MISA PNC Thunder Bay Region
2017-2018 Action Research Project Final Reporting

As referenced in the MISA PNC Plan, Priority Funding Area 2, Research and Evaluation

Each project team will submit a final report in the form of an abstract. Each abstract will be presented to the MISA Leaders and posted to the PNC website as a reference to all member boards. Poster or electronic presentations will be presented at the 2017-2018 NOEL Leadership Conference and / or to NOEL Directors during the 2017-2018 school year. Other opportunities to share learning will be explored with Lakehead University and other MISA PNCs.

Final Report Due May 30, 2018

Please submit to Colleen Kappel, MISA Executive Lead via email
Colleen_Kappel@lakeheadschools.ca

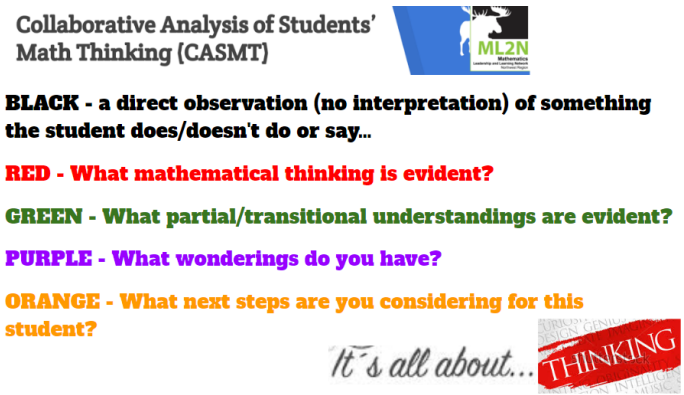
Upon receipt of the final report, the remaining 25% ($2,500) of funds will be dispersed.

MISA PNC ACTION RESEARCH PROJECT FINAL FUNDING REPORT
2018
DUE DATE: Wednesday, May 30, 2018

Board:	Superior-Greenstone
Topic:	Numeracy: Continuing to Connect the Concrete to the Abstract
Lead:	Kathleen Schram
Email:	kschram@sgdsb.on.ca

What did you learn?

Our work and learning this year closely aligned with the work of our Renewed Math Strategy. The components we will speak of here, is through the lens of the work we engaged in with our Junior teachers. This work involved continuing to increase educator understanding of visual representations and the impact connections between these representations have on conceptual thinking. Cathy Fosnot's Young Mathematicians at Work: Constructing Multiplication and Division book was used to increase educator conceptual understanding of the Fosnot landscapes and the developmental trajectories students follow as they work towards the horizon. Engaging in a deeper understanding of this, allowed us to take a closer look at student work, and determine responsive next steps. Part of this work involved the use of the Collobartive Analysis of Students Math Thinking (CASMT) as a protocol. And the learning through this protocol that helped to deepen conversations about content and learning trajectories while engaging in the work.



Some learning collected from contributions to chat pods from our online Adobe sessions:

Questions drive mathematics. Our questioning is key when it comes to promoting deeper thinking and investigation.

focusing not on the answers but on the thinking allows students to continue exploring

[redacted]: "Often to our surprise, children will use a path we have not encountered before" (18) Happens to me all the time, I am always learning from them.

[redacted]: we are talking about how the importance of class culture, discourse, inquiry but struggling with the balance of guided teaching which is needed with open inquiry

[redacted]: The idea of teaching to the horizon reminds me of the Thinking Classroom and teaching for enduring understanding through critical challenges that lead to the understanding of Big ideas

makes me think of the importance of observing what students are doing during the task

[redacted]: Chapter 3 allowed me to finally really understand some math vocab (part/whole, distributive property, commutative property, subitizing, unitizing) which are the strategies student's use. I have a better undersatnding now.

I immediately thought of the concrete area model per Ann Kajander last year!

[redacted]: We think the teacher landscape was pretty useful. I had also thought about using a landscape as an assessment tool by creating one for each student and highlighting sections when I observe that big idea or competency in problem solving situations.

