Collaborative Developmental Evaluation Report for the Eastern Ontario Staff Development Network Mathematics Project Year 4

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Section 1: Background

Introduction

Effective professional learning opportunities for educators are critical to developing and enhancing instructional practices that support student learning and achievement. The current context of in-service teacher education is characterized by collaborative learning groups (Cordingley, Bell, Thomason, & Firth 2005; Nelson & Slavit, 2008), inquiry-focused learning (Cochran-Smith & Lytle, 2002, 2009), and evidence-informed professional development (Fullan, 2007, 2009; Leithwood, Aitken, & Jantzi, 2006). The focus on educators' professional learning is generally aligned with systemic priorities related to student engagement and achievement, with funding sources targeting priority areas. While various frameworks of such professional learning exist in the literature, there is relative agreement that effective professional learning models need to provide long-term, classroom-embedded learning structures that also provide substantive opportunities for guided instruction, action, reflection, and collaboration (Borko, 2004; Darling-Hammond, 2010; Desimone, 2009; Donohoo, 2013; Elmore, 2004; Guskey & Yoon, 2009; Nelson & Slavit, 2008; Quatroche, Bauserman, & Nellis, 2014; Youngs & Lane, 2014).

Networked Professional Learning

To systematically support collaborative professional learning among educators across systems, networked professional learning (NPL) models are emerging and expanding in use. These networked models aim to build educators' knowledge and stimulate changes in practice, with the goal of systemically improving students' learning outcomes (Katz & Earl, 2010; Muijs & Ainscow, 2010; Moolenar, 2012). NPL initiatives are characterized by simultaneous activities across individual teachers, schools, and collectives engaged in learning within and across contexts of educational systems (Opfer & Pedder, 2011). As a result, contemporary NPL initiatives must simultaneously meet micro (individual), meso (local), and macro (systemic) needs among educators (Bore & Wright, 2009; Davis & Sumara, 2006). Given the differing needs across contexts, researchers and practitioners have increasingly acknowledged the complexity associated with NPL initiatives while also recognizing the potential to contribute to large shifts in policies and practices (Opfer & Pedder, 2011)

Effective NPL initiatives typically share a common purpose with fluid structures that allow for collaborative professional relationships and learning supported by system facilitators that operate across all contexts of a school district (Lieberman & Miller, 2014). Within these complex NPL systems, it can be challenging to achieve and demonstrate impact within and across contexts. For example, while system funders typically seek evidence of effectiveness through large-scale student achievement measures, qualitative data sources (e.g., classroom observations, classroom video, or student interviews) may provide more nuanced evidence of NPL impacts, especially in classroom and school contexts (Darling-Hammond, 2010; Fullan, 2007, 2009). Furthermore, Guskey (2014) suggests that change in educational systems occurs in five stages: participant reactions, participant learning, organizational support and change, participant use of new knowledge, and student learning outcomes. Consequently, it is essential to recognize that (a) it takes substantial time and concerted effort to realize intended student learning impacts, and (b) changes in educators and organizational supports precede desired changes in students.

Evidence-Informed Professional Learning and Practice

In Canada, contemporary collaborative professional learning models for educators utilize multiple forms of evidence to inform efforts. Typically, these collaborative inquiries involve recursive cycles of professional learning that leverage: (a) evidence from educational research, and (b) classroom-based evidence on instructional effectiveness (i.e., student assessment data) (Campbell & Levin, 2009; Donohoo, 2013; Leithwood, Aitken, and Jantzi, 2006). Research indicates that educators face challenges with this evidence-based approach to professional learning because many have limited research or data literacy skills (i.e., the knowledge and skills to collect, analyze, and use evidence) (Campbell & Levin, 2009; Cochran-Smith & Lytle, 2009; DeLuca, Shulha, Luhanga, Shulha, Klinger, & Christou, 2015). Within collaborative inquiry, this limited evidence literacy not only impedes educators' ability to construct and use classroom-based evidence (data literacy) but also their ability to interrogate evidence from educational research (research literacy) (LaPointe-McEwan, DeLuca, & Klinger, 2017).

Consequently, the need to support educators' development of data literacy has been identified as an essential component of contemporary professional learning models (DeLuca et al., 2015; Earl and Katz, 2006; Hattie, 2013; Timperley, 2011), and appears to be a critical issue to fulfill the intentions of evidence-based collaborative professional learning (Kennedy et al. 2011; Robinson 2010; Vineyard 2010; Wellman & Lipton 2004). However, despite the importance of data literacy in current professional learning models, previous studies have shown that educators generally maintain relatively low data literacy levels (Cochran-Smith & Lytle, 2009; DeLuca et al., 2015; LaPointe-McEwan, DeLuca, & Klinger, 2017; Schildkamp, Poortman, & Handelzalts, 2016), thus impeding intended impacts of professional learning initiatives.

Middle Leaders

Middle leaders play a critical role in supporting evidence-informed networked professional learning initiatives in the Canadian educational context. As articulated by Fullan (2015), middle leaders are district educators that facilitate in-service collaborative learning among educators in schools and classrooms across districts in regions. Leveraging leadership from the middle in NPL involves "a deliberate strategy that increases the capacity and internal coherence of the middle as it becomes a more effective partner upward to the state and downward to its schools and communities, in pursuit of greater system performance" (Fullan, 2015, p. 23).

In particular, middle leaders facilitate evidence-informed professional learning and practice with teachers in classrooms (micro) and groups of educators in schools (meso) to achieve system goals and priorities (macro) (Killion, 2012). Accordingly, effective NPL facilitation requires knowledge of learning content, skills in facilitation practices (i.e., implementing various pedagogical approaches with adult learners), research literacy, and data literacy (i.e., fluency in using classroom data to support and monitor evidence-informed NPL efforts). In most cases, middle leaders receive targeted support in building knowledge of learning content and facilitation skills; however, they less consistently receive support in developing data literacy (Avalos, 2011; Kennedy, Deuel, Nelson, & Slavit, 2011; Timperley, 2011). Middle leaders' abilities to use data to inform and monitor teachers' and students' learning within NPL is central to the effectiveness of these efforts and therefore necessitates explicit supports to attain desired NPL impacts on teachers' practices and students' learning (Chappuis, Chappuis, & Stiggins, 2009; Fullan & Knight, 2011; Leat, Lofthouse, & Towler, 2012).

The EOSDN Mathematics Project

Supported by funding from the Ontario Ministry of Education, the Eastern Ontario Staff Development Network (EOSDN), a consortium of Eastern Ontario District School Boards (DSBs) and the Faculty of Education at Queen's University EOSDN, have worked together for the past four years to enhance professional discourse, instructional practice, and student outcomes in the context of mathematics. Through this project, the nine Eastern Ontario English language DSBs collectively and collaboratively focused on building educator fluency among administrators, teachers, and researchers in the region.

Beliefs

This multi-year project has been developed and implemented under the foundational belief that networked opportunities to explore, examine, and challenge our instructional beliefs and mindsets about teaching and learning math will lead to significant shifts in practice and pedagogy. Through opportunities to network, co-plan lessons, observe and assess students at work, and to moderate student work, educators develop fluency in: (a) the observation, description, and analysis of students at work and their work products (i.e., knowing what to look and listen for); and (b) posing questions, providing feedback, and consolidating learning in ways that promote student thinking (i.e., shifting the role of the teacher from instructor to co-learner/coach).

Math Curriculum Content and Processes

The math content focus of the EOSDN Math Project (EMP) is fundamental, or *big ideas*, in math which cut across strands, have relevance for K-12 curriculum, and for which the Ministry and EQAO have produced current support materials. The math process focus of the project is representing mathematical thinking, which links to the goal of developing educators' fluency in observation, description, and analysis.

Strategies for Representing Thinking

The focus in math classrooms is to have students working on open, relevant problems. Students and teachers engage in math talk so mathematical thinking is revealed, and this can lead to rich discourses about the *big ideas* of math. Students also illustrate their thinking through the use of manipulatives, models, and demonstrations. The focus for teachers is observing and analyzing, posing questions, providing feedback, and consolidating learning in ways that promote student thinking. In Year 4, effective strategies promoted through the provincial Renewed Math Strategy (RMS) are incorporated.

Resources

The work within the EMP is based on Ontario Ministry of Education documents including the *Mathematics Curriculum* documents, *Learning for All*, *Growing Success*, and the *Paying Attention to Mathematics* monograph series. In addition, the EMP has leveraged various professional resources (e.g., YCDSB's *Supporting Students with LD in Mathematics* and YRDSB's *Understanding Learning Disabilities: How Processing Affects Learning Waterfall Chart*) and professional literature (e.g., *Five Practices for Orchestrating Productive Mathematics Discussions* and *The Four Roles of the Numerate Learner*).

Research and Implementation

External math and research experts are engaged to support effective and efficient monitoring of implementation – to advise on how to assess and document evidence of the learning of students and how to gauge the impact of strategies as they are being incorporated into classroom practice – both within the project inquiries, as well as in relation to Board and School Improvement Planning for Student Achievement (i.e., BIPSA and SIPSA) goals and strategies.

Across the four years of the project we have collectively learned, and continue to learn, about our own professional learning needs, the structures that effectively support shifts in mathematics instruction, and the ways in which these shifts impact teachers and students. The results from each year have provided critical insights for our learning and efforts in subsequent years.

Year 1 (2013-2014)

In Year 1 of the project, math leaders from each district school board (DSB) met monthly to learn more about strategic implementation and monitoring with support from recognized experts in the teaching of math, Queen's University researchers, Ministry of Education Student Achievement Officers, and an EQAO School Support and Outreach Education Officer. As a result, Eastern Ontario math leaders enhanced their own fluency with regards to facilitating and supporting educators within each of their DSBs. The 1100 educators involved in Year 1 the project collaborated within and across schools, focusing on local, specific needs that relate to the parameters of the regional project. All participants had access to math and research experts to develop, refine, and reflect on their math content knowledge and instructional strategies, both at regional and district gatherings. The first year of the project initiated the study of the five key areas impacting teaching and learning: Beliefs, Curriculum, Strategies for Representing Thinking, Resources, and Research and Implementation. See Appendix A for a summary of Year 1 activities and key findings.

Year 2 (2014-2015)

In 2014-2015, the EMP provided continued opportunity to further enhance professional discourse and instructional practice in the EOSDN region with a sustained focus on building educator fluency (i.e., applying understanding in practice) in mathematical *big ideas* (e.g., proportional reasoning) and the process of representation in math. Throughout Year 2, 700 educators involved in the project collaborated within and across schools focusing on local, specific needs that related to the five key parameters of the regional project: math curriculum content/process and mindset, designing effective collaborative inquiry for student learning, inclusive practices for all students, gauging our impact, and collaborative leadership among educators. This collaboration extended to include working partnerships with math and research experts to develop, refine, and reflect on the educators' math content knowledge and instructional strategies, both at regional and district gatherings. See Appendix B for a summary of Year 2 activities and key findings.

Year 3 (2015-2016)

The EMP continued for a third year (2015-2016), providing an opportunity for 700 regional educators to continue their focus on educator fluency, mathematical *big ideas*, and the process of representation in math. In Year 3, the project adopted a more precise emphasis on evidence-use to support math teaching and learning within and across contexts of the network (i.e., classrooms, schools, districts, and the region). Moreover, Year 3 participants explored various approaches to cultivating collaborative leadership among educators in schools and districts to spread and sustain regional learning beyond the project. See Appendix C for a summary of Year 3 activities and key findings.

Year 4 (2016-2017)

In Year 4 (2016-2017), the EMP was informed by the Renewed Math Strategy (RMS), introduced by the province in Spring 2016. The project was refocused to align with the provincial emphasis on a whole-school approach and purposeful inquiry into students struggling in mathematics. Specifically, while the EMP sustained its regional focus on educator fluency, *big ideas* in math, and the process of representation of mathematical thinking, the project also incorporated the RMS priorities of supporting students who struggle in mathematics, especially students with identified learning disabilities, through a whole-school approach—leveraging asset-based learner profiles, responsive instruction, targeted accommodations, and assistive technology. Twenty-one schools and approximately 150 educators participated directly in regional learning sessions. The EMP received funding from the Ministry of Education for a fifth year (2017-2018) to continue and build on this regional exploration within the RMS parameters. See Appendix D for a summary of Year 4 Steering Committee meeting activities. Year 4 findings are included in Sections 4 and 5 of this report.

Section 2: Evaluation Questions

Formulating Evaluation Questions

The purpose of this collaborative developmental evaluation is to develop a deeper understanding of how a regional focus on educator fluency in mathematical *big ideas* (e.g., proportional, spatial, and algebraic reasoning) and the process of representation impacts math teaching and learning in Eastern Ontario. Rarely can a single evaluation answer all of the questions that stakeholders have about a program's implementation and results. In formulating evaluation questions, it is critical to consider how important it is to ask each question in light of the decisions that need to be made, the expectations of stakeholders, and the resources available for the evaluation. These considerations help put *boundaries* on the evaluation.

The evaluation questions were developed through collaboration between the EOSDN project leads, the DSB facilitators, and the Queen's University research partners/evaluation team. Through participation in monthly Steering Committee sessions, observations of DSB professional learning sessions, and meetings between project leads and researchers, evaluation questions were formulated to guide data collection. Over time, guiding questions became deeper and more focused, reflecting our regional learning and collaborative capacity building.

EOSDN Math Project Evaluation Questions
Year 1 (2013-2014)

The following broad evaluation questions were developed collaboratively between the project leads and Queen's research partners to guide the Year 1 project evaluation:

1. What structures support the success of a regional collaborative professional learning initiative based on educators' roles, backgrounds, and previous experiences with professional learning?

2. How do inquiry processes support the success of a regional collaborative professional learning initiative?

3. How do relationships between educators and external learning partners support the success of a regional collaborative professional learning initiative?

Year 2 (2014-2015)

The subsequent guiding evaluation questions were developed among the EMP project leads, Queen's University research partners, Ontario Ministry of Education student achievement officers, and district math facilitators at the start of Year 2 of the project. At the September 2014 Steering Committee session, the four key recommendations for Year 2 of the project were shared from the Year 1 evaluation report. The Steering Committee, as a collective worked through a process of determining the regional guiding questions that would be addressed during subsequent Steering Committee sessions.

1. How does facilitator fluency with assessment, monitoring, data literacy, and coaching influence math teaching and learning in schools?

2. What are the elements of a vibrant learning culture for math, and how can these be fostered in classrooms and school communities?

3. How does a deeper understanding of math content (e.g., proportional reasoning) contribute to the more effective use of formative assessment practices among educators?

4. What professional learning supports and responsive feedback structures contribute to students' learning?

Year 3 (2015-2016)

As in Year 2, the guiding evaluation questions for Year 3 were developed among the EMP project leads, Queen's University research partners, Ontario Ministry of Education student achievement officers, and district math facilitators during the November 2015 Steering Committee session, enabling all facilitators to participate in the process. At this session, the four key recommendations for Year 3 of the project were shared from the Year 2 evaluation report, and the Steering Committee members collectively determined regional guiding question for Year 3.

1. How do we transfer facilitator fluency to school fluency with respect to assessment, monitoring, data literacy, and coaching to enhance math teaching and learning?

2. How might we cultivate collaborative leadership among educators in our region, DSBs, schools, and classrooms to sustain and spread the learning in math?

3. How might a focus on key practices (e.g., pedagogical documentation, reflection) support formative assessment and monitoring of regional math learning and instructional practice?

4. How might a professional learning framework (e.g., lesson study, classroom video analysis, collaborative inquiry) support responsive practice of facilitators and educators?

Year 4 (2016-2017)

The guiding evaluation questions for Year 4 were developed collaboratively among the EMP project leads, Queen's University research partners, Ontario Ministry of Education student achievement officers, and district facilitators (both math and district student support leads) during the September 2016 Steering Committee session. The development of Year 4 guiding questions was informed by the Year 3 regional findings and key recommendations, as well as provincial Renewed Math Strategy (RMS) priorities.

1. How might we transfer facilitator fluency to school fluency with respect to assessment, monitoring, data literacy, and coaching to enhance math learning, teaching, and leading?

2. How might we cultivate collaborative leadership for shared ownership among educators in our region, DSBs, schools, and classrooms to sustain, deepen, and spread the learning, teaching, and leading in mathematics?

3. How might a focus on key practices (e.g., understanding learner profiles, diagnostics, pedagogical documentation, reflection) help us name and notice student learning to inform, sustain, and spread precise, personalized assessment and instruction in mathematics?

4. How might precise, personalized assessment and instruction in mathematics respond to the needs of each learner?

Section 3: Evaluation Method

Project Evaluation Methodology and Plan

Our collaborative developmental evaluation explores the EOSDN Math Project (EMP) occurring in Eastern Ontario. This evaluation endeavors to: (1) understand and refine the implementation of the EMP over five years under complex, emergent, and dynamic conditions; (2) understand how the EMP is achieving its desired outcomes in relation to the larger educational context surrounding it; and (3) actively engage stakeholders in evaluation processes in order to enhance the overall quality of the evaluation and increase the utility of findings (Patton, 2012). Each phase of this evaluation is summarized below.

Phase 1: Building a Program Theory

One of the more difficult tasks for a program committee is to represent their program in a way that is both comprehensive and useful to initial program development and evaluation planning. The development of a *program theory* can address this dilemma. There are typically two components to a program theory. The *theory of action*, describes the assumptions underpinning program operations. The *theory of change* captures the processes intended to bring about the changes in individuals, organizations and communities (Rogers, 2011). Together these two aspects of a program theory can be used to first create links between the underlying framework for an initiative, the intended and enacted actions and the expected results and changes that may occur as a result. In order to operationalize a program theory it is useful to develop a logic model connecting the theory, actions, and expected products and outcomes. There are many advantages to representing the complete program theory in a logic model:

- It provides a baseline from which to compare the program-in-theory with the program–in–action.
- Identifying the intended effects of a program also sensitizes evaluators and program personnel to unintended effects.
- If it is not possible to test the program model against a comparative or control group, a program logic model allows evaluators and program personnel to begin developing defensible causal arguments (Miles & Huberman, 1994) and offers a framework for continued program developments (i.e., developmental evaluation).

Phase 1 of the EMP evaluation was completed in the winter of 2014 and focused on building a program theory for the subsequent evaluation and research. The purpose of Phase 1 was to begin to "fill in" the theory of action and change that underpinned the EMP. The development of the program theory was an iterative process among the Queen's researchers/evaluation team and the EOSDN project leads. The logic model was also shaped by the evaluators' regular participation in Steering Committee sessions and visits to participating DSBs. The program theory helped guide the initial the evaluation questions and design.

Phase 2: Exploring the Impact of the EOSDN Math Project Year 1 (2013-2014)

Phase 2 of the evaluation involved collecting data on the effectiveness of EMP activities to meet the EMP's initial aim as stipulated in the program theory. The evaluation used a collaborative developmental methodology to guide data collection and analyses. Data were collected from multiple participants including: project leads, district facilitators, teachers, school administrators, and expert learning partners (i.e., math and research experts). Data were collected in Spring 2014, at the end of Year 1 of the EMP, to provide an interim sense of the project's impact on participants' learning and practices, and to identify the structures that supported the project's success. In addition, data were obtained during project activities (i.e., Steering Committee sessions, DSB school visits, and year-end sharing sessions) to determine immediate and sustained value of project activities on professional learning and practice. See Appendix A for Year 1 Steering Committee and data collection activities, as well as key findings and recommendations.

Phase 3: Exploring the Impact of the EOSDN Math Project Year 2 (2014-2015)

Phase 3 of the evaluation continued the collection of data on the effectiveness of EMP activities to meet the EMP's initial aim as stipulated in the program theory through a collaborative developmental approach. As in Phase 2, data were collected from multiple participants including: project leads, district facilitators, teachers, school administrators, and expert learning partners (i.e., math and research experts). See Appendix B for Phase 3 (Year 2) EMP Steering Committee and data collection activities, as well as key findings and recommendations.

