop between Notre Dame (who piloted the Thinking Classroom this year) and the three new classrooms/schools to help them implement their Thinking Classrooms.	4 staff x 3 schools @ \$250/day = \$3000

**Notre Dame CHS**  
**MISA 2015/16**  
**Collaborative Inquiry Write Up**  
**MISA**

**The Run down at ND**

Year 2 MISA focused on mindset for both panels so Cathy Wyatt and Shawn Retty (with the help of Catherine Koehler) developed a set of mindset lessons (about half an hour long each). They implemented them together whenever possible to all grade 9 classes, regardless of subject. Mindset lessons addressed the idea of growth vs. fixed mindset, the chemistry of the brain and what mindset means for us at ND.

Year 2 also saw the implementation of a new model for teaching Grade 9 applied. Two senior teachers were paired to team teach the course together. They visited a Grade 8 classroom several times in order to see what strategies were being used there in an effort to create a smoother transition and also to carry forth DI strategies that were being used in elementary. Hands on strategies were used whenever possible and non-permanent surfaces (small white boards) were used periodically.

The model for last year was a success and there was a remarked improvement in EQAO scores from previous years. The model is currently in place again for a new group of students this semester. We are particularly interested to see if the success will continue given the new cohort of students. The teachers have remained the same as last year. There were a few concerns that last year's applied group was particularly atypical given that they did not present with many behaviours and therefore many hands on strategies could be used due to ease of managing the students. A question was also raised about how effective the model would be if the teachers changed.

**Year 3**

This year, the teacher focus for MISA is to sustain and extend current mindset and math DI practices.

As far as sustaining goes, we are continuing to tweak and develop new lessons and ideas for mindset. Current Grade 9's are in the process of last year's lessons, similar to how they were previously delivered in Year 2. As an extension, the lessons are moving down to elementary, beginning in Grade 8 where students are engaged in an updated and modified version of those lessons. (All lessons enclosed in folder – newer Grade 8 ones are marked)

Also as an extension, we have developed a “thinking classroom” in Grade 8 based on the research of Peter Liljedahl that is experiencing success so far. Visits to other thinking classrooms in the Ottawa area are in the process of being arranged. The video explains more how the process works.

As far as continuing the thinking classroom, we are currently working at Stage 2 according to the research. Stage 1 involved beginning lessons with problem solving tasks (was already in progress previously), using visibly random groups and using VNP surfaces. Stage 2 involves using oral instructions, de-fronting the room and answering questions.

**Data Collection**

EQAO comparison from 2013-2014 and 2014-2015

Comparison of class data from Grade 8 assessment to this year's academic “unofficial” EQAO data.

The Grade 8 assessment was created the week before administering based on EQAO questions from past Grade 9 applied EQAO tests.

*Short form:*

Grade 8 Results:

	Struggling	Approaching	Mastery
McGinnis –	62%	21%	17%
Gallagher-	62%	15%	22%
Seto –	67%	22%	11%
Clarey –	19%	19%	61%

Grade 8 Official Average Percentage on assessment:

McGinnis –	62%
Gallagher –	65%
Seto –	59%
Clarey –	76%

Grade 9 Unofficial EQAO Results:

	Struggling	Approaching	Mastery
McGinnis –	83%	17%	0%
Gallagher –	33%	42%	25%
Seto –	67%	25%	8%
Clarey –	29%	14%	
	57%		

Grade 9 Unofficial Average Percentage on the EQAO:

McGinnis –	56%
Gallagher –	67%
Seto –	62%
Clarey –	75%

These results are not completely conclusive given they do not include students taking math in semester 2 for this year in Grade 9.

Interviews with Grade 9 applied students from the new model of last year.

Interviews with current Grade 8 students “before Thinking Classroom” and will be repeated at 6 weeks. Could also be repeated at the end of the year depending on extension of classroom.

*Thinking Classroom Data*

Data for the thinking classroom involved a 4 day test. Half of students in the class were given chart paper and half worked on VNP surfaces. Groups were random as always. All students were given the same tasks all four days.