[redacted]: My part of the SLP is getting student's to learn that multiplication and division are interchangeable. The fact that I can now name the strategies my student's are using, has benefitted me, . . . and them. :) Thanks so much

[redacted]: In connection with our practice we will be thinking about the developmental progession of students in problem solving situations. We'll use the landscape to inform ourselves of where students are and what their next steps are.

[redacted]: our understanding of "context" - I used to think that every problem needed to have the names of our students in it, and to me, that was context. Now I know differently! That context is about relatability...about importance to the students, about relevance..about challenge

the importance of scaffolding as opposed to providing the answer or simplifying the problem

I find using this landscape to be so helpful - when I think about being explicity, and scaffolding, this is so helpful to me

[redacted]: When reading about the 'partitive' problems and the link to 'trial and error' thinking it just stood out to me that this is an area that I can see as one that requires a certain amount of resilience and perseverence-- I find math to be an area where if the 'instant gratification' isn't there then they start to break down...just making the link back to Critical Thinking and trial and error/partitive problems.

[redacted]: An open array can be used in connection with multiplication and division computation, and while it initially is used as a model of children's strategies, it eventually becomes a powerful tool to think with. (86)

[redacted]: Different types of division make us think about our questioning. Thinking about how to help students to develop their own model, and this idea of efficiency and when we "push" as student to a more efficient stratgegy or model - wondering how we foster this in students who struggle.

[redacted] is really thinking about her number talks and how she can enhance them based upon her learning today.Implementing more models - eg the number line.

: I haven't seen or used open arrays for division before and think it would be a good strategy for representing the relationship between multiplication and divsion

using the landscape when I moderate student thinking...knowing what to "nudge"

[redacted]: to focus on the process instead of the correct response. It has been a long time since I last taught Math and it has been quite the journey learning the last couple months.... I like the idea of using the landscape for tracking thinking too.

I've become more familiar with the landscape and can see how I can incorporate it into my practice.

Using the lanedscape to fill in gaps in learning. I struggled with multiplication startegies with my students

Helped me to reflect on what I am seeing when I have the chance to moderate student thinking

we talked at SPS and TBPS about using colours as a formtive tool as we are walking around and listening to student thinking....

This work also connected with the learning we were engaging in around creating thinking classrooms. We learned about the intellectual tools that need to be supported,

The Tools	Criteria for assessing mathematical thinking
Background knowledge	Can students draw upon accurate and relevant mathematical information?
Criteria for judgment	Can students make reasoned judgments using relevant criteria?
Critical thinking vocabulary	Can students competently use key concepts related to mathematical thinking?
Thinking strategies	Do students effectively employ useful strategies to work through the mathematical task?
Habits of mind	Do students exhibit effective thinking dispositions?

2018 OTF Webinar

And how when we are deepening understanding through visual representations we are supporting 'thinking strategies' with our students.

Moving forward we will continue to build on our knowledge of thinking classrooms and explore how tools such as Dreambox will impact our students' learning and understanding.

We also continue to engage in some of the research that we started last year, and ethics was just approved to be a part of continued research – information attached… Although no costs were yet associated with this, we are excited to engage in follow ups and provide learning based on what the research indicated.

What will you do next time?

It is our intent to move forward with bringing data-driven instruction to a more personalized learning classroom. Supporting educators in ways to deeper use the landscape to track and respond to student thinking. We will continue to support the use of the landscape in tracking and responding to student thinking and will analyze the data from other sources such as Dreambox to further support a data driven inquiry process with educators.

What are your recommendations?

Our recommendations are to continue to look for and support ways to make student work/data relevant to the learning that is occurring through school learning plans. We are making strides forward in this, but continue to need to support data analysis/assessment through a process of triangulation, and are looking to build capacity in a variety of tools to support educators and school teams in doing so.

Total Dollars Allocated: $ 12 000

Activity Description	Expenditures
Teacher release time	$3924
Dreambox Software licenses	$5363.43
Dreambox PD for data analysis	$612.96
PO# 36778 for Fosnot Context For Learning Kits	$2771.48
Total	$12 671.87

Submitted by: **Kathleen Schram**

Date: **May 28, 2018**
Revised: **June 18, 2018**