

## **PDIG Final Report 2018-2019**

### **Sir Wilfrid Laurier School Board**

#### **Project Title:**

**Elementary Math Focus Project: Deepening Learning about Teaching Mathematics**

#### **1) Project Description**

This project aimed to support the EMF Project teachers to incorporate what they learned from the DNA Team into their own practice. The PLC was structured in ways to deepen teachers' understanding of both math content and pedagogy. The ongoing PLC routines that supported the development of math content and pedagogy included:

- reflecting on teaching and sharing ideas, experiences, and challenges
- learning through literature, video-analysis, and evidence of student learning/work
- goal-setting for improving practice
- co-planning with goals in mind
- observing classroom teaching, with pre- and post-discussions to reflect on professional practice and student learning

Between the PLC meetings, the teachers engaged in classroom visits to observe their co-planned lessons in action, offer feedback to their colleagues on their teaching practices, and analyze teaching in terms of its impact on student learning.

#### *What worked well:*

The teachers benefited from coming together as a group and repeatedly expressed their gratitude for the time together. Many of them were the only teachers in their school who are part of the EMF Project. Teachers found the time working together to be extremely helpful in terms of planning and collaborating to improve their practice. The teachers felt the classroom visits were invaluable, especially when either receiving or offering feedback to one another, and in analyzing the student thinking during the lessons.

Maintaining focus on each teacher's professional goals seemed to work well, as the conversations would come back to what they felt they needed to work on. The two main professional goals that the teachers would always come back to were:

- working on the "launch" to know how to provide enough instruction and support to students in setting up a task, without lowering the cognitive demand, and
- working on their questioning techniques in order to elicit student thinking and promote student-to-student discussions.

When teachers were co-planning, many of the lesson ideas focused on these two professional goals, and in observing teachers in their classrooms, the group could see how these two practices played out in the lessons with students.

#### *Challenges:*

There were 9 teachers involved in the PLC, and unfortunately, there were moments when not all teachers could engage in deep reflection to analyze their teaching. During the PLC meeting, all teachers would bring evidence of student thinking and teaching to share with their

colleagues, but the time for sharing felt limited. To keep the reflection/sharing time more focused, the teachers agreed that they would only share with the group one proud or surprising moment and one challenge they experienced while teaching in order to seek feedback and support from their colleagues. This proved to be more beneficial for all members, as the conversations were more focused on teaching and learning. In some cases, the challenges were around student thinking and the conversation became about better understanding the math content for teaching, proving to be beneficial for all teachers in the group.

Because the time felt limited for sharing, there was limited time for reading new literature on professional practice. The teachers were continuing their work on “launches” which came from the literature we read in the PLC last year. For this year, the teachers voted that they would prefer spending the time bringing evidence of teaching and learning and engaging in reflections rather than reading new literature, given the time limitations. Because research suggests that teachers learn more when they are analyzing their own teaching and student learning, the PLC members felt justified in this decision.

## **2) Project Goals**

The goals of the project were to deepen teachers’ understanding of both math content and pedagogy. The achievement of the goals was done through teachers’ opportunities to:

- co-plan, deliver, and analyze lessons using the TQE Process
- reflect on their own professional practice and their students’ learning using evidence
- offer constructive feedback to their colleagues about professional practice
- analyze student thinking through evidence shared at meetings or during classroom visits
- unpack mathematics content by solving problems, exploring the use of manipulatives for teaching, understanding student misconceptions and thinking, or finding multiple ways to represent concepts

The goals of the project were met, but there is always more learning to be done. The teachers were asked if they felt they had improved in their learning of math and pedagogy, and all expressed that the PLC had positive impacts on their practice. This is evidenced through the quality of the lesson plans the teachers developed together using the TQE process. The lesson planning demonstrated teachers’ ability to: (a) select appropriate tasks to meet student learning goals; (b) devise questions to elicit student thinking, address misconceptions, and promote and consolidate student learning; and (c) anticipate what evidence would demonstrate if students learned or did not learn the intended goal and what next steps could be taken. The PLC impacts on teachers’ practices are also evidenced by the observations made during the classroom visits regarding teachers’ practices. The lessons and photos teachers shared regarding their teaching/student learning showed shifts to their practice as their lessons reflected the DNA philosophy where students were doing the sense-making. The contributions teachers made during the PLC and during classroom observation pre-discussions and debriefs demonstrated their reflexivity around pedagogy and content.

### 3) Project Outcomes

The teachers in this project participated in 6 PLC meetings and 4 classroom visits. The teachers have developed a bank of lesson plans reflecting the TQE Process, with student evidence demonstrating learning and misconceptions for each of the lessons. The teachers have also gathered evidence of their own teaching in some cases, and can use early video of their teaching as a measure for their growth. Gains were made to teachers' learning of math content as addressed in PLC meetings, including (but not limited to) better understanding of problem types for all operations (addition, subtraction, multiplication, and division); multiplication strategies (area model, partial products), and fraction models and contexts that are necessary to deepen student understanding of fractions. They also further developed their professional practices, specifically in launching complex tasks with students and questioning techniques to elicit student thinking, respond to student thinking, address misconceptions, and consolidate learning.

### 4) Reinvestment

The teachers have created a bank of lessons using the TQE Process that will be shared with all of the EMF Project teachers, as well as teachers across the school board who have not participated in the EMF Project (accompanied with support by the Math Consultant). Currently in the Lesson Bank, there are lessons for the following concepts for each cycle:

Cycle 1 and Kindergarten	Cycle 2	Cycle 3
<ul style="list-style-type: none"><li>• Fractions</li><li>• Addition</li><li>• Operations</li><li>• Place value</li><li>• Counting</li></ul>	<ul style="list-style-type: none"><li>• Addition</li><li>• Subtraction</li><li>• Area and perimeter</li><li>• Fractions</li><li>• Money</li></ul>	<ul style="list-style-type: none"><li>• Arithmetic/Operations</li><li>• Decimals</li><li>• Area and perimeter</li><li>• Volume</li><li>• Probability</li><li>• Money</li></ul>

Teachers in the PLC have also taken on leadership roles, where they are now presenting to their peers on math pedagogy and content. 3 of the teachers in this PLC have co-presented with Math Consultants to share their expertise on improving math teaching and learning. The PLC has helped to not only improve their math content knowledge and pedagogy, but also their confidence to take on more leadership roles to benefit others within their school and across the school board.

This project should be carried out by other teams. However, in order to do so successfully, strong relationships amongst the teachers and PLC facilitators must be made. Teachers must be open to making their teaching public, and in order for that to happen, a safe space for learning must be created. The role of the facilitator will be key in fostering the PLC culture.

## Supporting Documents:

A Google Drive folder has been created to share some supporting documents for this PDIG. In the folder, you'll find the document containing the teachers' professional goals and PLC goals, as well as a sample of 4 lesson reflections done by teachers.

- Google Drive link to access supporting documents:  
[https://drive.google.com/drive/folders/1ODepkY1j1mCkNA4I50xOctLUe\\_aLZ3K4?usp=sharing](https://drive.google.com/drive/folders/1ODepkY1j1mCkNA4I50xOctLUe_aLZ3K4?usp=sharing)
- Summer Institute PLC Lesson Bank:  
[https://drive.google.com/drive/folders/1BdUfsq\\_oVEUxLmVghUHCUahAZO355kyH?usp=sharing](https://drive.google.com/drive/folders/1BdUfsq_oVEUxLmVghUHCUahAZO355kyH?usp=sharing)