Phase 4: Exploring the Impact of the EOSDN Math Project Year 3 (2015-2016)

Phase 4 of the evaluation extended the collaborative developmental approach to collecting data on the effectiveness of EMP activities. As in Phases 2 and 3 (Years 1 and 2), data were collected from multiple participants including: project leads, district facilitators, teachers, school administrators, and expert learning partners (i.e., math and research experts). See Appendix C for Phase 4 (Year 3) EMP Steering Committee and data collection activities, along with key findings and recommendations.

Phase 5: Exploring the Impact of the EOSDN Math Project Year 4 (2016-2017)

Phase 5 of the evaluation occurred during the project's fourth year of implementation (2016-2017). The Queen's University research partner, project director, project coordinator, district facilitators (math and student support leads), and Ministry of Education student achievement officers worked

collaboratively to refine evaluation questions, data collection instruments, and evaluation methods used during Phase 4. Data were collected from project leads, district facilitators (math and student support), teachers (classroom and support), and school administrators at regular intervals throughout Phase 5 (Year 4) of the evaluation. Data were primarily collected through qualitative methods including in-depth interviews, open-response questionnaires, and ethnographic observations (Patton, 2002). In addition, surveys were administered to district facilitators, teachers, and school administrators to gain additional quantitative evidence on the impact of the EMP and artifacts were collected at various EMP sessions. These multiple data collection methods were used in order to triangulate findings and to establish trustworthy results. Data tools (i.e., interview protocols, questionnaires, and surveys) are presented in Appendices E and F. Table 1 provides a summary of the data collection activities for each participant group.

Table 1: *Data Collection by Participant Group*

Participant Group	Data Collection Activity	Number	Type of Data
Project Leads (N = 3)	Steering Committee Documentation	9	– Observation/Artifacts
	Project Lead Questionnaire	1	– Open-response
	Project Lead Focus Group	1 (n = 2)	– Interview
	Consolidation Day Documentation	3	– Observation
District Facilitators (N = 25)	Steering Committee Documentation	9	– Observation/Artifacts
	DSB Visits	4	– Observation/Artifacts
	Facilitator Survey	18	– Fixed-response – Open-response
	Facilitator Questionnaire	11	– Open-response
	Facilitator Focus Group	2 (n = 5)	– Interview
	Consolidation Day DSB Exit Card	9	– Open-response
	DSB Inquiry Poster	9	– Artifact
Teachers (N = 66)	Teacher Survey	52	– Fixed-response – Open-response
	Teacher Questionnaire	18	– Open-response
	Consolidation Day Exit Card	66	– Open-response
	Consolidation Day Artifacts	9	– Artifacts
School Administrators (N = 21)	Administrator Survey	18	– Fixed-response – Open-response
	Consolidation Day Exit Card	21	– Open-response

Along with the project leads (director, coordinator, and research partner), the EMP involved educators representing nine DSBs in the Eastern Ontario region: 66 teachers (both classroom and support teachers) from 21 schools, and approximately 25 district facilitators from the nine DSBs in Eastern Ontario. Eighteen of 25 district facilitators who regularly attended Steering Committee sessions completed surveys (response rate of 72.0%). We received 52 teacher surveys (response rate of 78.8%), and 18 administrator surveys (response rate of 85.7%; see Table 2).

Table 2: *Teacher and School Administrator Survey Return Rate by DSB*

District School Board	Number in Project[1]		Number of Complete Surveys		Survey Return Rate (%)	
	Teacher	Schools	Teacher	Admin	Teacher	Admin[2]
Algonquin Lakeshore Catholic (ALCDSB)	4	2	3	2	75.0	100.0
Catholic DSB of Eastern Ontario (CDSBEO)	4	2	3	1	75.0	50.0
Hastings Prince Edward (HPEDSB)	11	2	5	1	45.5	50.0
Limestone (LDSB)	5	2	5	1	100.0	50.0
Ottawa Carleton (OCDSB)	14	4	11	3	78.6	75.0
Ottawa Catholic (OCSB)	6	3	2	1	33.3	33.3
Renfrew Catholic (RCCDSB)	14	1	10	1	71.4	100.0
Renfrew County (RCDSB)	3	1	3	1	100.0	100.0
Upper Canada (UCDSB)	5	4	4	4	80.0	100.0
Total	66	21	46*	15**	69.7*	71.4**

Note. [1]Includes numbers of teachers and schools represented in DSB plans. [2]Administrator survey response rates are based on 1 administrator per school. *We received 52 teacher surveys, but only 46 teachers indicated their DSB affiliations. **We received 18 administrator surveys, but only 15 indicated their DSB affiliations.

Phase 6: Exploring the Impact of the EOSDN Math Project Year 5 (2017-2018)

Phase 6 of the evaluation will occur during the project's fifth year of implementation (2017-2018). The Queen's University research partner, project director, project coordinator, district facilitators (math and student support leads), and Ministry of Education student achievement officers will work collaboratively to refine evaluation questions, data collection instruments, and evaluation methods used during Phase 5. Data will be collected from project leads, district facilitators, teachers, school administrators, and relevant project partners at regular intervals throughout Phase 6 of the evaluation. In addition, EMP project leads, district facilitators, and project partners will continue to work with Ministry of Education personnel to align the work of the EMP with the provincial Renewed Math Strategy (RMS).

Data Analyses

With respect to Phase 5 (Year 4), qualitative data were analyzed using a standard thematic coding process (Namey, Guest, Thairu, & Johnson, 2008; Patton, 2002). Data were analyzed in relation to each participant group: project leads, district facilitators, teachers, and school administrators. From an initial analysis of data, a code list was generated and then codes were grouped into broader thematic categories. Codes with a high degree of co-occurrence (i.e., two or more codes used for same data) were collapsed into broader categories if they represented similar themes. Themes were then clustered based on their relation to: (a) the impact of the project on math teaching and learning, and (b) the structures that mattered most in the success of the project. In addition, specific anecdotes highlighting salient themes and learning experiences were identified and described. These anecdotes are represented in the presentation of results through 'spotlights'.

Quantitative survey data from district facilitators, teachers, and school administrators were analyzed through descriptive statistics, correlations, and one-way ANOVAs. These data provided information about the impact of the project, as well as associated supports and challenges.

Results from the EMP evaluation are presented in the next section. Taken together these findings provide the basis for key findings and recommendations for next steps of the EMP, presented in Section 5 of this report.

Section 4: Findings

Evaluation findings are presented in relation to the four groups of participants: project leads, district math facilitators, teachers, and school administrators. These four groups offered varied responses to the EOSDN Math Project (EMP). However, consistent across each group was a valuing of the EMP because it: (a) provided ongoing opportunities to collaboratively build fluency and shift learning cultures within and across regional contexts, and (b) focused on supporting all students' learning in math through a focus on the strengths and needs of students struggling in math (i.e., *students of mystery*).

Project Leads' Perspectives

Powerful professional inquiry begins with the intention to improve outcomes for students and thrives in a culture of support that builds on the knowledge and experiences of others.
~Project Director

The three EMP leads—project director, project coordinator, and research partner—responded to questionnaires at the end of the fourth year of implementation to gain their perspectives on the aspects of the project that have supported its success, impacts of the project on math teaching and learning in the Eastern Ontario region to date, and suggestions to refine the project moving forward into its fifth year.

The Renewed Math Strategy

Project leads explained that the regional inquiry focus over the past four years (i.e., educator fluency, *big ideas* in math, and the process of representation) was shaped by the province's current commitment to enhancing math teaching and learning. However, project leads identified that the Renewed Math Strategy (RMS), introduced by the province in Spring 2016, contributed enhanced precision in Year 4 of the regional project. Prior to the start of Year 4, the project director analyzed the RMS document and determined that many RMS priorities aligned with previously established EMP goals. Consequently, the EMP maintained these foci throughout Year 4, including: developing students' conceptual understanding of *big ideas* in math, implementing a balanced approach to instruction (i.e., skills and understanding), cultivating growth mindsets in math among educators and students, monitoring evidence of impact on students (e.g., assessment *for* learning cycles and pedagogical documentation), and fostering collaborative leadership in schools among educators. In addition to these foci, the project director identified key RMS priorities to further guide regional inquiry and learning in Year 4; specifically, supporting the needs of students struggling in math, especially students with identified learning disabilities, through a whole-school approach that leverages asset-based learner profiles, responsive instruction, targeted accommodations, and assistive technology.

In response to the RMS and new EMP foci for Year 4, the research partner refined the nested regional inquiry model that had been developed during Year 2 to guide this regional collaborative inquiry initiative. Most notably, the provincial context was added to the model to illustrate that EMP goals in Year 4 were nested within and informed by RMS priorities. This shifted the "loose-

tight" nature of the regional project—in past years, the regional context had provided the "tight" focus for learning in districts, schools, and classrooms, with EMP educators having the latitude to explore related inquires rooted in local needs and priorities (i.e., the "loose" aspect of the project). In Year 4, focus of the EMP became tighter, incorporating both RMS and regional priorities but being driven by the needs of students. According to the project coordinator, the RMS priorities served as "enabling constraints' throughout Year 4—guiding how DSBs engaged in the EMP and how district math facilitators approached professional inquiries in their EMP schools. In addition, 'student learning and achievement' was incorporated into the model to highlight that students' needs are driving professional learning and practice within and across classrooms, schools, districts, the region, and the province. According to the research partner, "The student has always been at the centre of our professional learning in this project, but this year, with the RMS, it was important to make explicit that students' needs are actually determining our learning and practice."

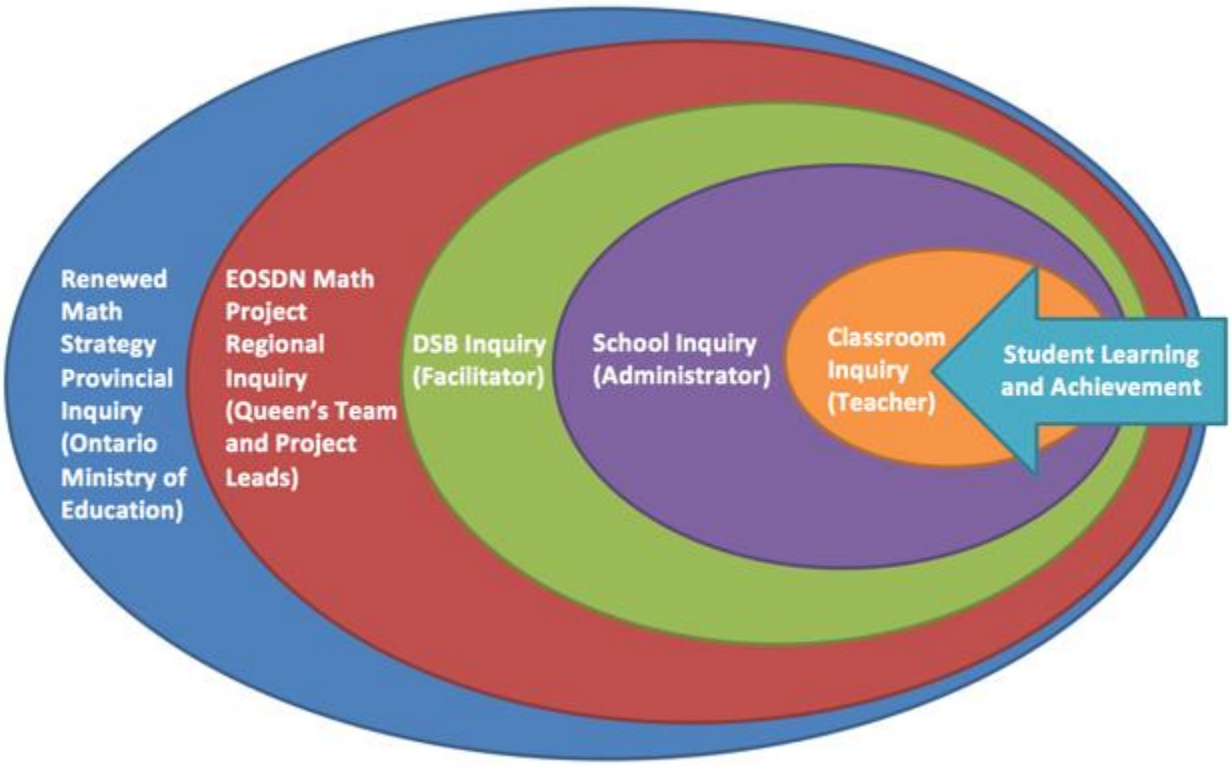

Figure 1. Nested regional inquiry model.

Cultivating Collaborative Leadership

As in Years 2 and 3, EMP project leads continued to prioritize the cultivation of collaborative leadership among educators involved in the project. In Year 4, project leads enacted a revised monthly Steering Committee structure that provided opportunities for district and school-based educators to collaborate at regular intervals throughout the year. The structure entailed the following rotation of participants:

Month	Steering Committee Participants
September	district facilitators (math and student support leads)
October	district facilitators (math and student support leads), EMP school administrators
November	district facilitators (math and student support leads), EMP school teams (school administrators, support teachers, classroom teachers)
December	district facilitators (math, student support, and TELT leads)
January	district facilitators (math, student support, and TELT leads), EMP school administrators
February	district facilitators (math, student support, and TELT leads), EMP school teams (school administrators, support teachers, classroom teachers)
March	district facilitators (math and student support leads)
April	district facilitators (math and student support leads)
May	Day 1: district facilitators (math, student support, and TELT leads), EMP school teams (school administrators, support teachers, classroom teachers) Day 2: district facilitators (math, student support, and TELT leads), school administrators
June	district facilitators (math and student support leads)

Note. TELT = Technology Enabled Learning and Teaching.

The Year 4 Steering Committee meeting structure enabled collaborative leadership within and across regional, district, and school contexts. As in previous years, Steering Committee meetings provided time for collaboration among district math facilitators, cultivating collaborative leadership across the EOSDN region and within their nine DSBs. In Year 4, Steering Committee meetings also provided formal time for district math facilitators to collaborate and plan with their district student support leads and technology enabled learning and teaching (TELT) leads, allowing district educators across DSB departments a unique opportunity to learn from each other and plan how to collectively support educators and students in their EMP schools. (See Appendix D for complete descriptions of monthly Steering Committee activities.)

In addition to EMP impacts on regional and district collaborative leadership, the inclusion of school administrators at designated Steering Committee meetings enhanced collaborative leadership in schools. Throughout Year 4, school administrators and district educators (i.e., district math facilitators, student support leads, and TELT leads) worked together at regional meetings to co-develop and monitor school inquiries that were rooted in local needs and priorities (i.e., tied to each administrator's School Improvement Plan for Student Achievement, SIPSA). In previous years, school administrator involvement in the EMP was encouraged; however, project leads asserted that the purposeful inclusion of school administrators at Year 4 Steering Committee meetings was critical to supporting a whole-school approach in EMP schools. According, the project coordinator and research partner noted increased school administrator engagement in and ownership of the project in Year 4. The research partner elaborated, "School administrators had a deeper understanding of the regional perspective of the project this year—they were part of the regional discussion and planning, and began to take that regional thinking back to the educators in their schools." Furthermore, at Steering Committee meetings attended by full EMP school teams (i.e., school administrators, support teachers, and classroom teachers), school administrators had opportunities to participate in and guide the learning of their staff, with support from district math facilitators, student support leads, and TELT leads. The project coordinator summarized, "We have built collaborative leadership into our project this year. The targeted support of administrators,

support teachers, and classroom teachers at regional meetings is contributing to spread and promoting a whole-school approach."

Focus on Supporting 'Students of Mystery'

A key difference in Year 4 of the EMP, stemming from the RMS, was the regional focus on supporting the needs of *students of mystery* in math. In previous years of the project, the focus was broader—typically endeavouring to support the needs of all students in a grade or division. In Year 4, the narrower focus on supporting *students of mystery* enhanced precision in professional learning and implemention in both regional and school-based sessions. As the project director highlighted, "The biggest motivator for teachers participating in professional learning or inquiry is being able to meet the particular needs of students in their classes. Thus, it is important to begin with the students, and particularly the *students of mystery*."

At regional sessions, *Learning for All* and *Supporting Students with LD in Mathematics* (York Catholic DSB) guided the professional learning and discourse. EMP school teams (i.e., school administrator, support teacher, and classroom teachers) from each DSB collaborated with their district math facilitators and student support leads to develop asset-based learner profiles for their identified *students of mystery* (two per EMP classroom), then explored instructional strategies to support these students' learning. According to the project director, "If your learner is a learner of mystery, you need this level of detail—then you need to apply your pedagogy to it and assess the impact of your pedagogical moves on student outcomes." The project director added, "Having a repetoire of strategies allows for precision in responding to students' learning strengths and needs. Thus, teachers benefit from having information that reflects the current collective wisdom of practice and research about strategies that respond to and accommodate particular learner profiles." As a result of participation in the EMP, the project coordinator observed, "Developing and revisiting learner profiles for *students of mystery* resulted in increased instructional intentionality among educators—educators gained confidence naming and noticing students' strengths and needs and used the learner profiles as a tool to guide their monitoring of students' learning. Over the year, educators began to recognize that what is good for their *students of mystery* is good for all of their students."

Along with a repetoire of instructional strategies, project leads highlighted the importance of the ongoing collection of evidence to monitor and support the progress of *students of mystery*, as well as all students. The project director stated, "Teachers need ongoing evidence about the impact of selected strategies on students. Thus, the design for student learning needs to include the collection of evidence of student thinking and approaches to the work, as well as samples of [student] work." In EMP Year 4, the project coordinator and research partner noted that school teams planned for purposeful data collection at the start of the year, with the support of their district facilitators at regional sessions. Throughout Year 4 and with the ongoing support of their district facilitators, school teams collected and triangluated multiple forms of rich data from their *students of mystery* (e.g., photos, videos, observational notes, student interviews, and diagnostic assessments), then constructed evidence of these students' learning at the regional Consolidation Day in May. The research partner noted, "At Consolidation this year, the student was really front and centre—students' strengths and needs drove everything that happened throughout the year in terms of professional learning, teaching strategies, and approaches to assessment." The project director agreed, "This year [at Consolidation], the artefacts spoke to 'at the desk' and 'in the classroom' learning".

Moving Forward

The project leads identified initial challenges navigating the integration of the RMS into the regional project at the start of Year 4, with some district math facilitators expressing concerns about supporting the RMS in their DSBs while concurrently engaging in the EMP. These concerns largely dissipated over time, with district math facilitators strategically aligning EMP activities with RMS goals articulated in their BIPSAs. Year 4 concluded with enhanced regional clarity and renewed regional enthusiasm regarding how the EMP would move forward—continuing to align with the RMS while maintaining regional learning goals.

Project leads offered two primary recommendations to further support, consolidate, and spread the learning in Year 5. First and foremost, project leads emphasized the value of continued monthly Steering Committee meetings to build on and consolidate regional learning for all educator participants; however, they also articulated suggestions to refine these regional sessions. In particular, leads identified the importance of providing rich professional learning opportunities at all regional meetings, strategically targeting the needs and interests of attending educator participants and facilitated by external experts (e.g., Connie Quadrini or Alex Lawson) as well as internal experts (e.g., district math facilitators, TELT leads). Project leads specified the need to provide educators with formal opportunities for deeper exploration and application of developmental/conceptual continua in relation to the K-12 math curriculum (with pockets of educators focused on K-3 and Grade 9 Applied math), learner profiles, high-yield instructional strategies, the use of manipulatives and technology to support students' learning, and assessment strategies to monitor the instructional impacts on students' learning. Project leads specifically noted that there were fewer professional learning opportunities targeted at district math facilitators during Year 4 Steering Committee meetings, and advocated to augment professional learning opportunities for facilitators in Year 5.

Second, project leads recommended the continued involvement of current EMP school teams in Year 5 (i.e., school administrators, support teachers, and classroom teachers) along with an expansion to include additional schools from each DSB. Project leads noted that many of the school-based educators in Year 4 of the EMP were new to the project, therefore continuing in Year 5 would provide these educators with critical opportunities to build and consolidate learning from Year 4. The project director also specified the importance of spreading EMP learning by engaging additional schools in Year 5. For all educators involved in the EMP, the project coordinator and research partner noted the importance of clarifying the regional project goals, "so we all have a clear understanding of the big picture at the start of Year 5."