In terms of time taken to put “paper to pencil” (first notation):

Chart paper – 2:02 min

VNPS – 19.8 seconds

Engagement period:

Chart paper – 7:18 min

VNPS – 23.2 min

While this data may be a bit “rough” – the tasks were not the same everyday so it would be hard to measure average for engagement to be exact – it does provide enough evidence for me to conclude that my students are persisting much longer. In fact, some groups were upset when I would have to bring the large group back to focus.

**Concerns about thinking classroom:**

Will novelty wear off?

Can I sustain it?

Can I document enough data for assessment?

Will achievement improve?

**Other anecdotal notes:**

Basically my feelings are that my students are much more engaged, thanks to both thinking classroom but also mindset. We had already established a “I can’t do this YET” culture in the room previously but now we are setting up some good vocabulary and they are understanding better that they can train their brains still, even when they do not feel like they are good at something. Math confidence is improving and students are relying much less on me. I am able to focus on asking good questions and actually talking to students much more than I could when they were working on paper alone.

The impressions from kids has been positive, we will see what interviews reveal in about 2 weeks. The kids seem much happier and have indicated that coming to math class isn’t as “hard” as it used to be.

In this classroom, I do find that much of the energy depends on me. When I am fully committed and spend the time to create challenging questions that promote thinking, the dynamics work much better. I am not typically the “serious” math teacher which also lends itself to this style of teaching because it is not lecture style.

I don’t think that establishing this style of work might be good on the first day of Grade 8 as I had already well established the culture of respect and management that I needed to have. Setting this up has not been a difficult process for myself at this point in the year but I do question how it would work in September. I will likely find out in the fall when I have a new class of students to begin again.

**Do I think it’s a good idea to continue in mindset and the thinking classroom?**

**YES!**

**St. Francis de Sales  
MISA 2015/16  
Collaborative Inquiry Write Up**

**Outcomes**

Through problem solving, learning and using a growth mindset framework students:

- Are given opportunities to choose their own strategies to solve problems
- Commented that pictures helped them decide how to solve problems
- Are demonstrating a willingness to experiment and take risks.
- Were exposed to a variety of strategies to solve more problems
- Became more capable of showing different, appropriate ways to solve problems
- Partner work gave struggling students courage to approach Math problems because they feel safe
- Enthusiasm about Math is increased when work is displayed

It was discovered, tracking student grades, that a teachers skillful questioning has a direct impact when guiding students to identify their thinking process and strategies chosen to solve mathematical problems.

**Through observation and discussion, teachers**

- Became aware of strategies students are comfortable with and which students are risk takers.
- Learned not to assume that students understand math vocabulary
- Need to work together in professional learning communities to plan and collaborate.

**Lessons learned**

Through involvement teachers gleaned many insights into what and how students learn. The process assisted teachers in recognizing students' comfort level when learning Mathematical concepts, and how to differentiate learning as there is no model that meets the needs of all learners. Teachers had the opportunity to discuss appropriate math resources and become more immersed in curriculum expectations. Teacher's recognized the need to allow students time to solve their problems, students therefore took ownership for their learning. Collaboration with different schools provided opportunity for rich discussion, deep reflection and next steps.

Continuing on this pathway some identified next steps are:

- Continued revision for our long range and school improvement plan
- Using common math language when dialoging
- Using daily or weekly word problems to help students practice computation and thinking skills
- Providing opportunities for journaling using authentic questions.



## St. John CHS

### MISA 2015/16

#### Collaborative Inquiry Write Up

**1. Actual Outcomes and Measures (What changes/achievements resulted from the outputs? What data/evidence supports these results?)**

- a) -students in grades 8 to 10 were able to consistently define mindset and explain the differences between an open and closed mindset  
-data to support this was student interviews (year 2) and a survey administered at various points (year 3)
- b) -students were able to start to use the language of mindset in their interactions in the math classroom  
-Data to support teacher observation as documented by a monthly CPLC,
- c) -Students build capacity in the ability to reflect on their learning in math class  
-data to support reflective journals, student interviews, discussion from various mindset classroom activities (tangrams, picture books discussions, classroom circles, student interviews)
- d) -Students attempt more questions on tests and assignments  
-data to support is student work as discussed in monthly CPLC