> *As professionals, we have focused on curriculum content and processes, on research into math teaching and learning, on strategies for assessment and instruction, on gathering and analyzing data – all to build educator fluency so that we can respond with precision to the student voice. If we do not hear the student voices, we do not make the difference that we now have the professional capacity to make.*
>
> *~Project Director*

District Facilitators' Perspectives

This project has helped me to become much more precise in meeting the needs of principals, teachers, and students in math!

District facilitators' (math and student support leads) perspectives were collected through surveys, questionnaires, focus groups, observations, and artifacts. These data were analyzed to elucidate the impact of the EMP on facilitators' support of math teaching and learning in their respective DSBs. Our overarching goal was to understand the impact of the project on facilitators' fluency with coaching practices and inquiry processes, including data collection and analysis, in math at the end of Year 4.

Survey Results

The district facilitator survey consisted of 65 fixed-response items using 5-point scales, 2 open-response items, and 8 demographic items. The survey instrument, along with descriptive statistics for fixed-response and demographic items, are reported in Appendix F. Demographic frequencies for facilitators are summarized in Table 3. Eighteen of 25 facilitators responded to the survey (72.0%). The majority of facilitators who responded were Experienced in the facilitator role (3-11 years experience; 66.7%), and also Experienced with collaborative inquiry in math (3-11 years experience; 61.1%). Half of the facilitators were in their fourth year of the EMP (50.0%), while some were new to the project this year (16.7%). A majority of facilitators (61.1%) had previously completed Additional Qualifications courses in math, and half had completed specialists in math (50.0%).

The 66 fixed-response survey items were combined to create nine subscales that represented key aspects for each section and aligned with the program theory under three broad categories: Impacts, Supports, and Challenges. Internal consistencies (Cronbach's α), means, and standard deviations were calculated for each subscale for the total sample and by facilitators' years of experience in the EMP (Table 4). All subscales exhibited high levels of internal consistency (.77-.94), demonstrating the ability for the items to provide consistent measures of the intended subscales (Table 4).

Table 3. *District Facilitators' Demographic Information (n = 18*)*

	# of Facilitators	Frequency (%)
Experience as Facilitator		
Novice (< 3 yrs)	3	16.7
Experienced (3-11yrs)	12	66.7
Expert (>11 yrs)	1	0
Experience with Math Collaborative Inquiry		
Novice (< 3 yrs)	3	16.7
Experienced (3-11yrs)	11	61.1
Expert (>11 yrs)	1	5.6
Years in EOSDN Math Project		
0-1	3	16.7
1-2	4	22.2
2-3	2	11.1
>3	9	50.0
Background		
AQ in Math	11	61.1
AQ Specialist in Math	9	50.0
Master's Degree	0	0

Note. *Facilitators' responses to demographic items were incomplete, therefore frequencies do not reflect the full sample.

Table 4. *EOSDN Math Project Mean Impacts, Supports, and Challenges for District Facilitators by Years of Experience in the Project*

	Cronbach's α	Total Sample n = 18 (SD)	Year 1 n = 3 (SD)	Year 2 n = 4 (SD)	Year 3 n=2 (SD)	Year 4 n=9 (SD)
Impacts						
Ability to Support Math Teaching and Learning (2a-f, n-r)	.94	4.10(.62)	3.92(.68)	3.78(.59)	4.80(.28)	4.14(.60)
Ability to Engage in Inquiry Processes (2j-m)	.90	4.18(.69)	**3.81(.17)**	3.69(.55)	**5.00(.00)**	4.33(.72)
Ability to Support Administrators (2g-i)	.93	3.67(1.11)	3.56(.96)	3.08(.69)	5.00(.00)	3.67(1.26)
Supports						
Structure of the Project (3a-h)	.82	3.97(.68)	3.88(.63)	3.58(.38)	4.44(.80)	4.03(.78)
Inquiry Processes (3i-q)	.90	3.91(.89)	3.63(.65)	**3.37(.23)**	**4.94(.08)**	3.97(1.05)
Resources (3r-cc)	.82	4.15(.73)	3.77(.62)	3.83(.49)	5.00(.00)	4.19(.80)
Challenges						
Math Fluency (4a)	n/a	1.69(.79)	2.00(1.00)	**2.67(.58)**	1.50(.71)	**1.25(.46)**
Structure of the Project (4b-j)	.77	1.85(.35)	1.96(.28)	2.07(.17)	1.72(.39)	1.75(.41)
Inquiry Processes (4k-o)	.84	1.95(.60)	2.20(.87)	2.20(.35)	1.90(1.27)	1.78(.43)

Note. Significant differences for facilitators based on years in the project are in **bold.**

Impacts on Facilitation in District School Boards

Unlike previous years of the EMP, district facilitators reported the greatest impact of the project on their "Ability to Engage in Inquiry Processes", followed by their "Ability to Support Teaching and Learning" in their respective DSBs. On both of these subscales, facilitators in their third or fourth year with the EMP reported greater impacts than facilitators in their first or second year of the project (Table 4). While these differences were not consistently significant, this suggests the ongoing and incremental nature of facilitator learning within the EMP. Overall, with respect to their "Ability to Engage in Inquiry Processes", facilitators specifically noted impacts on their abilities to support inquiry teams in collecting and analyzing evidence of the impact of their teaching on students' learning in math. With respect to their "Ability to Support Teaching and Learning", facilitators reported increases in their confidence as math facilitators, ability to support the Renewed Math Strategy (RMS) in their respective DSBs, and ability to provide feedback to teachers regarding math teaching and learning. As in previous EMP years, "Ability to Support Administrators" remained the lowest of the three Impact subscales (Table 4), however facilitators identified the impact of the project on their ability to ask questions of and facilitate learning with school administrators regarding math teaching and learning. See Appendix F for complete survey results.

> *I am very pleased to see the focus on students of mystery and LD in math this year—we can bridge this between EOSDN [Math Project] and RMS—learning in one contributes to learning in the other. It's not seen as an "add on", but flows through all the work in our board.*

Qualitative data from district facilitator questionnaires, focus groups, and Steering Committee artifacts further elaborated the EMP's impacts on facilitators' learning and practice in their DSBs. Year 4 marked an important shift in facilitators' work within the EMP, as their focus was guided by the provincial Renewed Math Strategy (RMS), introduced in Spring 2016. The RMS provided facilitators with a framework in which to develop precise inquiry foci, incorporating previous EMP learning while aligning with newly articulated RMS priorities. In accordance with the RMS, all DSBs in Year 4 focused on responding to the needs of *students of mystery* in the math classroom (i.e., students struggling in math or students with identified learning disabilities), however each DSB had the latitude to develop unique inquiries rooted in their local needs and priorities (e.g., early numeracy, personalized instruction, formative assessment, technology) (see Table 5).

At regional Steering Committee meetings throughout Year 4, facilitators (i.e., district Curriculum leads) had the opportunity to work collaboratively with district leads from the Student Support and Technology Enabled Learning and Teaching (TELT) departments. Collectively, these district educators planned for and supported the professional learning of their EMP school teams (i.e., school administrators, support teachers, and classroom teachers). District educators learned from each other, complementing each other's knowledge and experience—with facilitators leading learning about math content and pedagogy, student support leads supporting the development and refinement of learner profiles for *students of mystery*, and TELT leads assisting in the exploration and use of technology to support math teaching and learning.

During Year 4 of the EMP, each DSB involved fewer schools and classrooms, however facilitators generally considered this a positive—(a) enabling them to provide additional support to schools not receiving intensive or increased support through the RMS; and (b) allowing them to cultivate collaborative leadership among their EMP school teams. Throughout Year 4, facilitators worked regularly with school administrators from EMP schools at selected regional Steering Committee meetings. Unlike in previous years of the project, this enabled facilitators and school administrators to collaboratively develop and plan for school inquiries, construct shared understandings of math content and pedagogy, and analyze evidence of the EMP's impact on math teaching and learning in participating classrooms. Consequently, many facilitators observed increased confidence and engagement among their school administrators during Year 4. One facilitator shared, "In our EOSDN schools, our school leaders are at the table and part of the learning—it's the teachers who are driving the learning, but the school leaders are there as participants." A few facilitators reported that administrators began to lead school-based math professional learning, instead of relying on facilitators for this support. In several cases, facilitators observed that the professional learning occurring in EMP classrooms was spreading throughout schools due to school administrators' involvement in the project—for example, a whole-school focus on developing learner profiles for *students of mystery* across all classrooms with collaborative analysis of student assessment data to better understand these students' learning.

During Year 4, facilitators continued to support school-based sessions to help school teams develop and refine learner profiles, explore resources, discuss instructional approaches, co-plan/co-teach lessons, monitor the progress of *students of mystery* through assessment *for* learning cycles, and use tools (e.g., technology and manipulatives) to support these students' learning. A facilitator explained, "Our project included looking at *students of mystery* and their IEPs, deliberately choosing high-yield strategies to meet those students' needs, co-planning and co-teaching a lesson with a team of teachers, and finally reflecting on the student thinking demonstrated in that lesson and planning for next steps together." Through this work, facilitators observed enhanced precision in conversations and practices among EMP school teams with respect to learner profiles, math content and pedagogy, accommodations, assessment, technology, and manipulatives. One facilitator shared, "We quickly discovered that the strategies that were good for *students of mystery* were good for all, so we started looking at all students' representation of their thinking [in math]." In some cases, the learning from EMP school teams began to spread throughout schools and DSBs. For example, a facilitator shared, "We have a unified school that seems to be speaking the same language and have a school-wide focus on teaching and learning in math. The teachers want to go into other classrooms and want to share and create resources. The support teacher is a constant during math blocks in some classrooms. We have also used many of the ideas [from this school] in other classrooms throughout the board."

> *Teachers are using more high-yield strategies and they can explain the impact of these strategies on student learning. Teachers are finding new ways to make student thinking visible and planning next steps in in a more responsive way.*

In previous years of the EMP, facilitators' work with school teams was primarily focused on supporting educator learning in order to impact student learning. In Year 4, facilitators' work with school teams became more precise and focused on students' learning—specifically, on closing gaps in math for *students of mystery*. Consequently, several facilitators explored developmental and/or

It's no longer about what students can't do, but asking questions about what students can do—if this is the issue, then what are we going to do?

conceptual continua with their school teams, to identify "where students are coming from and where they are going to". In several instances, school teams mapped math curriculum across strands onto these continua, to develop a deeper understanding of students' learning in specific grades, divisions, and across multiple divisions. These continua provided a common language and focus among facilitators and school-based educators and supported assessment *for* learning cycles with EMP school teams. Throughout Year 4, facilitators helped school teams monitor the learning of *students of mystery* through observations, conversations, and products. Facilitators encouraged an asset-based approach to assessment, helping school teams collect evidence of what *students of mystery* can do in math and using gaps to drive instruction. As one facilitator shared, "We're having these conversations with our school teams, including administrators. People are really looking at interventions and next steps and being precise so we can meet the needs of our students." Facilitators also helped school teams move away from a reliance on paper/pencil tests in math, toward collecting more varied assessments of students' learning that included photos, videos, audio recordings, and/or observational notes. In many schools, facilitators also supported assessment processes through technology (e.g., One Note or Google platforms). As one facilitator shared, "Many of our teachers haven't done a paper and pencil test in a long time, but they know much more about their students' learning and instructional next steps."

At the end of Year 4, facilitators noted that changes in school teams' approaches to instruction and assessment in math positively impacted classroom and, in some cases, school culture. Through the EMP's focus on supporting *students of mystery* in math, school teams began to focus on leveraging students' strengths to support their learning in math. As in previous years of the project, participating teachers and students began to approach mistakes as "opportunities to learn" in the math classroom. Specific to Year 4, teachers observed that *students of mystery* demonstrated increased confidence and risk-taking in math, more frequently engaging in and persevering with problem solving tasks. Moreover, *students of mystery* were better able to name and notice math strategies and were more creative and independent in using tools to solve problems. Among their *students of mystery*, teachers reported improvements in number sense and problem solving, with a few students moving from modified to accommodated programs. As one teacher summarized, "Through this project, I have created a more positive classroom culture in math. My students like math and think of themselves as mathematicians now!"

Our school teams are assessing what students can do—monitoring their conceptual understanding and development—instead of evaluating them against curriculum standards.

Supports of District Facilitators' Learning and Practice

Consistent with previous EMP findings, survey data revealed that district facilitators most valued the "Resources" provided by the EMP, followed by the "Structure of the Project" then "Inquiry Processes" (Table 4). As in previous years of the EMP, facilitators identified the importance of co-learning with other facilitators at monthly Steering Committee sessions and ongoing relationships

with research partners. Facilitators also continued to value informal times to collaborate with regional facilitators and trusting relationships among participants within and across all contexts to support regional professional learning through collaborative inquiry (Appendix F).

> *The opportunity for continued networking in Eastern Ontario has been really positive—we're all working towards a common goal and we're able to share where we're at in the process.*

Facilitator questionnaires, focus groups, and Steering Committee artifacts further explained three valued EMP supports. As in previous years of the EMP, facilitators emphasized the importance of continued monthly regional Steering Committee sessions for co-learning and professional dialogue within and across DSB teams. In Year 4, facilitators particularly valued the inclusion of system leaders across departments in their DSBs (i.e., Curriculum, Student Support, and TELT leads), providing opportunities for co-learning, co-planning, and co-facilitation of learning among their EMP school teams. Facilitators also appreciated the involvement of EMP school administrators at selected regional sessions, enabling them to co-plan school inquiries with administrators that were rooted in SIPSAs but tied to overarching EMP goals and RMS priorities. According to facilitators, the involvement of school administrators at regional Steering Committee meetings helped administrators feel more connected to the EMP and take more ownership of the learning occurring in their schools and participating classrooms. One facilitator summarized, "Having school administrators at our Steering Committee meetings allowed them to see and understand our long-term goals, then were able to take that back to their schools and help their teachers see that vision too."

Second, facilitators prioritized continued partnerships with pedagogical and research experts in Year 4 to support implementation and monitoring. During Year 4, facilitators continued to access relevant pedagogical experts to support learning and implementation in EMP schools, although to a lesser extent than in previous years of the project. Some facilitators also worked with research experts to plan for data collection to build evidence of the impacts of the EMP. One facilitator elaborated, "The researcher helped us create a data collection plan not only for the EOSDN math project but also for our RMS. These two plans are nested within each other. Having these plans has really allowed us to be more precise with our monitoring and stay focused on our goal."

Finally, facilitators enjoyed opportunities to explore relevant resources at regional Steering Committee meetings. In particular, facilitators appreciated digging deeper into Learning for All to support the development of learner profiles for *students of mystery*. Facilitators also expressed the benefits of exploring the York Catholic DSB *Supporting Students with LD in Mathematics* document with their school teams in order to enhance math teaching and learning with *students of mystery*.

Challenges to District Facilitators' Learning and Implementation

Consistent with previous years of the EMP, survey data indicated that district facilitators generally did not perceive "Math Fluency", "Structure of the Project", or "Inquiry Processes" as significant challenges to their participation in the EMP. Of note, perceived challenges were lowest among facilitators involved in the project for four years. Responses to individual survey items can be found in Appendix F.

Our challenge was to align the EOSDN math project schools with our overall RMS plan and have a plan that did not involve the same level of coach support for our EOSDN schools.

Facilitator questionnaires elaborated three primary challenges they faced during Year 4 of the EMP. First, several facilitators experienced challenges supporting EMP school teams' learning while concurrently supporting RMS goals within their DSBs. In most cases, facilitators tried to ensure that their EMP inquiry was aligned their DSB's RMS goals—to facilitate their own implementation and so that the EMP was not perceived as a separate initiative by EMP school teams. Despite this alignment, facilitators found it difficult to support educators' learning and practice in both EMP and RMS schools. As one facilitator stated, "With the RMS, I find I was stretched thin. It was really challenging to give all that I needed to in regards to this project. I think moving forward we need to continue to build capacity in [school] administrators, to empower them to guide and take responsibility for the project."

A second challenge expressed by facilitators was time to work with their EMP school teams. Because Year 4 of the EMP did not fund release time for school-based educators (i.e., classroom and support teachers), facilitators relied heavily on time at regional Steering Committee meetings to discuss, share, and plan with their school teams. In most cases, school administrators were able to fund some additional release time for their EMP teams to co-plan, co-teach, analyze assessment data, reflect on implementation, and discuss next steps. However, even with this time, facilitators shared that there was "never enough time" to support the learning and implementation of their EMP school teams. In particular, facilitators shared that many school teams required extensive support developing learner profiles for their *students of mystery* and developing plans to support and monitor these students' learning. Facilitators would have valued additional time with their school teams to develop and refine these plans over the year, at both regional and school-based professional learning sessions.

The data collection and analysis provides an excellent venue for moving forward, but finding the time to do it justice can be challenging.

A final challenge that facilitators shared centered on supporting the purposeful collection of data to monitor students' learning in classrooms. Facilitators identified that EMP classroom teachers were at different points of readiness with respect to documenting the learning of their *students of mystery* through observations, conversations, and products, then analyzing and using these assessment data to inform next steps. For some EMP teachers, this process required substantial facilitator support. According to one facilitator, "Part of their learning and our learning was making [this process] more manageable for them." Sometimes there were concerns about sharing samples of authentic student work beyond the classroom environment. A facilitator elaborated, "It was a challenge to hold ourselves accountable to bring student work to the table that included observations, conversations, and products—to get a richer understanding of students' thinking."

Table 5. *EOSDN Year 4 Math Project Inquiry Focus by DSB*

DSB	Project Inquiry Focus
Algonquin Lakeshore Catholic (ALCDSB) ➢ K-Grade 2	How might using targeted assessments (diagnostic and formative) help determine student's area(s) of need, in order to plan appropriate next steps and supports in early numeracy (counting, quantity, operational sense)?
Catholic DSB of Eastern Ontario (CDSBEO) ➢ Grades 4-8	How will having students use math talk, making connections, and using concrete representations or tools improve their number sense and numeration, specifically fluency with fractions and decimals?
Hastings Prince Edward (HPEDSB) ➢ Grades 3-7	How might we document students' math learning in order to better understand our students' strengths and needs in numeracy learning and develop and provide more precise accommodations? How might we "plan to the edges" using a model that supports comprehensive math instruction?
Limestone (LDSB) ➢ Grades 7-8	How might a focus on ***how students represent their thinking*** in mathematics help us identify and plan for ***personalized instruction and assessment*** in mathematics based on individual learning profiles?
Ottawa Carleton (OCDSB) ➢ K-Grade 8	How might a focus on key practices help us name and notice student learning to inform, sustain, and spread precise personalized assessment and instruction in mathematics?
Ottawa Catholic (OCSB) ➢ Grade 6	How will targeted intervention to support the instructional and social/emotional needs of specific students support the academic achievement of those students?
Renfrew Catholic (RCCDSB) ➢ K-Grade 7	By responding to student needs, how will an increased focus on teaching precise strategies, and accuracy and efficiency with numbers, influence students' proportional reasoning, representation, and communication through thinking questions?
Renfrew County (RCDSB) ➢ K-Grade 1	How might a focus on key practices help us name and notice student learning to inform, sustain, and spread precise personalized assessment and instruction in mathematics?
Upper Canada (UCDSB) ➢ Grades 7-9	How might we transfer facilitator fluency to school fluency with respect to assessment, monitoring, data literacy and coaching to enhance learning, teaching, and leading in mathematics?

Moving Forward

As the EMP prepares to move into its fifth year, district facilitators offered ideas to continue the learning of educators involved in the project, including themselves. All facilitators valued monthly Steering Committee meetings, but most suggested refinements to enhance the impact of these sessions. First and foremost, facilitators expressed the need for regular, deep professional learning at Steering Committee sessions, with embedded opportunities to apply this learning with their DSB and school teams (i.e., school administrators, support teachers, and classroom teachers). Facilitators would like additional learning specific to: cultivating math knowledge for teaching, exploring developmental or conceptual continua in relation to the math curriculum, understanding and accommodating learning disabilities in math, developing learner profiles, enhancing assessment strategies (e.g., documenting and analyzing evidence of students' thinking, using the CASL method), and integrating technology in math. Facilitators identified experts that might support this learning at regional sessions, including Connie Quadrini, Christine Suurtaam, the Saganaska School team, and Alex Lawson. Facilitators also suggested that some learning at regional meetings could be led by fellow district facilitators—for example, sharing resources or strategies they are using in their DSBs to support math teaching and learning then providing opportunities for the other DSB teams to apply this learning. One facilitator noted, "I personally didn't learn as much at our Steering Committee meetings this year, as I have in the past." Another facilitator added, "I still have a lot of learning to do."