**2. Lessons Learned/Smart Practices (What lessons learned/smart practices have emerged and can be shared?)**

- growth mindset can be taught quite easily as a concept but the difficult part is translating the concept into student behavior in the math classroom
- students need constant prompting to rephrase their comments to be more growth mindset like; this takes a long time. It helps to have a visual reminder such as a word wall. Teachers modeling growth mindset language is a big help.
- formal lessons on mindset are important. However what really makes a difference is the teacher noticing an improvement in the student's achievement and telling them so as often as possible in a very personal and specific way
- focusing on mindset provides opportunities for assessment as learning and the development of metacognition
- mindset is a great anchor to bring together various grade levels: we were able to use the same activities in grades 8-10 and it brought forward excellent discussion about curriculum
- The book The 5 Practices is a great framework for preparing open math questions and then administering them in the classroom
- We always started out monthly CPLCs with a report of what each teacher tried in their class and how it went, this kept us accountable and also able to learn from each other's experiences. The end of each CPLC we decided on the task that would be done for the next one and the date

## **St. Luke CHS**

**MISA 2015/16**

### **Collaborative Inquiry Write Up**

#### **Participants:**

Jennifer Lentz – Vice Principal

Scott Renaud – Grade 7/8 Teacher

Carolyn Crosby – High School Teacher

#### **Inquiry Topic:**

Financial Literacy

#### **Process:**

Last year we developed a Financial Literacy Continuum outlining what key Financial Literacy skills we wanted all of our students to be able demonstrate at each grade level, in collaboration with teachers throughout the school we created key questions and assessments to assess these key skills.

#### **Results:**

In the Fall we had all students in grade 7/8 complete the Financial Literacy assessment, during the winter we took an afternoon and went through and coded and graded each student's response using excel. This month we are all having all students complete the same assessment so that we can track and compare their growth throughout the school year. Our goal going forward is to track these students as they enter high school across our financial tool we have created.

#### **Outcomes:**

In our first year our results showed that on average students were successful in demonstrating level 3's in Financial Literacy. Our results showed that the financial literacy benchmarks that we have selected as well as the instructional hands on practices we are using in our math centers are successful in providing our students with the skills to be effective. Further feedback will be learned from the June assessments when we are able to compare the results and assess growth throughout the school year, especially for those students who struggled on certain aspects of the assessment.

#### **Feedback:**

Although great effort was taken in the development of our assessments to ensure they were readable and the questions were designed to assess specific learning skills, we learned that some of our questions needed to be improved and we also learned that some specific areas within our assessment need more focus within the classroom. We also learnt that our current format is not the greatest format for our students, we are going to try and make adjustments to our assessment tools so we are not giving our students long packages to complete and come up with more ways for them to answer and demonstrate the same knowledge and understanding. With the current package a number of students are losing interest after a few pages and the delivery and format of the assessment may need to be revisited and modified.

#### **Next-Steps:**

Before the end of the school year our grade 7/8's will complete a modified assessment on financial literacy through Kahoot, we will take the results and compare each students scores from the spring session to the fall session and compare these results to their math marks on their report cards as well. Next year we will have the first grade 9 completion of the math assessment as the 8's from this year move into grade 9 and the

second year for this years grade 8's. Going forward we are going to try and have more of a set schedule of days for meeting to analyze and work with the data and results so there is not a lot of time which occurs between tests and analysis.

Students will also complete an end of year survey like we did at the end of last year and use these results to assist us in our work for next year.

## **St. Michael CHS**

### **MISA 2015/16**

#### **Collaborative Inquiry Write Up**

3. **Actual Outcomes and Measures (What changes/achievements resulted from the outputs? What data/evidence supports these results?)**
  - Students relayed via reflection form that they were more confident in solving word problems
  - Students found using Problem Solving Placemat helpful and teachers found that students provided more details in open response questions from use of this strategy
  - Students answers were more organized and well laid out
  - Students were more prepared for the expectations and transition from the Gr. 8 to 9 Math program
  
4. **Lessons Learned/Smart Practices (What lessons learned/smart practices have emerged and can be shared?)**
  - We will continue to use common word walls, problem solving placemats, and growth mindset lessons in the math classroom
  - Numeracy CPLCs will continue to be ongoing sharing data with Gr. 6 to 9 math teachers
  - Common Assessment Tasks will be used for both Gr. 7, 8, & 9 students
  - Students have more of a growth mindset towards math after participating in Growth Mindset lessons and watching inspiring growth mindset videos