Secondly, many facilitators wanted more formal time to collaborate within and across DSB teams at Steering Committee meetings. Facilitators valued time to collaborate with their district student support and TELT leads at regional meetings and would like this to continue. In addition, facilitators would like time to collaborate across DBS teams to discuss how their regional colleagues are aligning EMP work with RMS priorities. Some facilitators proposed working with selected DSB teams who share a similar inquiry focus to their own, allowing them "to become critical friends, and push each other's thinking." Other facilitators proposed backward planning for EMP Consolidation days at the start of Year 5, to support more purposeful work with EMP school teams at regional and school-based sessions throughout Year 5. A few facilitators suggested the development of a video or monograph to mobilize EMP knowledge in the region and province.

Finally, facilitators would appreciate more funding for release time in EMP schools. One facilitator shared, "I have found the opportunity for school teams to collaborate is very important. I am not sure if it is possible, but some release time for these teachers may help with this process." Whether through the regional project or administrators at EMP schools, facilitators consistently advocated for the importance of formal time to work with their school teams to support professional learning and implementation of new instructional approaches in math and assessment.

I truly felt that it is through this project that I have had an opportunity to reflect, learn, and grow as a consultant. I feel that compared to other areas of the province, our region has stronger consultants because of it.

Teachers' Perspectives

When given the opportunity to engage with colleagues to understand our shared classroom experiences and co-learn about practices, it improves my practice and, in turn, my students' learning and achievement.

Teachers' perspectives were collected through surveys, questionnaires, focus groups, school visits, and artifacts; these data sources offered important insights that serve to inform and enhance the professional learning model moving into 2017-2018. Our goal was to explore the impact of the EMP on teachers' professional learning and practice in math at the end of Year 4 and highlight any differences between teachers based on their year of participation the project.

Survey Results

Surveys were distributed through district math facilitators across the nine participating DSBs to all teachers (n = 66) involved in the EMP. We received 52 complete surveys; a response rate of 52/66 (78.8%) (see Table 2). The survey consisted of 61 fixed-response items using 5-point scales, 2 open-response items, and 8 demographic items. The survey and descriptive statistics for fixed-response and demographic items are reported in Appendix F.

Demographic frequencies are reported in Table 6. (Please note that teachers' responses to demographic items were incomplete, therefore frequencies do not reflect the full sample.) Forty-one teachers were in their first year of the EMP (78.8%), 7 were in their second year (13.5%), 2 were their third year (3.8%), and two in their fourth year (3.8%). Twenty-two teachers represented the Primary division (45.8%), with 15 Junior teachers (31.3%), 11 Intermediate teachers (22.9%), one Senior teacher (2.1%), and 9 teachers who identified as Other (i.e., student support teachers; 18.8%) rounding out the sample. Twenty-eight of the teachers were Expert in their careers (>11 years experience; 53.8%), with 19 Experienced teachers (3-11 years experience; 36.5%). Unlike previous years of the EMP, most teachers were Novice with respect to collaborative inquiry in math (< 3 years experience; 61.5%), and 13 teachers (24.8%) had completed Additional Qualifications courses or specialists in math.

The 61 fixed-response survey items were combined to create nine subscales that represented key aspects for each section and aligned with three broad categories of the program theory: Impacts, Supports, and Challenges. Internal consistencies (Cronbach's α), means, and standard deviations were calculated for each subscale for the total sample and by years in the project (Table 7). All subscales exhibited high levels of internal consistency (.80-.95), demonstrating the ability for the items to provide consistent measures of the intended subscales. Subscale means were compared to elucidate statistically significant differences between teachers based on their years in the project (Table 7). Survey results were triangulated with teacher questionnaire and focus group findings and reported concurrently as impacts on, supports of, and challenges to teachers' learning and practice in the EMP.

Table 6. *Frequency of Teachers' Demographic Information (n=52*)*

Demographic	# of Teachers	Frequency (%)
Current Grade Level**		
Primary (1-3)	22	45.8
Junior (4-6)	15	31.3
Intermediate (7-8)	11	22.9
Senior (9-12)	1	2.1
Other	9	18.8
Teaching Experience		
Novice (< 3 yrs)	0	0
Experienced (3-11yrs)	19	36.5
Expert (>11 yrs)	28	53.8
Experience with Math Collaborative Inquiry		
Novice (< 3 yrs)	32	61.5
Experienced (3-11yrs)	13	25.0
Expert (>11 yrs)	0	0
Year in EOSDN Math Project		
Year 1	41	78.8
Year 2	7	13.5
Year 3	2	3.8
Year 4	2	3.8
Background		
AQ in Math	11	21.0
AQ Specialist in Math	2	3.8
Masters Degree	6	11.5
Doctorate Degree	0	0

Note. *Teachers' responses to demographic items were incomplete, therefore frequencies do not reflect the full sample.
**Some teachers reported multiple grade levels.

Table 7. *EOSDN Math Project Impacts, Supports, and Challenges for Teachers by Years in the EMP*

	Cronbach's α	Total Sample n= 52* (SD)	Year 1 n=41 (SD)	Year 2 n= 7 (SD)	Year 3 n=2 (SD)	Year 4 n=2 (SD)
Impacts						
Math Teaching Practice (2a-i)	.95	3.34(.81)	3.22(.76)	3.75(.93)	3.17(.71)	4.44(.47)
Inquiry Processes (2 j, k)	.90	3.47(.93)	3.38(.96)	3.79(.70)	3.50(.71)	4.25(1.06)
Students' Math Learning (2l-q)	.94	3.22(.84)	**3.05(.78)**	3.91(.95)	3.17(.24)	**4.25(.12)**
Professional Collaboration (2r-t)	.94	3.62(1.08)	3.54(1.07)	4.19(1.00)	2.50(.71)	4.33(.94)
Supports						
Structure of the Project (3a-h)	.84	3.50(.77)	3.38(.75)	4.08(.80)	3.38(.75)	4.06(.97)
Inquiry Processes (3i-q)	.94	3.57(.91)	**3.42(.88)**	**4.54(.49)**	3.33(.31)	3.94(1.34)
Resources (3r-x)	.92	3.59(.96)	3.47(.97)	4.51(.50)	3.07(.51)	4.00(.81)
Challenges						
Math Fluency (4a)	n/a	2.04(.80)	**2.19(.79)**	1.40(.55)	2.00(.00)	**1.00(.00)**
Structure of the Project (4b-j)	.87	2.13(.58)	**2.21(.61)**	1.76(.35)	2.22(.61)	**1.65(.03)**
Inquiry Processes (4k-o)	.80	1.86(.52)	**1.96(.51)**	**1.33(.37)**	1.90(.14)	1.60(.57)

Note. *Only completed surveys were included in subscale analyses. Significant differences for teachers based on years in the project are in **bold.**

Impacts on Teachers' Learning and Practice

> *I incorporate math into as many aspects of my day as possible now. There definitely is an increased focus on math instruction in my classroom and I feel that has carried over to my students' interest in math.*

Like Year 3 of the EMP, teachers reported that the project had the greatest impact on their "Professional Collaboration". Unlike previous years of the project, the second greatest impact reported by teachers was on their use of "Inquiry Processes" (i.e., collecting and analyzing data to build evidence of instructional impacts on students' learning in math). Overall, teachers in their fourth year of the EMP reported the greatest impacts on all subscales (i.e., "Math Teaching Practice", "Professional Collaboration", "Students' Math Learning", and "Inquiry Processes"). With respect to "Students' Math Learning", teachers in their fourth year of the project reported significantly greater impacts, while teachers in their first year of the project reporting significantly lesser impacts (see Table 7). This highlights that it takes time and sustained efforts for professional learning to impact students' learning. As in previous years of the EMP, teachers articulated substantial increases in their comfort in discussing math teaching and learning with district facilitators, other teachers, and, to a lesser extent, school administrators. Teachers also identified the project's impact on their ability to use manipulatives to support students' learning and to use student data to assess the impact of their teaching on students' learning in math (Appendix F).

> *The development of the learner profile has provided me with an opportunity to see the whole child as a learner and has helped me to choose the most appropriate path to push their learning forward.*

Qualitative data from teacher surveys, questionnaires, and Steering Committee artifacts further elaborated the EMP's impact on teachers' professional learning and practice. Teachers involved in Year 4 particularly valued the project requirement to develop learner profiles for two of their *students of mystery* in math. Teachers explained that the process of developing two learner profiles at the start of the school year, in collaboration with their district facilitators and school teams (i.e., school administrators, support teachers, and other teachers), helped them to construct a more holistic understanding of each student's unique learning strengths and needs. Teachers were then able to use this information to drive precise planning, instruction, and assessment through an asset lens—focusing on students' strengths while accommodating specific learning needs. Over time, many teachers recognized that "what is necessary for some is good for all" and adopted a Universal Design for Learning (UDL) stance toward math instruction—extending strategies initially intended for *students of mystery* to all students in their math classrooms. As one teachers shared, "The process of developing learner profiles for my *students of mystery* has helped me become more mindful of the range of needs in my math classroom." Another teacher added, "Now I actively look for ways to help the whole class by helping those who struggle."

The learner profiles that teachers developed for their *students of mystery* also guided their professional learning foci throughout the Year 4. Teachers worked collaboratively with their district facilitators and school teams to determine the math content and pedagogical knowledge needed to help them collectively support the identified needs of their *student of mystery*. Through regional and

It is important to know your students, so you can help them develop conceptual understanding in a way that matches their strengths and needs.

school-based sessions, teachers developed math knowledge for teaching, with an emphasis on understanding cognitive domains and how they impact teaching and learning in math. In several school teams, teachers explored continua of learning in math (developmental and/or conceptual) to understand how students' mathematical thinking progresses from Kindergarten through Grade 8 (K-8). In many cases, school teams mapped math curriculum across strands onto these continua, to develop a deeper understanding of students' learning in specific grades, divisions, and across multiple divisions. Through the foci on *students of mystery* and learner profiles, some teachers expressed that they felt more latitude to "slow down and go deeper into math concepts", versus rushing to cover all specific expectations in grade-level curriculum.

During Year 4, most school teams opted to focus on enhancing students' number sense and problem-solving skills through *big ideas* in math (i.e., proportional, spatial, and algebraic reasoning). As such, teachers worked with their district facilitators and school teams to explore various instructional approaches to support the math learning of all students, including *students of mystery*. Through the project, teachers began to implement more explicit instruction (i.e., naming the math and the strategies used), cultivating a common math language among educators and students in schools and classrooms. Instructional strategies implemented by school teams included: number talks, number strings, 3-part lessons, spiraling, open problems, tools (e.g., technology or manipulatives), and cognitive strategies (e.g., "visualize, verbalize, verify").

I find myself 'naming' the strategy rather than just teaching it. I can see the impact on student learning as they demonstrate that they are considering the most appropriate strategy to solve the problem.

As teachers developed confidence in new approaches to math instruction, they became less procedural and encouraged a variety of problem solving strategies among students. In particular, teachers intentionally explored the use of tools (i.e., technology and manipulatives) in their math classrooms, helping students select tools not only to facilitate multiple representations of their thinking and but also to enhance their conceptual understanding. Teachers shared that this helped to make problem solving more accessible to *students of mystery*, and helped all students become more comfortable using tools to support their math learning. Notably, teachers shared that *students of mystery* began to self-advocate for tools that supported their learning best, based on their individual learning profiles. Over time, teachers also observed that their *students of mystery* were more confident and successful in communicating their mathematical thinking, solving math problems, and persevering to complete math tasks. In several classrooms, this increased confidence and success extended beyond *students of mystery* to all students.

Through their work in the project, teachers also explored a variety of assessment strategies to support and monitor the progress of their *students of mystery*, emphasizing an asset-based approach (i.e., emphasis on what students *can* do). In collaboration with their district facilitators and school teams, many teachers implemented and analyzed diagnostic assessments (e.g., Prime) at the start of

We can better assess our students over time by giving them multiple opportunities to show their learning.

the school year to determine the strengths and needs of *students of mystery* and plan for subsequent instruction. Throughout the year, facilitators helped teachers in their ongoing documentation of these students' learning through observations, conversations, and products—with less reliance on paper/pencil products and more emphasis on documenting observations and conversations through multiple data sources including photos, videos, audio recordings, and/or observational notes. With the support of their facilitators and school teams, teachers collaboratively analyzed and triangulated this data to build evidence of impact on their *students of mystery*, then used this evidence to inform next steps in instruction. As teachers became familiar with this approach to assessment, many began to document the learning of all their students this way—implementing fewer traditional tests and providing more varied opportunities for students to demonstrate their thinking. In several instances, teachers described an increased use of questioning to draw out their students' thinking, doing "more listening and less talking". In some cases, teachers co-constructed math success criteria with students and helped students use these criteria to support peer- and self-assessment in math. Several teachers began to use developmental continua in math to assess representations of their students' thinking as concrete, pictorial, or symbolic, then used this information to elucidate next steps in instruction. As one teacher explained, "We are recognizing the value of triangulating observations, conversations, and products and focusing on what students *can* do. As a result, we understand our students better and can support their learning better through our instruction."

The students with LD profiles are more successful and more comfortable showing and sharing their thinking in math.

As in Year 3 findings, teachers identified that their shift to an asset lens in math instruction and assessment cultivated related shifts in classroom culture and students' learning. Through the project, both teachers and students began to approach mistakes as "opportunities to learn" in the math classroom. Specific to Year 4, teachers observed that *students of mystery* demonstrated increased confidence and risk-taking in math, more frequently engaging in and persevering with problem solving tasks. Moreover, *students of mystery*, were better able to name and notice math strategies and were more creative and independent in using tools to solve problems. Among their *students of mystery*, teachers reported increases in number sense, with some students moving from modified to accommodated programs. As one teacher summarized, "Through this project, I have created a more positive classroom culture in math. All of my students are having more success and feeling more confident."

Supports of Teachers' Learning and Practice

Survey data revealed that teachers most valued the "Resources", followed closely by "Inquiry Processes" to support their learning and practice within the EMP (Table 7). This was the first year of the EMP in which teachers placed greater value on "Inquiry Processes" than the "Structure of the Project", suggesting a shift in how teachers prioritize the use of student evidence to inform their professional learning and practice. In particular, teachers identified that collecting student data in the form of artifacts, observations, reflections, and videos/photos supported their work within the EMP. Teachers also valued trusting relationship with their inquiry teams, sessions with math experts, and opportunities to learn with other teachers and district facilitators (Appendix F).

Taking the time to further our own learning professionally in a collaborative environment, where we learn from each other's experiences, can only further the learning of our students.

Teacher questionnaires and Steering Committee artifacts further explained valued EMP supports. District facilitators were highly valued supports throughout Year 4, at both regional and school-based professional learning sessions. At regional Steering Committee meetings, facilitators helped teachers develop learner profiles for their *students of mystery* and create plans to support and monitor these students' learning over the course of the school year. At school-based sessions, facilitators shared resources to help teachers develop math knowledge for teaching, modelled instructional strategies in teachers' classrooms, provided feedback on teachers' approaches to math instruction, and helped teachers collect and analyze data to build evidence of impact on *students of mystery*. In many cases, facilitators also introduced and demonstrated new tools (i.e., technology and/or manipulatives) to support teaching and learning in math classrooms. Facilitators also helped school teams explore math continua (developmental and/or conceptual) and map K-8 curriculum expectations onto these continua to facilitate cycles of instruction and assessment, fostering a whole-school approach to supporting students' learning in math.

As in previous years of the project, teachers also valued designated time to collaborate with their school teams (i.e., other teachers, support teachers, and school administrators). Teachers especially valued time with grade- and divisional-colleagues to co-plan and co-teach math lessons, the co-analyze documentation of student thinking (i.e., observations, conversations, and/or products). Teachers also appreciated time to share and explore new instructional strategies and tools (i.e., technology and manipulatives) with their teams. While most teachers preferred school-based collaborative learning sessions because these were focused on their local and individual needs, many teachers also appreciated the resources and learning provided at regional sessions (e.g., YCDSB's *Supporting Students with LD in Mathematics* document, Sagonaska School presentation, TELT team sessions).

Challenges to Teachers' Learning and Implementation

Consistent with previous EMP years, teacher survey data indicated that teachers generally did not perceive "Math Fluency", "Structure of the Project", or "Inquiry Processes" as challenges to their participation in the project. Notably, teachers in their first year of the project perceived these areas as significantly greater challenges than teachers in the EMP for two or more years (Table 7). As in previous EMP years, teachers expressed concern that they may be losing instructional time by participating in the EMP (Appendix F).

Teacher questionnaires and Steering Committee artifacts elaborated challenges experienced by teachers. Unlike previous years, teachers were involved in both regional and school-based sessions throughout Year 4. Several teachers felt that the expectations of the EMP were not clear at the outset, desiring more specific regional direction from the beginning of the school year. Some teachers also expressed a desire for more explicit continuity and depth of learning in regional sessions. In particular, teachers would like to learn more about supporting students with learning disabilities in math, using technology to support math teaching and learning, and assessing students' math learning in relation to developmental and/or conceptual continua.

As in previous years, teachers shared challenges related to time. In many cases, teachers did not feel that they had sufficient formal time allotted to work collaboratively with their district facilitators and school teams throughout the school year. Teachers wanted more time to explore resources, develop and refine learner profiles, discuss instructional approaches, co-plan/co-teach lessons, and analyze student assessment data. Without this formal collaborative time in schools, many teachers felt isolated and challenged to fulfill the professional learning requirements of the EMP—especially developing learner profiles, using technology in the math classroom, and monitoring the learning of *students of mystery* through ongoing documentation.

I would like more time to navigate this learning journey with my colleagues. They are a valued support in planning for and ultimately meeting the needs of my most complex learners.

Moving Forward

Teachers particularly appreciated the focus on *students of mystery* in Year 4, and recommended maintaining this focus moving forward. Teachers also offered two primary suggestions to enhance the EMP in Year 5. First, as in previous years, teachers requested more release time to collaborate with grade-level and divisional colleagues in their schools. Teachers consider school-based sessions critical to enhancing their math instructional practice and students' learning, allowing them to share resources, collaboratively develop learner profiles, co-plan/co-teach lessons, and collectively assess students' thinking to determine next steps.

Second, at regional sessions, teacher would like more time designated to cohesive professional learning over the course of the school year. In particular, teachers want in-depth learning about supporting students with learning disabilities in math, using technology to support math teaching and learning, and assessing students' math learning in relation to developmental and/or conceptual continua. Teachers would also like time to explore and apply this new knowledge to their own practice, through hands-on activities facilitated by external experts, system educators, or Ministry of Education personnel.

I'm glad I was part of the EOSDN math project this year.
It was a great learning opportunity to lead students
onto a successful math journey!

School Administrators' Perspectives

My staff now sees me as in instructional leader in math because I am part of this project.

School administrators' perspectives were collected through surveys and artifacts, including Consolidation Day exit cards from all administrators involved in the EMP. These data sources offered important insights that serve to inform and enhance the professional learning model moving into 2017-2018. Our goal was to explore the impact of the EMP on administrators' fluency and instructional leadership in math at the end of Year 4, and highlight any differences between administrators based on their number of years in the project.

Survey Results

Across the nine participating DSBs, surveys were distributed through district facilitators to school administrators (n = 21) involved in the project. Unlike previous years of the project, school administrator participation in the EMP was a regional requirement in Year 4, with administrators attending five out of ten regional Steering Committee meetings (Appendix D). From the nine DSBs, we received 18 completed surveys; a response rate of 18/21 (85.7%) (Table 2). The administrator survey consisted of 63 fixed-response items using 5-point Likert scales, 2 open-response items, and 8 demographic items. The survey instrument and descriptive statistics for fixed-response and demographic items are reported in Appendix F.

Demographic frequency data for the surveyed administrators are summarized in Table 8. (Please note that administrators' responses to demographic items were incomplete, therefore frequencies do not reflect the full sample.) Thirteen administrators were in their first year of the EMP (72.2%), three were in their second year (16.7%), one was in her/his third year (5.6%), another in her/his fourth year (5.6%). Ten administrators were Experienced in their careers (3-11 years experience; 55.6%), with two Expert in their careers (>11 years experience; 11.1%) and two Novice in their careers (< 3 years experience; 11.1%). With respect to collaborative inquiry in math, a majority of administrators were Experienced (3-11 years experience; 44.4%), and 11 were Novice (< 3 years experience; 61.1%). One had completed Additional Qualifications courses in math (6.5%) and seven administrators (38.9%) had completed graduate studies.

The 62 fixed-response survey items were combined to create nine subscales that represented key aspects for each section and aligned with three broad categories of the program theory: Impacts, Supports, and Challenges. Internal consistencies (Cronbach's α), means, and standard deviations were calculated for each subscale for the total sample and by years in the project (Table 9). All subscales exhibited high levels of internal consistency (.71-.92), demonstrating the ability for the items to provide consistent measures of the intended subscales. Subscale means were compared to see if statistically significant differences could be found between administrators based on their years of experience in the EMP (Table 9). Survey results were triangulated with administrator artifacts and reported concurrently to describe impacts on, supports of, and challenges to administrators' learning and practice in the EMP.

Table 8. *Frequency of School Administrators' Demographic Information (n=18*)*

Demographic	# of Administrators	Frequency (%)
Administrator Experience		
Novice (< 3 yrs)	2	11.1
Experienced (3-11yrs)	10	55.6
Expert (>11 yrs)	2	11.1
Administrator Experience at Current School		
Novice (< 3 yrs)	11	61.1
Experienced (3-11yrs)	3	16.7
Expert (>11 yrs)	0	0
Experience with Math Collaborative Inquiry		
Novice (< 3 yrs)	6	33.3
Experienced (3-11yrs)	8	44.4
Expert (>11 yrs)	0	0
Years in EOSDN Math Project		
0-1	13	72.2
1-2	3	16.7
2-3	1	5.6
>3	1	5.6
Background		
AQ in Math	1	5.6
AQ Specialist in Math	0	0
Masters Degree	7	38.9

Note. *Administrators' responses to demographic items were incomplete, therefore frequencies do not reflect the full sample.

Table 9. *EOSDN Math Project Mean Impacts, Supports, and Challenges for School Administrators by Years in the Project*

	Cronbach's α	Total Sample n= 18 (SD)	Year 1 n= 13 (SD)	Year 2 n= 3 (SD)	Year 3 n=1 (n/a)	Year 4 n=1 (n/a)
Impacts						
Instructional Leadership in Math (2a-g, r)	.92	3.59(.60)	**3.34(.44)**	**4.14(.24)**	3.71	5.00
Inquiry Processes (2 h-j)	.87	3.48(.72)	**3.23(.59)**	**4.11(.19)**	3.33	5.00
Teaching and Learning (2k-n)	.90	3.94(.63)	3.73(.54)	4.41(.62)	4.25	5.00
Professional Collaboration (2o-q)	.88	3.83(.74)	3.66(.75)	4.11(.50)	4.00	5.00
Supports						
Structure of the Project (3a-h)	.85	3.84(.63)	3.70(.68)	4.12(.25)	3.75	4.62
Inquiry Processes (3i-q)	.88	3.75(.62)	3.55(.64)	4.00(.00)	4.22	4.66
Resources (3r-aa)	.90	3.55(.71)	3.36(.73)	4.08(.64)	3.90	3.70
Challenges						
Math Fluency (4a)	n/a	2.20(.77)	2.40(.84)	2.00(.00)	1.00	2.00
Structure of the Project (4b-j)	.71	1.94(.41)	2.04(.42)	1.70(.39)	2.11	1.55
Inquiry Processes (4k-o)	.83	2.12(.58)	2.26(.63)	2.06(.23)	1.80	1.20

Note. No significant differences were found between administrators based on years of experience in the EMP.

Impacts in Schools

As in Year 3 of the EMP, school administrators reported that the EMP had the greatest impact on "Teaching and Learning" and "Professional Collaboration" related to math in their schools (Table 9). Overall, administrators reported the lesser impacts on their "Instructional Leadership in Math" and "Inquiry Processes", with administrators in their first year of the project indicating significantly lower impacts in these areas than administrators involved in the project for multiple years. As in Years 2 and 3 of the EMP, administrators identified positive shifts in their schools' cultures in math, changing instructional practices among teachers, and their own increased comfort discussing math teaching and learning with teachers, facilitators, and other administrators. In Year 4 of the EMP, administrators also shared that the EMP helped them support the Renewed Math Strategy (RMS) in their schools (Appendix F).

Qualitative data from administrators further elucidated the EMP's impact on their instructional leadership and school's culture in math. In Year 4 of the EMP, school administrators attended

selected regional Steering Committee meetings to co-learn and co-plan with their district facilitators and school teams. In particular, at the October Steering Committee meeting, administrators co-developed EMP school inquires with their district math facilitators and student support leads—these inquires incorporated both RMS and BIPSA priorities while also reflecting each administrator's SIPSA and local priorities. Throughout Year 4, administrators learned from and with their colleagues at regional sessions (i.e., district math facilitators, student support leads, TELT leads, school support teachers, and classroom teachers) about developing learner profiles for *students of mystery* in math, implementing instructional strategies to support these *students of mystery*, and using multifaceted assessment approaches to monitor students' learning.

In between regional Steering Committee meetings, administrators supported the learning of their EMP school teams (i.e., support and classroom teachers) through opportunities for school-based collaborative learning, generally with embedded support from their district math facilitators. In many cases, administrators incorporated EMP learning into their staff meetings, in an effort to spread the learning from the project to all educators in their schools and cultivate a whole-school approach to math teaching and learning. For example, in several schools district math facilitators, administrators, support teachers, and classroom teachers began to explore math continua (developmental or conceptual) in relation to the K-8 math curriculum in order to better understand and support students' learning progression across grades. In one school, a school administrator stated that all teachers were developing learner profiles for their *students of mystery* in math to support responsive instruction and students' learning.

> *My staff has become much more open to learning as a result of this project. We are actually going into classrooms~watching lessons then discussing students' learning.*

Throughout Year 4, administrators actively cultivated collaboration between support and classroom teachers to support shifts in EMP teachers' instructional practice and foster spread to classrooms not officially involved in the EMP. At the end of Year 4, several administrators shared that a common math language had emerged among educators in their schools, with school culture shifting to an asset-based approach and teacher's exhibiting increased confidence and precision with math instruction and assessment. One administrator summarized, "The growth in our school may not be readily measurable in terms of student achievement, but the attitude toward math teaching and willingness to stretch outside of one's comfort zone has increased."

Supports of School Administrators' Learning and Leadership

In contrast to EMP Year 3 in which school administrators most valued "Resources" provided by the project, survey data revealed that administrators most valued the "Structure of the Project", followed by "Inquiry Processes" and "Resources" in Year 4 (Table 9). This suggests that administrators appreciated being part of both regional and school-based sessions during the current EMP year. No significant differences were found between administrators based on years of experience in the EMP. Administrators specifically valued the alignment of EMP goals with board and provincial priorities. Administrators also valued trusting relationships with their school inquiry teams and time to co-learn with their teachers (Appendix F).

Qualitative data further explained supports valued by school administrators. Administrators particularly appreciated the EMP's intentional alignment with goals articulated in the provincial RMS and their respective BIPSAs, enabling a coherent focus for professional learning and practice. Moreover, administrators valued the flexibility to develop school inquiries within the EMP that aligned with their respective SIPSAs. The intentional focus on alignment of EMP goals with provincial, DSB, and school priorities helped administrators understand the broader project goals and take more ownership of EMP learning within their school teams throughout Year 4. Administrators also appreciated opportunities to develop trusting relationships with and learn from their district facilitators through collaboration at both regional and school-based sessions. Consequently, administrators felt more connected to EMP learning throughout Year 4. During school-based sessions, administrators also valued facilitators' support of teachers' implementation of new instructional and assessment strategies. According to one administrator, "I think that is one thing the EOSDN region has done really well—establishing that network of support for our [district facilitators] so they can bring new learning to us in our boards and schools."

> *Our Curriculum Support team is amazing! They did a tremendous job supporting and encouraging teachers through their learning while not increasing stress around the additional responsibilities that teachers had [in the project].*

Challenges to School Administrators' Learning and Leadership

The data from the school administrator surveys suggests that administrators generally did not perceive "Math Fluency", "Structure of the Project", or "Inquiry Processes" as challenges to their participation in the EMP. Furthermore, there were no significant differences on Challenges subscales based on administrators' years of experience in the EMP (Table 9). Administrators' responses to individual survey items are summarized in Appendix F.

> *Our greatest challenge is addressing practices rooted in pedagogy developed 20 years ago and moving towards current effective practices.*

While survey results did not elucidate significant challenges to school administrators' participation in the EMP, qualitative data revealed two primary challenges. First, many administrators were challenged by the amount of time the project required them to be out of their schools throughout the school year. Although they appreciated opportunities to collaborate and learn with their teams at regional sessions, they were regularly faced with competing priorities that detracted from their full engagement at regional meetings. Second, administrators faced challenges spreading EMP learning to all teachers in their schools. This was particularly true in larger schools and in cases where there was reluctance to explore new practices. As one administrator explained, "This project made me aware of the risks of being complacent in our practice and the importance of embracing new or different approaches." Another administrator added, "Sometimes we think we understand that students have different learning needs, but do we really support these students in alternative ways?"

Moving Forward

School administrators contributed two primary suggestions to refine and enhance the EMP moving into Year 5. First, administrators offered a variety of ideas to refine their involvement in regional sessions: (a) a shorter project timeline with specific learning objectives and fewer days out of their schools; (b) time to co-learn with other school administrators, and (c) time to observe implementation in other EMP schools. Second, administrators requested enhanced professional learning content at regional sessions, supported by relevant experts, to explore *big ideas* in math across grade levels, do the math, explore instructional strategies in more depth, and develop monitoring plans. Finally, administrators advocated for additional time in schools with their teams (i.e., support and classroom from district math facilitators as possible, to plan, implement, and reflect on new approaches to math teaching and learning.

I look forward to continued growth in the next year~
to further focus and refine our inquiry and further impact our students.

Section 5: Key Findings and Recommendations

The Year 4 evaluation report contributes to an emerging body of knowledge regarding the systemic elements and structures that support evidence-informed, networked professional learning facilitated by middle leaders. Specifically, this collaborative developmental evaluation of the EOSDN Math Project (EMP) at the end of Year 4 (Phase 5) indicates that the project continues to be a valuable process to support educators' professional learning and teaching in math (planning, instruction, and assessment) across the nine DSBs in the Eastern Ontario region. In particular, our Year 4 findings: (a) illustrate how the characteristics of effective professional learning (i.e., instructive, reflective, active, collaborative, and substantive) operate in a networked, regional initiative; and (b) contribute new understandings regarding the systemic elements that support evidence-informed professional learning and collaborative leadership within and across regional contexts, facilitated by middle leaders (i.e., district facilitators).

Our findings confirm previous research that middle leaders play a critical role in facilitating evidence-informed, networked professional learning across classrooms, schools, and systems (e.g., Fullan, 2015; Killion, 2012). In addition, this four-year regional initiative reinforces the value of a shared, regional focus with fluid structures to enable latitude in implementation (e.g., Lieberman & Miller, 2014) and supports Guskey's (2014) assertion that it takes time and concerted effort for professional learning initiatives to shift practice and impact students' learning. Our collaborative work extends previous research, demonstrating that when middle leaders receive sustained support to build their own data literacy (i.e., fluency in using classroom data to support and monitor evidence-informed, networked professional learning efforts), they are better able to: (a) support evidence-informed professional learning across classrooms, schools, and systems; and (b) cultivate data literacy and foster evidence-informed practices among school-based educators. Moreover, our Year 4 findings augment the work of Guskey (2014) by illustrating that a precise, regional focus on understanding, supporting, and monitoring the learning needs of *students of mystery*, facilitated by data literate middle leaders, may accelerate intended impacts on students and/or make impacts on students more readily apparent in networked professional learning initiatives.

Interview, questionnaire, survey, and observational data from all participants demonstrated shifts in educators' learning and practices in math and inquiry processes, specifically increases in asset-based approaches to supporting *students of mystery* in math and the emergence of collaborative leadership through a whole-school approach. Our overall findings for the EMP provide support for its continuation; however, our evaluation and research have also generated important knowledge that will help to refine the EMP as it moves forward into its fifth year of funding. The key findings below highlight the factors that appear to have been most significant to participants in moving regional math teaching and learning forward in Year 4 of the EMP.

Key Findings in Year 4: What matters most to participants' learning?

1. ***Purposeful Alignment:*** The purposeful alignment of regional project goals with provincial, DSB, and school priorities supports educators' ownership and engagement in networked regional professional learning.

   Over the past four years, the regional project inquiry and professional learning foci have been rooted in the province's commitment to enhancing math teaching and learning. However, in Year 4, the EMP's alignment with provincial priorities became more explicit with the introduction of the Renewed Math Strategy (RMS). In accordance with the provincial RMS document, the EMP maintained its ongoing focus on developing students' conceptual understanding of *big ideas* in math, implementing a balanced approach to instruction (i.e., skills and understanding), cultivating growth mindsets in math among educators and students, monitoring evidence of impact on students (e.g., assessment *for* learning cycles and pedagogical documentation), and fostering collaborative leadership in schools among educators. In addition to these foci, the EMP adopted the RMS focus on students struggling in math (i.e., *students of mystery*), especially students with identified learning disabilities, through a whole-school approach that leveraged asset-based learner profiles, responsive instruction, targeted accommodations, and assistive technology. These RMS priorities were also reflected in the BIPSAs and SIPSAs of educators involved in Year 4, allowing these educators to engage in the regional project while concurrently addressing their DSB- and school-specific goals.

2. ***Precise Focus:*** Articulating a precise regional focus on supporting *students of mystery* enables targeted professional learning and responsive implementation among educators within classrooms, schools, and across regional contexts.

   In previous EMP years, educators focused their support on math learning for all students in a division or grade by addressing their own learning needs as educators. In Year 4, the RMS contributed a slightly revised focus. While maintaining the goal to support all students, a precise regional focus on understanding and supporting *students of mystery* in math was initiated, rooted in more explicitly considering individual student's needs. Consequently, all educators involved in Year 4 of the project co-developed asset-based learner profiles and monitoring plans for two *students of mystery* in each EMP classroom. These learner profiles and monitoring plans enabled targeted professional learning and responsive implementation at both regional and school-based sessions. Moreover, the focus on *students of mystery* and learner profiles promoted a common language which helped both educators and students name and notice math thinking and strategies. At the regional Consolidation Day in May, artifacts constructed by participating educators clearly illustrated student voice and highlighted the impacts on students' learning to a greater extent than in previous EMP years. Overall, the precise regional focus on supporting *students of mystery* throughout Year 4 elucidated the importance of leveraging students' learning needs to drive professional learning.

3. ***Whole-School Approach:*** Engaging school administrators, support teachers, and classroom teachers in regional and school-based professional learning sessions cultivates a whole-school approach and promotes spread throughout schools.

   Previous EMP years prioritized cultivating collaborative leadership in schools; however, Year 4 marked an important shift toward achieving this goal through changes to the structure of regional Steering Committee meetings. By including school administrators, support teachers, and classroom teachers at designated regional meetings throughout Year 4, school teams had critical opportunities to learn and plan with their district facilitators (math, student support, and TELT leads). In-between regional meetings, with support from district math facilitators where possible, enabled school teams to implement new practices and shared regional learning with their colleagues—most notably school administrators through staff meetings and support teachers through their ongoing work across classrooms. This contributed to a whole-school approach to supporting *students of mystery* through asset-based learner profiles and responsive instruction.

4. ***Conceptual Assessment:*** Monitoring the conceptual understanding of *students of mystery* through multiple forms of assessment (observations, conversation, and products) over time supports learning and informs instruction for all students.

   Stemming from the Year 4 focus on supporting *students of mystery* in math, educators began to assess these students' understandings of math concepts across continua of learning, as well as in relation to their achievement of grade-specific curriculum expectations. This helped educators better understand the needs of their *students of mystery* from a developmental perspective and provide instructional accommodations to enable these students' success in math. Moreover, educators recognized the importance of leveraging multiple forms of assessment (observations, conversations, and products) to understand and support their *students of mystery*—relying more on student voice in assessment (e.g., interviews, videos, observational notes) and less on paper-pencil products to guide instructional next steps. As the school year progressed, educators acknowledged that this approach to assessment supported learning and instruction with not only *students of mystery*, but all students.

5. ***School-based Support:*** Formal time for facilitated, school-based support of planning, implementation, and reflection helps administrators, support teachers, and classroom teachers apply new learning in their own contexts of practice.

   Year 4 prioritized the cultivation of a whole-school approach by including school administrators, support teachers, and selected classroom teachers at regional Steering Committee meetings. While the inclusion of these educators at regional sessions provided valued opportunities for collaboration and co-learning with their district facilitators (math, student support, and TELT leads), school teams advocated the importance of formal release time for facilitated support in their schools. In particular, district math facilitators: (a) provided important support to administrators leading learning at staff meetings; and (b) supported teachers' working with *students of mystery* across classrooms, and classroom teachers' implementing new instructional strategies. This facilitated support in schools was especially important for educators new to the project, as was the case for many administrators and teachers in Year 4.

Key Recommendations after Year 4

The following four recommendations have been identified to guide next steps for the EMP in Year 5 (2017-2018).

1. ***Maintain alignment with Renewed Math Strategy (RMS) and focus on students of mystery.***

   Continue to align regional project goals with the provincial Math Strategy (RMS). This alignment helps participating educators across contexts engage in cohesive professional learning and construct knowledge that informs instructional practice and students' learning in the province, region, districts, and schools. Furthermore, the RMS provides an enabling framework that supports precision in educators' learning and practice while allowing latitude to build on regional learning and momentum from Years 1 through 4.

2. ***Collectively identify precise regional objectives and develop monitoring plans.***

   Devote regional learning time at the start of Year 5 to identifying precise regional objectives for each guiding question, following the process of co-constructing success criteria. These objectives, or criteria, will inform the subsequent development of monitoring plans that can be used to guide data collection in the region, districts, schools, and classrooms throughout Year 5.

3. ***Increase depth of professional learning at regional Steering Committee meetings.***

   Provide consistent opportunities for deep professional learning at regional Steering Committee meetings, supported by external and district experts as appropriate. Ensure that these opportunities allow educators sufficient time to apply new learning (e.g., solving math problems, mapping developmental/conceptual continua onto math curriculum, developing and refining learner profiles, using the CASL method to analyze student work, exploring technology to support *students of mystery*).

4. ***Provide additional opportunities for facilitated learning in schools.***

   School-based educators require facilitated support of their learning and implementation within their own contexts of practice. This is especially important for educators who are new to the project and/or to collaborative inquiry in math. While facilitator support may be released gradually over time, it is critical in the initial stages when educators are planning, implementing, and reflecting on new practices. This support pertains not only to teachers in classrooms, but also to school support teachers who are fostering spread through their work across classrooms and school administrators who are beginning to lead learning in staff meetings and other school-based initiatives.

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Appendix A: Summary of Year 1 Project Activities

EOSDN Regional Mathematics "Closing the Gap" Project
Year 1 (2013-2014)

Focus of the Project/Study

The EOSDN Math project/study is supporting teacher inquiry and professional learning in mathematics through the following:

- examining beliefs about teaching mathematics (mindset)
- developing fluency in the observation, description, and analysis of students at work and their work products (knowing what to look and listen for)
- developing fluency in posing questions, providing feedback and consolidating learning in ways that promote student thinking (shifting the role of the teacher from instructor to co-learner/coach)
- using the "power of co" through co-planning, co-observing/assessing students at work, and co-moderating student work
- networking within and beyond the DSB

All of this is being done through a regional focus on proportional reasoning and representation of student thinking in mathematics – each of which cuts across strands, topics, and courses.

Valued Components of the Project

Steering Committee Sessions

A key component of the EOSDN math project/study is the ongoing learning of math program facilitators from each DSB. This 'support of the supporters' is being recognized by participants and by the researchers as having significant impact on the depth and spread of the project. Operational items have been dealt with through teleconferences, emails, and end of session 20 minute updates. The focus of each session has been on learning.

September at HPEDSB This session focused on local Implementation plans, and the submission of DSB plans and letter of financial commitment. Dr. Rebecca Luce-Kapler from Queen's University led a discussion about Queen's University's role as researchers and support within the project. She also spoke about assessment and monitoring, and each DSB was given the opportunity to share questions and/or concerns regarding assessment and monitoring.

October at CDSBEO The focus was to gain further knowledge in the areas of Proportional Reasoning and EQAO (facilitated by Lorraine Giroux, School Support and Outreach Education Officer), and to continue discussions about monitoring (facilitated by Danielle LaPointe and Christopher Deluca, Queen's Researchers).

December at OCDSB Each DSB shared ideas from local implementation of the EOSDN Math Project. The remainder of the day was facilitated by Queen's Researchers, Danielle LaPointe and Don Klinger leading learning about Data/Evidence Collection and Analysis. Each DSB had the opportunity to work through a shared data analysis process using data from the EOSDN Regional Think Tank Sessions. DSB teams followed the data analysis process that was modelled to analyze data from their own DSB.

January at OCSB Steering Committee Reps planned for facilitation of learning at the SIM Session on January 31: EOSDN Math Project - Proportional Reasoning, the Process of Representation and Teacher Fluency. The remainder of the day was facilitated by Queen's Researcher, Danielle LaPointe, the topic being Observing with Purpose: Exploring Classroom Video Analysis.

March at OCDSB Cathy Bruce, Trent University Researcher facilitated the learning with the focus on being an effective instructional coach - facilitation, efficacy, and how mathematics leaders support others. She also focused on student representation of their thinking using fractions as the proportional reasoning content.

April at Limestone Planning Session for the May 14-15 Regional Think Tank Session with a focus on consolidating the learning of teacher participants in the project. As well, the Queen's Researchers explained how they will gather data from participants to develop a deeper understanding of the structures that support the success of collaborative professional learning initiatives (where success is defined as the impact of the professional learning program on enhanced teacher practice, improved student learning and achievement, and increased collaboration among educators).

May at ALCDSB Finalizing the planning for the consolidation day; providing input into the report to the Board of Directors; working with Queen's researchers on data collection tools.

June at RCDSB Steering Committee reps consolidated their DSB data into a summary report and created a poster representing the learning journey within the district. The poster becomes part of the report to the Ministry of Education.

Access to Expertise

Having access to acknowledged experts in mathematics and in research methodology is also valued highly by DSB participants.

- Marian Small facilitated three Regional Think Tank Sessions on September 27(Kingston), October 7(Ottawa) and 8(Kemptville). The 700 teachers participating in the Math Project were invited to attend one of the sessions. The focus for the learning was on developing and/or refining an understanding of Proportional Reasoning in the Ontario Curriculum K-12; 'Doing the Math' in DSB teams; Strategies for Providing for Feedback using Asset Model stance.

- Each DSB was funded for up to 5 days of in-district mathematics expert time. In some DSBs, the math expert worked directly with teacher inquiry teams; in other DSBs she/he worked with school administrators and district facilitators. Some DSBs collaborated co-terminously and added extra days with the math expert. DSBs were able to select the math expert with whom they worked, provided the focus was related to the project.

- Math facilitators from each district are working with researchers from Queen's University Faculty of Education to become more effective in formulating an inquiry and in assessing and monitoring progress in the implementation work. The researchers and project coordinator have been spending two days within each DSB to provide support tailored to the district inquiry focus - to advise on how to assess and to document evidence of the learning of students and how to gauge the impact of strategies as they are being incorporated into classroom practice.

- In April, an inquiry team from each DSB was invited to attend the MISA/Math day where researchers from Queen's and the Student Achievement Division provided support on data analysis.

- In May, many members of the Steering Committee attended the OAME conference, funded by the Math project, where they attended workshops and plenaries by leading math educators. Exposure to different experts will be useful as we move into year two.

Consolidation of Year 1 Learning

District School Board Learning

A consolidation day was held in mid-May with 100 teacher/school administrator participants. From the table dialogue and the artifacts presented, some encouraging themes emerged:

- "Kids can do it!" – Teachers reported that students could meet high expectations in math
- "Math makes sense" – Teachers reported that *big ideas* in math help connect the different topics, strands, courses they teach – "I used to teach math compartments, now I teach connections"
- "Abandon the pie chart" – Teachers reported that student thinking is revealed in representation – they can see, hear and probe their reasoning through a variety of ways
- "Spreading the Joy of Math" - There is spread beyond the original inquiry groups – There were several examples of all grades tackling the same open problem – creating a school math community
- "Fluency instead of speed" – Teachers reported that think time, persevering time is important for deep learning
- "We can do it" – There was energy and optimism in the room – "When we have the same focus we can support each other".

As part of the consolidation process, steering committee members spent a second day analyzing the data from their own DSB with support from the Queen's researchers.

Regional Learning

Nearing the end of year 1 of the EOSDN Regional Math Project/study, the Queen's research partners gathered data from teacher participants, school administrators, math facilitators on the Steering Committee, and project leads. The combination of surveys and interviews adds to the classroom data from each district that is being analysed and studied and is presented in the developmental evaluation report and project poster.

Data Collection Year 1 (2013-2014)

Phase 2 (Year 1) of the evaluation involved collecting data on the effectiveness of EMP activities to meet the EMP's initial aim as stipulated in the program theory. The evaluation used a collaborative, developmental methodology to guide data collection and analyses. Data were collected from multiple participants including: project leads, district facilitators, teachers, school administrators, and expert learning partners (i.e., math and research experts). Data were collected in Spring 2014, at the end of Year 1 of the EMP, to provide an interim sense of the project's impact on participants' learning and practices, and to identify the structures that supported the project's success. In addition, data were obtained during project activities (i.e., Steering Committee sessions, DSB school visits, and year-end sharing sessions) to determine immediate and sustained value of project activities on professional learning and practice.

Table 1: *Data Collection by Participant Group (Year 1)*

Participant Group	Data Collection Activity	Number	Type of Data
Project Leads	Steering Committee Sessions	10	– Observation – Artifacts
	Project Lead Interview	2	– Interview
District Facilitators	Steering Committee Sessions	10	– Observation – Artifacts
	DSB Visits	9	– Observation
	Facilitator Survey	22	– Fixed-response – Open-response
	Facilitator Interview	9	– Interview
	DSB Inquiry Poster	9	– Artifact
Teachers	School Visits	6	– Observation – Artifacts
	Teacher Survey	184	– Fixed-response – Open-response
	Consolidation Day (May 14)	9	– Artifacts
School Administrators	School Visits	6	– Observation – Artifacts
	Administrator Survey	12	– Fixed-response – Open-response
Experts	Interview Questionnaire	4	– Interview

Data were primarily collected through qualitative methods including in-depth interviews and ethnographic observations (Patton, 2002). In addition, surveys were administered to district facilitators, teachers, and administrators to gain additional quantitative evidence on the impact of the EMP. These multiple data collection methods were used in order to triangulate findings and to established trustworthy results. Data tools (i.e., interview protocols, questionnaires, and surveys) are presented in Appendices B and C. Table 1 provides a summary of the data collection activities for each participant group.

Along with the two project leads, the EMP involved educators representing nine DSBs in the Eastern Ontario region: 700 teachers and 350 school administrators, and approximately 50 district facilitators from the nine DSBs in Eastern Ontario. The 22 district facilitators who regularly attended Steering Committee sessions completed surveys. Teacher surveys were distributed to five of nine the districts; this convenience sample was selected based on DSBs in which permission for external research was obtained. From these five DSBs, we received 184 surveys; however 20 of those surveys were from teachers who were not officially involved in the EMP. The response rate within these DSBs was 61.4% (see Table 2).

Table 2: *Teacher Survey Return Rate by DSB (Year 1)*

District School Board	Number of Teachers in Project	Number of Surveys Received	Survey Return Rate (%)
Algonquin Lakeshore Catholic (ALCDSB)	42	26	50.0
Catholic DSB of Eastern Ontario (CDSBEO)	48	30	62.5
Hastings Prince Edward (HPEDSB)	55	n/a	n/a
Limestone (LDSB)	68	n/a	n/a
Ottawa Carleton (OCDSB)	220	n/a	n/a
Ottawa Catholic (OCSB)	120	52	43.3
Renfrew Catholic (RCCDSB)	21	20	95.2
Renfrew County (RCDSB)	36	36*	100
Upper Canada (UCDSB)	90	n/a	n/a
Total	700	164**	61.4***

Note. *RCDSB aligned the EOSDN Math Project with their district's Junior Math Collaborative Inquiry and therefore had 56 teacher participants engaged in the professional learning. RCDSB submitted 56 teacher surveys for this evaluation, all of which were included in subsequent analyses because all 56 teachers received the same the professional learning content.
**Moving forward, teacher survey sample reported as n = 184.
***Return rate based on the 5 DSBs surveyed (n = 267).

School administrator surveys were also distributed to the five DSBs indicated above. Of the 132 administrators involved in the EMP from those five DSBs, only 12 returned surveys, a response rate of 9.0%. Due to the low response rate, administrator surveys were not included in subsequent data analyses; however, findings pertaining to administrators were captured in the data collected from project leads, facilitators, teachers, and experts.

Key Findings in Year 1: What matters most to participants' learning?

1. ***Readiness:*** *Recognizing and addressing educators' mindsets and previous learning experiences supports their engagement in collaborative professional learning.*

   Educators began the EMP with different degrees of comfort and experience with math pedagogy, inquiry, and data practices, which differentially impacted their learning journeys within the EMP. The project leads and experts acknowledged and were responsive to different degrees of readiness in promoting educators' knowledge acquisition and fluency of application of new learning in practice. In particular, our findings identified the importance of differentiated support in the professional development of district facilitators, and this would likely extend to teachers and school administrators as well.

2. ***Ownership:*** *Educators engaged in collaborative professional learning identify their own area of inquiry so the learning is meaningful and relevant to their role, context, and needs.*

   Project leads and district facilitators spoke about the "loose-tight" structure of the project that enabled educators, within the overall "enabling constraints" of project goals, to engage in inquiry meaningful to their respective contexts and needs. Although the EMP identified three key goals (i.e., building educator fluency in the areas of proportional reasoning and the process of representation in math), there was considerable latitude for all educators involved to determine an area of inquiry that was meaningful to them. This freedom appears to have increased educators' engagement in the EMP and broadened the range of inquiries occurring under the umbrella of the project.

3. ***Alignment:*** *Strategically aligning professional learning to a meaningful focus promotes a common language and depth and spread of learning among educators within a school district and across a region.*

   The purposeful alignment connecting the focus of the EMP with various, ongoing professional learning activities helped to create a project that was responsive to the needs of students, teachers, schools, districts, and the province. Such alignment also helped to ensure the EMP would be viewed as an integrated project within the larger school, district, and regional goals, rather than as a separate disconnected initiative.

4. ***Relationships:*** *Building trusting, supportive relationships among all participants involved promotes a culture in which educators can take risks in professional learning and practice.*

   Much of the success of the EMP was grounded in the professional relationships that developed throughout the first year of implementation. All of the participants reported the importance of trusting relationships as a support of collaborative professional learning and change in professional practice. As trusting relationships developed over the year, educators began to take more risks in their learning and practices. They also became more comfortable talking about challenges, barriers, and opportunities with colleagues and more willing to ask for support from experts and each other. As a result of these relationships, the regional learning and dialogue created a momentum that allowed educators to explore their thinking and learning more deeply around the goals of the EMP in their respective districts.

5. ***Intentionality:*** *Devoting time and personal resources to build fluency, support practice, monitor learning, and develop relationships contributes to meeting professional learning goals.*

Building professional fluency and changing professional practice occurs through intentional design and actions. It requires professional commitment supported with resources and opportunities to engage in learning, reflection, and dialogue. Educators in the EMP reported that having designated times to engage in learning, reflection, and dialogue with colleagues, supported by expert learning partners as appropriate, impacted their learning and practice. Educators also reported the need for flexible support in their own contexts as they explored and practiced implementing new learning in-between group sessions. There was general agreement that this support should be regular and ongoing, include feedback from colleagues and experts, and be individualized to the role and readiness of each educator.

Key Recommendations after Year 1

The following four recommendations were made to guide next steps for the EMP in Year 2 (2014-2015).

1. ***Cultivate depth and spread***

   Continue to focus on the EMP's goals, informed by emerging understandings about what matters most in building educators' fluency, to promote depth and spread of the learning. The direct involvement of fewer schools with more educators per school may support deeper implementation and precise monitoring of learning in schools and classrooms. An intentional focus on meeting the professional learning needs of secondary teachers and school administrators may increase the EMP's impact on these educators. All those involved in the EMP are encouraged to be cognizant of authentic opportunities to align the learning of this project with other district and school goals and professional learning initiatives to maximize the spread of learning.

2. ***Focus on assessment and monitoring***

   Continue to develop educators' assessment and monitoring strategies that are purposeful and responsive to learners' needs. Expert modelling and support of these practices is essential in all phases of learning and implementation and as new educators become involved in the EMP. Provide opportunities for facilitators to explore and practice these strategies in ways that minimize stress and concerns with trying "something new." This includes the extensive use of formative methods of assessment and developmental methods of monitoring. Further, work to develop common monitoring procedures and tools that not only meet quality requirements but also those of district facilitators and school educators.

3. ***Contribute to professional learning***

   Continue to find the balance that provides opportunities for professional judgment and ownership within a structure that allows the learning to be meaningful to participants and the broader educational community within the region and the goals of the EMP. Educators' learning must address individual goals as well as the goals of the project.

4. ***Rethink leadership***

   Explore important questions about leadership. Facilitators, school administrators, and teacher leaders all fulfill leadership roles. How do we develop and support leadership capacity among educators in each of these roles? How does building leadership capacity in facilitators, administrators, and teacher leaders contribute to spread of professional learning in schools and systems? Year 1 provided important opportunities to further develop the leadership skills of district facilitators. It will be important to continue to develop these skills while also helping teachers involved in the EMP to develop their own leadership skills related to the goals of the EMP and their inquiries. Such leadership models will further help to cultivate depth and spread.

Appendix B: Summary of Year 2 Project Activities

EOSDN Regional Mathematics "Closing the Gap" Project
Year 2 Activities (2014-2015)

During Year 2, the Steering Committee continued to use its monthly meetings for their own continued learning in the facilitation of adult learning of mathematics content and pedagogy and the systematic collection and analysis of evidence of adult and student learning. Over the first four meetings, DSB facilitators formally shared the DSB Year 1 Research Posters; the DSB Year 2 Inquiry Questions and/or Theories of Action; and the DSB Year 2 Data Collection Processes.

September: The group reviewed and reflected on the EOSDN Math Project Report from Year 1 one to determine the Steering Committee research focus for learning in Year 2. As well, the proposal for the Secondary Mathematics Focus was explained which included the goal, structure and costs.

October: Christine Suurtamm facilitated learning and discussions around the area of Mathematics teaching and learning: dilemmas, challenges and solutions through the lens of her research in this area. This learning was intended to further develop Math facilitator knowledge in the area of Mathematics teaching and learning.

November: Queen's University researchers shared their process for data collection for the Year 2 Evaluation Report which will explore the tensions identified in the Collaborative Inquiry in Ontario monograph. They provided a review of purposeful data collection process, and in DSB teams the Steering Committee reps discussed and planned strategies for Year 2 data collection.

January: With a focus on Assessment, Lorraine Giroux, EQAO School Support and Outreach, facilitated learning about EQAO Math Assessments and Proportional Reasoning. EQOA data from Eastern Ontario 2013-14 results was shared. The Steering Committee reps reflected on Years 1 and 2 to develop a potential focus for learning in Year 3, if funds were made available by the Ministry.

February: Facilitated by Queen's Researchers, Danielle LaPointe and Don Klinger, the February Steering Committee meeting provided Steering Committee reps the opportunity to analyze data that had been collected thus far in Year 2 of the EOSDN Math Project within their DSB.

March: The learning, sharing and discussions focused on Pedagogical Documentation facilitated by Sharon McNamara-Trevison, Colleen DeMille, Danielle LaPointe and Tammy Billen. The group reviewed the Pedagogical Documentation Revisited monograph in the context of their own DSBs. Student Work Study Teachers: Nikki Roy, Erik Lemke, Alison MacDougall, and Katie Williamson shared their experiences with regards to Pedagogical Documentation. Susan Davidson, Helene Coulombe and Kim Lacelle from OCSB then shared their DSB Pedagogical Documentation Learning journey. EOSDN Secondary Math Project representatives shared their learning journey thus far.

April: The Steering Committee planned for the EOSDN Math Project Consolidation Day on April 28. After reviewing 2014 Consolidation Day agenda, Steering Committee reps reflected on components of the day that would be maintained and provided suggestions for changes to enable rich sharing from Year 2 of the project.

Consolidation of Year 2 Learning

District School Board Learning

A consolidation day was held in late-April with approximately 100 teacher/school administrator participants. From the table dialogue and the artifacts presented, some encouraging themes emerged:

- "Planning a math task is planning for consolidation."—Teachers were increasingly focused on highlighting *big ideas* in math lessons through consolidation during instruction.
- "What is this student work telling me?"—Teachers engaged in pedagogical documentation, observing and listening to their students' current understandings to enable responsive instruction.
- "How do we move from presentations to conversations?"—Teachers fostered accountable talk among students in their math classrooms.
- "We need to engage in productive floundering!"—Teachers and students explored multiple ways of thinking about and solving math problems.
- "All students have an entry point."—Rich, open problems allowed all students to engage in problem solving tasks.
- "Get your toolbox!"—Manipulatives supported students' learning across K-12 classrooms.

As part of the consolidation process, steering committee members spent a second day analyzing the data from their own DSB with support from the Queen's researchers.

Regional Learning

Nearing the end of year 2 of the EOSDN Regional Math Project/study, the Queen's research partners gathered data from teacher participants, school administrators, math facilitators on the Steering Committee, and project leads. The combination of surveys and interviews adds to the classroom data from each district that is being analyzed and studied and is presented in the developmental evaluation report and project poster.

Data Collection Year 2 (2014-2015)

Phase 3 (Year 2) of the evaluation involved collecting data on the effectiveness of EMP activities to meet the EMP's initial aim as stipulated in the program theory. The evaluation used a collaborative, developmental methodology to guide data collection and analyses. Data was collected from project leads, district facilitators, teachers, school administrators, student achievement officers (SAOs), and expert learning partners at regular intervals throughout Phase 3 of the evaluation. Data were primarily collected through qualitative methods including in-depth interviews, open-response questionnaires, and ethnographic observations (Patton, 2002). In addition, surveys were administered to district facilitators, teachers, and school administrators to gain additional quantitative evidence on the impact of the EMP. These multiple data collection methods were used in order to triangulate findings and to establish trustworthy results. Data tools (i.e., interview protocols, questionnaires, and surveys) are presented in Appendices C and D. Table 1 provides a summary of the data collection activities for each participant group. [Note: The job action initiated in May 2015 precluded affiliated educators from participating in subsequent data collection activities.]

Table 1: *Data Collection by Participant Group (Year 2)*

Participant Group	Data Collection Activity	Number	Type of Data
Project Leads	Steering Committee Sessions	8	– Observation/Artifacts
	Project Lead Questionnaire	2	– Open-response
	Project Lead Interview	2	– Interview
	Consolidation Day (April 29)	9	– Artifacts
District Facilitators	Steering Committee Sessions	8	– Observation/Artifacts
	DSB Visits	7	– Observation/Artifacts
	Facilitator Survey	12	– Fixed-response – Open-response
	Facilitator Questionnaire	9	– Open-response
	DSB Inquiry Poster	5	– Artifact
Teachers	School Visits	7	– Observation/Artifacts
	Teacher Survey	113	– Fixed-response – Open-response
	Teacher Questionnaire	21	– Open-response
	Teacher Focus Group	6 (n=29)	– Interview
	Consolidation Day (April 28)	9	– Artifacts
School Administrators	School Visits	7	– Observation/Artifacts
	Administrator Survey	23	– Fixed-response – Open-response
	Administrator Questionnaire	2	– Open-response
	Administrator Interview	6	– Interview
Experts	Expert Questionnaire	4	– Open-response

Along with the two project leads, the EMP involved educators representing nine DSBs in the Eastern Ontario region: 400 teachers from 220 schools, and approximately 45 district facilitators from the nine DSBs in Eastern Ontario. Twelve of 45 district facilitators who regularly attended Steering Committee sessions completed surveys (response rate of 26.7%). We received 113 teacher surveys (response rate of 28.3%), and 23 administrator surveys (response rate of 10.5%; see Table 2).

Table 2: *Teacher and School Administrator Survey Return Rate by DSB (Year 2)*

District School Board	Number in Project[2]		Number of Complete Surveys		Survey Return Rate (%)	
	Teacher	Schools	Teacher	Admin	Teacher	Admin[3]
Algonquin Lakeshore Catholic (ALCDSB)	28	8	12	5	42.9	62.5
Catholic DSB of Eastern Ontario (CDSBEO)	32	8	24	5	75.0	62.5
Hastings Prince Edward[1] (HPEDSB)	30	9	14	3	46.7	33.3
Limestone[1] (LDSB)	33	18	2	3	6.1	16.7
Ottawa Carleton[1] (OCDSB)	113	117	2	0	1.8	0.0
Ottawa Catholic (OCSB)	80	31	37	0	46.3	0.0
Renfrew Catholic (RCCDSB)	14	9	13	5	92.9	55.6
Renfrew County[1] (RCDSB)	24	7	4	0	16.7	0.0
Upper Canada[1] (UCDSB)	46	13	5	2	10.9	15.4
Total	400	220	113	23	28.3	10.5

Note. [1]DSBs impacted by the job action during survey data collection.
[2]Includes numbers of teachers and schools represented in DSB project participation logs. [3]Administrator survey response rates are based on 1 administrator per school.

Key Findings in Year 2: What matters most to participants' learning?

1. ***Loose-Tight Structure:*** A focus on common project goals while supporting related, nested district, school, and classroom inquires responsive to local needs and priorities fosters educator engagement.

   In our Year 1 evaluation report, both project leads and district facilitators spoke about the "loose-tight" structure of the project that enabled educators, within the overall "enabling constraints" of the EMP, to engage in inquiry meaningful to their respective contexts and needs. Despite this latitude, Year 1 specific inquiries were closely related to the regional EMP goals. In Year 2, the value of the "loose tight" structure became increasingly apparent in three primary ways. First, at the start of Year 2, district facilitators, along with research experts, project leads, and SAOs, co-developed four precise regional guiding questions. These questions were grounded in the Year 1 EMP evaluation findings, and were nested within, but distinct from, the three overarching project goals. Second, district facilitators pursued selected regional guiding questions in their districts and developed related DSB inquiry foci that were precise and relevant to the needs of educators in their district's schools and classrooms (Table 2). Third, district facilitators provided opportunities for educators in schools and classrooms to pursue meaningful areas of inquiry nested within their identified DSB inquiries. These nested regional inquires across regional contexts (see Figure 1) supported the dual professional learning purposes of: (a) attaining systemic instructive professional learning goals (i.e., developing new knowledge and instructional practices in math grounded in theory and aligned with curriculum); and (b) fostering active engagement of educators in personal professional learning goals relevant and meaningful in their current contexts of practice. Further, the sharing of these connected but distinct inquiries enabled those across the region to learn from the experiences of others.

2. ***Sustained Focus:*** A continued regional focus on project goals and research-based strategies cultivates depth and spread.

   The EMP's sustained focus on the three overarching goals in Year 2 supported depth of professional learning and the development of a common knowledge and understanding of math teaching and learning through the big idea of proportional reasoning among participants. Among other benefits, the result has been an emerging common math language across the region—facilitating rich professional dialogue among educators and contributing to shifts in district, school, and classroom math culture. Moreover, the EMP provided recurring opportunities for educators to engage in reflective, collaborative professional learning and dialogue within and across regional contexts. Professional learning and dialogue was most commonly supported by district facilitators, however in some cases, school-based educators involved in the project for the second year took on informal leadership roles, fostering the spread of learning to educator colleagues within and outside the EMP. It was apparent throughout the EMP, that changes in the "math culture" within participating schools and teachers' instructional practices require time, resources and sustained effort.

3. ***Increased Precision:*** As educator fluency and understanding of systematic inquiry develops, the focus of learning and implementation becomes increasingly precise.

   Building on the collective learning experiences and emerging fluency during Year 1, EMP participants pursued more precise professional learning goals in Year 2, with an increased focus on implementation of professional learning in the context of practice. Specifically, educators focused their learning on more precise content areas (e.g., understanding fractions through the linear model, developing multiplicative thinking in primary grades), linked to more explicit pedagogical practices (e.g., questioning, diagnostic assessment, pedagogical documentation, consolidation, use of manipulatives), and supported by triangulation of purposefully collected evidence (products, conversations, and observations) to demonstrate educator and student learning within and across contexts.

4. ***Supported Implementation:*** The provision of responsive, context-embedded support for educators promotes transfer of learning into practice**.**

   Grounded in Year 1 collaborative evaluation findings and acknowledging the importance of opportunities to apply professional learning in the context of practice, the EMP prioritized organizational support for increased context-embedded support throughout Year 2. This support was differentiated and responsive to local educators' needs and manifested in two primary ways. First, the EMP provided regular opportunities for knowledgeable others (district facilitators, math and research experts) to support the implementation of new math pedagogy and inquiry processes. These knowledgeable others enriched educators' learning and supported educators' risk taking within their own professional practice. Second, educators worked with colleagues, who had shared interests, to explore professional learning goals and support each other's implementation of learning and resulting pedagogy within their own practice. Educators valued these critical opportunities to work with such colleagues as they collectively developed fluency with math pedagogy and inquiry processes.

5. ***Collaborative Leadership:*** Processes that enable educators to work together within and across regional contexts provide valuable supports that enhance the development and attainment of: (1) professional learning goals; (2) shifts in learning culture; and (3) educational leadership.

   Rooted in professional relationships that developed during Year 1, collaborative leadership among educators emerged within and across contexts in Year 2. This collaborative leadership was central to the success of the EMP and evident in multiple ways including: (1) the project leads and research experts facilitating regional learning at Steering Committee sessions; (2) district facilitators working collaboratively to support regional, district, and school learning; (3) district facilitators, school administrators, and teachers collectively leading learning in schools; and (4) teacher teams in schools supporting the learning of administrators, peers, and students. We recognized the value of collaborative leadership among educators to foster the spread of EMP learning across the region and shifting the regional math culture, specifically cultivating growth and inquiry mindsets among educators and students. Furthermore, collaborative leadership contributed to meaningful learning within and across regional contexts that provided educators with opportunities to move beyond sharing professional ideas and experiences to collaboratively generating new professional knowledge.

Key Recommendations after Year 2

The following four recommendations were identified to guide next steps for the EMP in Year 3 (2015-2016).

1. ***Promote spread and sustainability***

   Continue to focus on regional project goals and "loose-tight" nested inquiry structure, but adopt common professional learning models (e.g., Lesson Study) and focus on key practices (e.g., pedagogical documentation) that have the potential to support regional math learning and instructional practice throughout Year 3 and beyond. Common models and key practices should be collaboratively determined by Steering Committee members at the outset of Year 3.

2. ***Cultivate further collaborative leadership.***

   Leverage district facilitators and math experts, in conjunction with common professional learning models and foci, to develop school-based collaborative leadership teams among teachers and school administrators. These teams may play a central role in adapting, sustaining, and spreading new math pedagogical practices and shifting math culture in schools and classrooms across the region in Year 3 and beyond the EMP's funding.

3. ***Focus precise support on assessment and monitoring.***

   Provide differentiated, responsive support for educators in all regional contexts to further develop educators' fluency with assessment and monitoring. Ensure that these strategies are purposeful and responsive to learners' needs and leverage expert modelling and support of learning and implementation as appropriate in districts, schools, and classrooms. Further, work to develop common monitoring procedures and tools that not only meet quality requirements but also those of district facilitators and school educators.

4. ***Identify models and methods to examine the impact of inquiry efforts to impact students' learning.***

   Along with a focus on assessment and monitoring for the purposes of teaching and learning in the classroom context, it will also be critical to expand these assessment and monitoring efforts to provide links between professional inquiry efforts and subsequent student learning. As one example, educators involved in the project may now have the skills to develop a "theory in action" for their specific inquiries. These theories in action can enable those in involved in systematic inquiry to more explicitly identify the intended impacts of their efforts on students' educational outcomes.

Appendix C: Summary of Year 3 Project Activities

EOSDN Regional Mathematics "Closing the Gap" Project
Year 3 Activities (2015-2016)

Project activities for Year 3 of the EOSDN Math Project followed a similar structure as Year 1 and 2, in that regional Math leads attended monthly Steering Committee meetings. The learning at these sessions shifted from facilitation of educator learning of mathematics content and pedagogy to developing 'collaborative leadership' within district school boards to promote sustainability and spread. As in the first two years of the project, Queen's Researchers continued to support and/or refine the systematic collection and analysis of evidence of educator and student learning. All Steering Committee meetings were co-planned and co-facilitated by Tammy Billen (Project Coordinator) and Danielle LaPointe-McEwan (Queen's researcher).

September: Steering Committee reps reviewed and reflected on the EOSDN Math Project Developmental Report from Year Two, with a focus on the Key Findings and Recommendations for the purpose of DSBs developing their EOSDN Math plans for year three. DSB teams were also completed a Needs Assessment Survey for the purpose of determining next steps for Steering Committee meeting learning.

October: The objective of this meeting was to give regional Math reps the opportunity to think, discuss and reflect on personal and DSBs ideas of 'Developing Collaborative Leadership'. Discussions were facilitated through questions pertaining to educator leadership; learning structures; mathematical fluency; and data collection and analysis. The Ontario Leadership Framework was used as a framework for reflecting and planning forward.

Shelley Yearley, Provincial Math Lead, shared experiences with modified Lesson Study and ideas for implementing this learning structure in the EOSDN project. The intent of this sharing was to give reps the opportunity to think about a learning structure that would meet the needs of the learners involved in the EOSDN Math Project.

November: Reviewing and reflecting on the EOSDN Math Project Regional learning from Year 2, reps determined regional and DSB guiding questions for Year 3. Reps planned and/or reflected on their year 3 DSB plan, revisiting the Key Recommendations from the Year 2 report to ensure plans aligned with these recommendations. The Steering Committee collectively worked through a process of determining the guiding questions for learning regionally that would be addressed at subsequent monthly Steering Committee meetings. Don Klinger and Danielle LaPointe-McEwan, Queen's Researchers supported team in developing DSB inquiries and guiding questions.

January: The learning focused on mathematics content for teaching, and instructional strategies to meet teacher and student need. Sharon McNamara-Trevisan and Ruth McNulty (Student Achievement Officers) shared an overview of the big ideas from the MISA "Celebration of Thinking through Collaboration" with Peter Liljedahl. Shelley Yearley (Provincial Math Lead) and Ross Isenegger (Provincial Math Lead, Digital Resources) facilitated learning in the area of fractions referencing resources (e.g. Fractions Learning Pathways and Math digital resources) to support educator learning. DSB teams were provided time to reflect and plan next steps when considering the learning from the day and the EOSDN Math project regional inquiry and guiding questions.

March 30 and 31:
March 30: Reps reflected on their EOSDN Math plans and learning from the 2015-16 year. DSBs shared a three-minute 'Public Service Announcement' that captured their DSB Inquiry Question(s), Celebrations and Tensions. The professional learning cycle was used as the framework by which DSBs reflected, shared and planned forward.
March 31: This regional networking session included representation from the MISA and EOSDN Math groups. Rachel Ryerson (Ministry of Education) facilitated the learning of 'Ethical Use of Pedagogical Documentation'.

April: The Steering Committee planned for the EOSDN Math Project Consolidation Day scheduled for May 10, 2016. After reviewing 2015 Consolidation Day agenda, Steering Committee reps reflected on components of the day that would be maintained, provided suggestions for changes to enable rich sharing from Year 3 of the project, and in teams planned the consolidation day. The teams were cognizant of framing the day in a manner that would encourage discussions about 'collaborative leadership' within their DSB.

May: Meeting the day following the Regional Consolidation, reps shared the reflections from the teachers and administrators who participated in the EOSDN Math this year. Reps began analyzing DSB data using Year 3 guiding questions as a framework.

In May, some Steering Committee members also presented their learning from the project at the OAME and/or CAfLN Conferences and attended relevant workshops conducted by math and assessment experts in the field.

June: Steering Committee reps consolidated their DSB data into a summary report and created a poster representing the learning journey within their district. The poster becomes part of the report to the Ministry of Education.

Consolidation of Year 3 Learning

District School Board Learning

A consolidation day was held in May with 100 teacher/school administrator participants. From the table dialogue and the artifacts presented, some encouraging themes emerged:

- "Don't over-structure the learning."—Many school teams focused on cultivating students' understanding through spiraling of *big ideas* in the math curriculum.
- "What does evidence of success look like?"—District- and school-based educators collected multiple sources of classroom evidence to demonstrate impacts on students' learning.
- "Teachers need to collectively own the learning."—School-based inquiry teams identified and explored local needs and goals within the project.
- "Assessment build relationships."— Students valued personalized, targeted oral feedback from teachers.
- "Spread is happening."—District facilitators and school-based inquiry teams shared new learning and strategies with colleagues not officially involved in the project.

As part of the consolidation process, steering committee members spent a second day analyzing the data from their own DSB with support from the Queen's researchers.

Regional Learning

Nearing the end of Year 3 of the EOSDN Regional Math Project/study, the Queen's research partners gathered data from teacher participants, school administrators, district math facilitators on the Steering Committee, and project leads. The combination of surveys and interviews adds to the classroom data from each district that is being analyzed and studied and is presented in the developmental evaluation report and project poster.

Data Collection Year 3 (2015-2016)

Phase 4 (Year 3) of the evaluation involved collecting data on the effectiveness of EMP activities to meet the EMP's initial aim as stipulated in the program theory. The evaluation used a collaborative, developmental methodology to guide data collection and analyses. Data was collected from project leads, district facilitators, teachers, school administrators, student achievement officers (SAOs), and expert learning partners at regular intervals throughout Phase 4 of the evaluation. Data were primarily collected through qualitative methods including in-depth interviews, open-response questionnaires, and ethnographic observations (Patton, 2002). In addition, surveys were administered to district facilitators, teachers, and school administrators to gain additional quantitative evidence on the impact of the EMP. These multiple data collection methods were used in order to triangulate findings and to establish trustworthy results. Table 1 provides a summary of the data collection activities for each participant group.

Table 1: *Data Collection by Participant Group (Year 3)*

Participant Group	Data Collection Activity	Number	Type of Data
Project Leads	Steering Committee Sessions	10	– Observation – Artifacts
	Project Lead Interview	2	– Interview
District Facilitators	Steering Committee Sessions	10	– Observation – Artifacts
	DSB Visits	9	– Observation
	Facilitator Survey	22	– Fixed-response – Open-response
	Facilitator Interview	9	– Interview
	DSB Inquiry Poster	9	– Artifact
Teachers	School Visits	6	– Observation – Artifacts
	Teacher Survey	184	– Fixed-response – Open-response
	Consolidation Day (May 14)	9	– Artifacts
School Administrators	School Visits	6	– Observation – Artifacts
	Administrator Survey	12	– Fixed-response – Open-response
Experts	Interview Questionnaire	4	– Interview

Along with the two project leads, the EMP involved educators representing nine DSBs in the Eastern Ontario region: 700 teachers and 350 school administrators, and approximately 50 district facilitators from the nine DSBs in Eastern Ontario. The 22 district facilitators who regularly attended Steering Committee sessions completed surveys. Teacher surveys were distributed to five of nine the districts; this convenience sample was selected based on DSBs in which permission for external research was obtained. From these five DSBs, we received 184 surveys; however 20 of those surveys were from teachers who were not officially involved in the EMP. The response rate within these DSBs was 61.4% (see Table 2).

Table 2: *Teacher Survey Return Rate by DSB (Year 3)*

District School Board	Number of Teachers in Project	Number of Surveys Received	Survey Return Rate (%)
Algonquin Lakeshore Catholic (ALCDSB)	42	26	50.0
Catholic DSB of Eastern Ontario (CDSBEO)	48	30	62.5
Hastings Prince Edward (HPEDSB)	55	n/a	n/a
Limestone (LDSB)	68	n/a	n/a
Ottawa Carleton (OCDSB)	220	n/a	n/a
Ottawa Catholic (OCSB)	120	52	43.3
Renfrew Catholic (RCCDSB)	21	20	95.2
Renfrew County (RCDSB)	36	36*	100
Upper Canada (UCDSB)	90	n/a	n/a
Total	700	164**	61.4***

Note. *RCDSB aligned the EOSDN Math Project with their district's Junior Math Collaborative Inquiry and therefore had 56 teacher participants engaged in the professional learning. RCDSB submitted 56 teacher surveys for this evaluation, all of which were included in subsequent analyses because all 56 teachers received the same the professional learning content.
**Moving forward, teacher survey sample reported as n = 184.
***Return rate based on the 5 DSBs surveyed (n = 267).

Key Findings in Year 3: What matters most to participants' learning?

1. ***Educator Fluency:*** Educators leverage previous learning and experiences within the project, exercising sound professional judgment, based on knowledge of math content and processes as well as evidence-use.

   Educators' fluency continued to develop in Years 1 and 2 of the EMP, providing a foundation for multifaceted inquiries and professional learning goals in Year 3. Specifically, district facilitators leveraged previously developed capacity in inquiry processes and evidence-use to more independently identify meaningful areas of inquiry, prioritize and plan for purposeful data collection, and analyze and use evidence to inform math teaching and learning in their DSBs. These processes continued to be supported by research experts in Year 3, however this support became more precise and responsive to the current fluency and goals of district facilitators. In addition, school-based educator teams (i.e., classroom teachers, student support teachers, and school administrators) involved in the project for multiple years pursued precise professional learning and practice goals, rooted in previous learning and related to specific instructional practices and approaches to classroom assessment. These teams leveraged their developing fluency to determine how more knowledgeable-others (i.e., district facilitators, learning partners, and math experts) and research-based resources would be used to support their collective learning.

2. ***Embedded Learning:*** As educators develop fluency, they prioritize personalized learning opportunities, embedded within their respective contexts of practice and rooted in local educator and student needs.

   While regional learning sessions were necessary in EMP Years 1 and 2 to build educators' foundational knowledge specific to the project's goals, these sessions were less important for educators in Year 3. In particular, educators involved in the project for multiple years preferred opportunities to more deeply explore their beliefs and practices, and implement new strategies within their respective contexts of practice. For example, embedded learning opportunities allowed DSB-based teams (i.e., district facilitators) to plan for purposeful inquiry and data collection, adapt professional learning models, and determine math content foci in alignment with their BIPSAs. Likewise, embedded learning opportunities allowed school-based educator teams to collectively explore classroom implementation and analyze evidence of math teaching and learning from students in their own schools.

3. ***Evidence-informed Practice:*** Collecting, analyzing, and using multiple sources of data over time enhances and demonstrates the project's impacts on math teaching and learning in the region, DSBs, schools, and classrooms.

   Educators in DSBs, schools, and classrooms focused their efforts in Year 3 on evidence-informed practice, supported by the language and processes of AfL In particular, district facilitators engaged in systemic AfL—they developed DSB inquires and associated professional learning goals; developed success criteria for professional learning outcomes; identified potential data sources that could provide evidence of professional learning outcomes—including products, observations, and conversations; collected these data from multiple stakeholders over

time; and analyzed sources to inform subsequent learning and practice. School-based educators engaged in similar processes, prioritizing classroom data obtained through pedagogical documentation and diagnostic assessments to inform local professional learning and practice. In these ways, educators leveraged evidence to inform and demonstrate impacts of the project within and across regional contexts.

4. ***Collaborative Leadership:*** Educator fluency, coupled with embedded learning opportunities and trusting professional relationships, contributes to collaborative leadership among educators in the region, DSBs, and schools.

Educators involved in the project for multiple years emerged as collaborative leadership teams in Year 3. District facilitators contributed knowledge constructed within the EMP (e.g., math pedagogy, facilitation, inquiry processes) to educators involved in concurrent provincial and DSB-based initiatives. Furthermore, these district facilitators shared important insights from their EMP experiences during provincial and DSB planning sessions regarding the Renewed Math Strategy to be enacted in Year 4. School-based educators involved in the project for multiple years shared excitement about their EMP learning with colleagues not officially involved in the project, modelling new instructional strategies and assessment approaches and distributing research-based resources to spread learning within their schools.

5. ***Collective Ownership:*** As educators' fluency and collaborative leadership emerge, collective ownership of shared professional learning goals, reflective of local educator and student needs, is increasingly important.

In Year 3, professional learning goals were less focused on individual needs and interests and more focused on collective needs and interests. District facilitators across the nine DSBs readily developed and agreed upon regional guiding questions for Year 3, based on evidence of educator and student learning from Year 2 regional and DSB inquires. Moreover, Year 3 guiding questions were more interrelated than those developed in Year 2, reflecting cohesive regional learning priorities. Similarly, school-based educator teams pursued professional learning goals that targeted educator and student needs across classrooms within their schools. In previous years, individual educators generally set goals specific to their practice in their own classrooms. However, in Year 3 teams of school-based educators who had been involved in the EMP for multiple years moved toward setting common goals for students across their collective classrooms and, in some cases, across the entire school. This accelerated the learning and engagement of those teachers newly entering the project. Accordingly, regional, DSB, and school-based educators began to take collective ownership of educator and student learning within and across regional contexts—moving away from thinking about 'my students' and 'your students', toward thinking about 'our students'.

Key Recommendations after Year 3

The following four recommendations were identified to guide next steps for the EMP in Year 4 (2016-2017).

1. ***Sustain the "loose-tight" focus.***

   Continue to focus on the overarching project goals but allow DSB- and school-based teams to adapt various professional learning models (e.g., collaborative inquiry, lesson study) and explore meaningful areas of inquiry that target local educator and student needs in math. This is particularly important for educators who have been involved in the project for multiple years—these educators require latitude to explore precise areas of inquiry in more depth than educators who are new to the project. Such initiatives should be supported by relevant experts internal or external to the school district and the region.

2. ***Cultivate and refine approaches to collaborative leadership through regional learning sessions.***

   Devote regional learning time (i.e., selected Steering Committee sessions) to cultivating and reining approaches to collaborative leadership among DSB teams of school-based educators. Moreover, recognize that these school-based educators will likely require explicit opportunities to build foundational knowledge in math teaching and learning, facilitation, and evidence-use, thus enhancing their capacity to foster and spread changes in practice and culture among colleagues within their schools.

3. ***Prioritize personalized, embedded learning opportunities for educators, supported by more knowledgeable-others and/or research-based resources.***

   Provide educators with personalized learning opportunities embedded within their respective contexts of practice in order to attain desired EMP impacts. While central sessions are valuable for foundational knowledge building and networking, embedded learning supported by more knowledgeable-others enables professional learning and dialogue that is meaningful and relevant to local educators' and students' needs. In addition, develop internal capacity among district- and school-based educators in order to sustain this embedded learning beyond the project's funding.

4. ***Collect evidence of impact on students' learning in alignment with the Renewed Math Strategy in order to inform provincial math goals.***

   Continue to collect, analyze, and use evidence of the project's impact on students' math learning through various methods (e.g., pedagogical documentation, diagnostic assessment, formative assessments, large-scale assessments). However, as appropriate, align these efforts with the Renewed Math Strategy in order to explicitly inform provincial needs and goals for students in math. Continue to prioritize building district- and school-based educators' capacity to leverage quantitative and qualitative evidence to inform and monitor instructional practices and student learning outcomes.

Appendix D: Summary of Year 4 Project Activities

EOSDN Regional Mathematics "Closing the Gap" Project
Year 4 Activities (2016-2017)

Project activities for Year 4 of the EOSDN Math Project followed a revised structure that enabled collaborative leadership within and across regional, district, and school contexts. As in the first three years of the project, Queen's Researchers continued to support and/or refine the systematic collection and analysis of evidence of educator and student learning. All Steering Committee meetings were co-planned and co-facilitated by Eleanor Newman (Project Director), Tammy Billen (Project Coordinator), and Danielle LaPointe-McEwan (Queen's researcher) and attended by Ministry of Education personnel (i.e., Senior Education Specialist, Regional Student Success Lead, and Student Achievement Officers).

Month	**Steering Committee Participants**
September	district facilitators (math and student support leads)
October	district facilitators (math and student support leads), EMP school administrators
November	district facilitators (math and student support leads), EMP school teams (school administrators, support teachers, classroom teachers)
December	district facilitators (math, student support, and TELT leads)
January	district facilitators (math, student support, and TELT leads), EMP school administrators
February	district facilitators (math, student support, and TELT leads), EMP school teams (school administrators, support teachers, classroom teachers)
March	district facilitators (math and student support leads)
April	district facilitators (math and student support leads)
May	Day 1: district facilitators (math, student support, and TELT leads), EMP school teams (school administrators, support teachers, classroom teachers) Day 2: district facilitators (math, student support, and TELT leads), school administrators
June	district facilitators (math and student support leads)

Note. TELT = Technology Enabled Learning and Teaching.

July: - Regional superintendents and district math facilitators from the nine DSBs attended a special EOSDN Learning Session with a focus on the Renewed Mathematics Learning Strategy (RMS). EOSDN Math Project leads shared an overview of the RMS, and specifically the advice and direction pertaining to Teaching and Learning, Goals for Students, Classroom Pedagogy, Special Education and Curriculum. The EOSDN Math Project leads also summarized the 'Five Key Areas for Professional Thinking' from the EOSDN project and described how these areas support and align with the RMS.

September: District facilitators (math and student support leads) reviewed the Ontario Ministry of Education Renewed Math Strategy, and how the learning gleaned from the EOSDN Math Project would support RMS work in DSBs. The group also reviewed the whole-school approach of the 2016-17 EOSDN Math Project, which brings the project into tighter alignment with the RMS. Danielle LaPointe-McEwan (Queen's Researcher) summarized the findings and recommendations

from the Year 3 developmental evaluation report. The group considered the perspectives of policy, practice and research for the purpose of refining and/or developing new regional guiding questions for the current year.

October: School administrators engaged in the regional project joined the district facilitators for this learning session. Tammy Billen and Danielle LaPointe-McEwan shared an overview of the EOSDN Math Project regional inquiry questions and guiding questions for 2016-17. Participants reviewed the Ontario Ministry of Education Renewed Math Strategy, and its alignment with the EOSDN Math Project, as well as an overview of the structure and goals of the 2016-17 EOSDN Math Project. DSB teams reviewed the template for "Designing Effective Professional Collaborative Inquiry for Student Learning" and how this model aligns with learning within their DSB and school contexts. Administrators shared school strengths, needs and plans for addressing Mathematics within each of their schools with their DSB team. The group determined that the learner profiles of *students of mystery* would form a basis for planning and collaboration at each school.

November: School administrators and teachers involved in the regional Math Project joined with the district facilitators (math and student support leads). The group reviewed the overview of the EOSDN Math Project regional inquiry question and guiding questions for 2016-17 to provide a context for those who had not participated in the EOSDN Math Project to date. Danielle LaPointe-McEwan then shared the 'Revised Nested Regional Inquiry Model', explaining how this model aligns with the EOSDN Math Project and with the RMS. When considering the RMS renewed emphasis on Balanced Mathematics, DSB teams reflected on their current thinking about practices related to 'Balanced Mathematics' and created a mind map. Using a SWST-like stance, participants focused on school-identified *students of mystery* and used the 'Designing Effective Professional CI for Student Learning' framework for DSB teams (district facilitators, school administrators, support teachers, and classroom teachers) to develop DSB plans. Colleen DeMille and Tammy Billen sharing a possible process of utilizing Connie Quadrini and YCDSB's resource, *Supporting Students with Learning Disabilities in Mathematics* to address student needs.

December: Technology Enabled Learning and Teaching (TELT) leads from each DSB joined the district facilitators (math and student support leads). The focus for learning was 'Enhancing Precision in our Work' when considering the goals of the EOSDN Math Project, RMS, and DSB goals. Teams reviewed their EOSDN Math Project data collection plans, with a focus on the *students of mystery* and a whole school approach to meeting student needs. TELT leads contributed to DSB discussions as to how they could collaboratively support DSBs with a focus on the context of the EOSDN Math Project. Tracy Joyce and Heidi Ferguson (math facilitators, RCCDSB) shared a process for utilizing the YCDSB's *Supporting Students with Learning Disabilities in Mathematics* document to support teacher and student learning. DSBs discussed how this document could support teachers involved in the EOSDN Math Project to address student needs with focused intention and precision.

January: District facilitators (math and student support leads), school administrators, and Technology Enabled Learning and Teaching (TELT) leads were present. The objective for this meeting was to provide the opportunity to learn from each other about the use of assessment strategies, learner profiles, and pedagogical approaches in DSBs. District facilitators and school administrators reflected on their current processes and strategies, planning forward to meet the

needs of both educators and students involved in the EOSDN Math Project. Participants shared artifacts, processes and strategies in a gallery walk. School administrators shared specific school needs with TELT contacts in the area of Mathematics, the LD learner, and technology. Collectively, regional needs were identified. District facilitators shared processes for utilizing math resources provided by EOSDN with the purpose of supporting educator learning as a district and within schools.

February - School administrators and teachers (classroom and support) involved in the regional Math Project joined with the district facilitators (math, student support, and TELT leads). The group revisited the 'Revised Nested Regional Inquiry Model' – starting with the 'student' - explaining how this model aligns with the EOSDN Math Project and the RMS goals. DSB teams further refined their thinking about learner profiles using the *Learning for All* document for the purpose of developing profiles for each of their identified *students of mystery*. RCCDSB Steering Committee reps shared their process for meeting the LD learner needs utilizing Connie Quadrini and YCDSB's resource, *Supporting Students with Learning Disabilities in Mathematics*. The afternoon was facilitated by regional TELT leads, addressing technology needs identified at the January meeting.

March: District facilitators (math and student support leads) participated in the Ministry of Education's Virtual Learning Session facilitated by Connie Quadrini in the morning, with a focus the LD learner in Mathematics. In the afternoon, district facilitator shared processes for data collection with regards to DSB and EOSDN goals, and monitoring and documentation processes used for *students of mystery*.

April: The agenda for the day was to plan for the EOSDN Math Project Consolidation Day in May. After reviewing 2016 Consolidation Day agenda, district facilitators (math and student support leads) reflected on components of the day that would be maintained and provided suggestions for changes to enable rich sharing from Year 4 of the project. District facilitators then divided into three teams, to plan the Minds On, Regional Sharing Time, and Professional Learning for the day. Administrators involved in the project were invited to participate in a teleconference during this planning day for the purpose of district facilitators sharing plans and seeking feedback concerning the Consolidation Day.

May: Meeting the day following the Regional Consolidation, district facilitators analyzed DSB data using exit card responses from the Regional Consolidation day. District facilitators then shared the reflections from their teachers and administrators who participated in the EOSDN Math this year.

June: District facilitators (math and student support leads) further analyzed the exit cards from the Regional Consolidation day from a regional perspective using the 2016-17 guiding questions as a framework for analysis. Facilitators then consolidated their DSB data and created a poster representing the learning journey within their district. The DSB posters are included in the Appendix of this evaluation report to the Ministry of Education.

Consolidation of Year 4 Learning

District School Board Learning

A consolidation day was held in May with 137 participants. These participants included district facilitators (math, student support, and TELT leads), school administrators, teachers (classroom and support), and Student Achievement Officers. From the professional dialogue and the artifacts constructed by DSB teams, some encouraging themes emerged:

- "What can they do? How can I build on that?"—Developing asset-based learner profiles for *students of mystery* enhances precision in professional learning and practice.
- "Necessary for some, good for all…"—Focusing on supporting *students of mystery* helps educators support the learning of all students.
- "Assessment practices are changing."—School teams are relying less on products and assessing more through observations and conversations.
- "A whole-school approach is emerging."—School administrators and support teachers are supporting in-between work with classroom teachers.
- "Spread is happening."—District facilitators (math, student support, and TELT leads) are collaborating and spreading EMP learning within DSBs.

As part of the consolidation process, steering committee members spent a second day analyzing the data from their own DSB with support from the Queen's researchers.

Regional Learning

Toward the end of Year 4 of the EOSDN Regional Math Project/study, the Queen's research partners gathered data from teacher participants, school administrators, district facilitators on the Steering Committee, and project leads. The combination of surveys and interviews adds to the classroom data from each district that is being analyzed and studied and is presented in the developmental evaluation report and project poster.

Appendix E: Data Collection Protocols

Project Lead Interview Protocol/Questionnaire

The purpose of this questionnaire is to gather information regarding your experiences with the EOSDN Math Project (2016-2017). We greatly appreciate your time and insights regarding the project.

1. How has your involvement in this project impacted your thinking about collaborative inquiry, teaching, and learning in math?

2. What specific evidence do you have that the EOSDN math project has had an impact on math teaching and learning in the region?

3. How has the RMS influenced your work within the EOSDN math project over the past year?

4. Thinking about this EOSDN initiative, what are the greatest needs for the DSBs and educators involved?

5. If you could make 2 suggestions for the next phase of the EOSDN math initiative, what would you suggest?

District Facilitator Interview Protocol/Questionnaire

The purpose of this questionnaire is to gather information regarding your experiences with the EOSDN Math Project (2016-2017). We greatly appreciate your time and insights regarding the project.

1. How has your involvement in this project impacted your thinking about collaborative inquiry, teaching, and learning in math?

2. Describe the supports within the project that have contributed most to your learning.

3. How has your involvement in this project impacted your work as a district facilitator and your board's culture around math teaching and learning?

4. How has your involvement in this project impact your implementation of the provincial RMS in your board?

5. What specific evidence do you have that the EOSDN math project is having a positive impact on math teaching and learning in your board?

6. Talk to me about how your approach to collaborative inquiry in math has evolved over this past year.

7. Thinking about this EOSDN initiative, what are some of the challenges you faced?

8. What would you suggest to improve the EOSDN math project?

Teacher Questionnaire

The purpose of this questionnaire is to gather information regarding your experiences with the EOSDN Math Project (2016-2017). We greatly appreciate your time and insights regarding the project.

1. How has your involvement in this project impacted your thinking about collaborative inquiry, teaching, and learning in math?

2. Describe the supports within this project that have contributed most to your learning.

3. How has your involvement in this project impacted your teaching practice, students' learning, and classroom culture around math?

4. What specific evidence do you have that the knowledge and skills you are learning in this project are supporting your teaching practice and your students' learning in math?

5. Talk to me about how your approach to collaborative inquiry in math has evolved over this past year.

6. Thinking about this EOSDN initiative, what are some of the challenges you have faced?

7. What would you suggest to improve this EOSDN math project?

Educator Exit Card
(Consolidation Day Participants: District Math Facilitators, Student Support Leads, TELT Leads, School Administrators, Support Teachers, Classroom Teachers)

1. Share key evidence of impact on "Student(s) of Mystery" mathematical learning in your DSB.

2. How has involvement in the project impacted educator thinking about teaching and learning in mathematics?

3. What learning and thinking connected with/challenged/extended educator learning and thinking in your DSB over the past year?

4. What supports are needed by educators in your DSB to move forward?

Appendix F: Surveys with Item Descriptives

District Facilitator Survey

The purpose of this survey is to learn about your experiences in the EOSDN Closing the Gaps in Math Project. Please respond to the questions based on your experiences during the 2016/2017 school year. This survey will take approximately 15 minutes to complete. We greatly appreciate your time and insights.

1.	**a. What has been your level of direct involvement in the EOSDN Math Project? (*1 = not at all, 5 = extremely*)**	**Mean** 4.44	**SD** 0.70
	b. How many years have you been involved in the EOSDN Math Project? (0-1, 1-2, 2-3, >3)	2.94	1.21
2.	**To what extent has the EOSDN Math Project impacted your: (*1 = not at all, 5 = a great deal*)**	**Mean**	**SD**
a.	Knowledge around math teaching and learning	4.11	0.90
b.	Confidence in your role as a facilitator/consultant/coach/coordinator in math	4.29	0.77
c.	Fluency with *big ideas* in the math curriculum (e.g., proportional reasoning)	4.11	0.76
d.	Ability to ask questions of teachers regarding math teaching and learning	4.06	0.80
e.	Ability to provide feedback to teachers regarding math teaching and learning	4.17	0.79
f.	Ability to facilitate math learning with teachers to promote further thinking	4.06	0.73
g.	Ability to ask questions of administrators regarding math teaching and learning	3.61	1.20
h.	Ability to provide feedback to administrators regarding math teaching and learning	3.72	1.23
i.	Ability to facilitate math learning with administrators that promotes further thinking	3.67	1.14
j.	Ability to support inquiry teams in their collection of evidence of the impact of their teaching on students' learning in math	4.28	0.75
k.	Ability to support inquiry teams in their analysis of evidence of the impact of their teaching on students' learning in math	4.22	0.73
l.	Ability to collect evidence of the impact of this project on math teaching and learning in your fo	4.12	0.86
m.	Ability to analyze evidence to assess the impact of this project on math teaching and learning in your board	4.11	0.96
n.	Inquiry teams' knowledge around math teaching and learning	4.06	0.64
o.	Inquiry teams' instructional practice in math	4.06	0.73
p.	Inquiry teams' willingness to try new instructional strategies in math	4.17	0.79
q.	Board's culture around math learning (e.g., math talk; student, teacher, and administrator engagement in math learning)	3.94	0.80
r.	Ability to support the Renewed Math Strategy (RMS) in your board	4.28	0.83
s.	Other (please rate and describe)	n/a	n/a
3.	**To what extent have the following supported your learning in the EOSDN Math Project? (*1 = not at all, 5 = a great deal*)**	**Mean**	**SD**
a.	Focused learning goals (e.g., proportional reasoning)	3.75	0.93
b.	Alignment of EOSDN learning goals with other initiatives in your board	4.13	0.96
c.	Co-learning with other program facilitators/consultants/coaches/coordinators	4.63	0.72
d.	Co-learning with administrators	3.69	1.20
e.	Co-learning with teachers	4.19	0.83
f.	Collaboratively identifying an area of inquiry based in student data	4.13	0.96

g. Co-planning math lessons with your inquiry team	3.56	1.09
h. Co-teaching math lessons with your inquiry team	3.64	1.01
i. Gathering evidence of teacher and/or student learning in math through artifacts (e.g., student work)	4.06	1.00
j. Gathering evidence of teacher and/or student learning in math through videos/photos	4.13	0.92
k. Gathering evidence of teacher and/or student learning in math through surveys/exit cards	3.81	1.33
l. Gathering evidence of teacher and/or student learning in math through observations	4.00	1.21
m. Gathering evidence of teacher and/or student learning in math through written reflections (e.g., journals)	4.13	0.96
n. Co-analyzing evidence gathered to make instructional decisions in math	4.19	0.98
o. Co-analyzing evidence gathered to improve your practice as a facilitator/consultant/coach/coordinator in math	4.00	0.89
p. Co-analyzing evidence gathered to refine your inquiry question with your inquiry team	3.63	1.15
q. Collaboratively identifying new inquiry questions in math with your inquiry team	3.40	1.18
r. Large group sessions with math experts	4.00	1.21
s. Small group sessions with math experts	4.18	0.98
t. Relationships with math experts	4.23	1.01
u. Large group sessions with research partners (e.g., Queen's)	3.64	1.34
v. Small group sessions with research partners (e.g., Queen's)	3.75	1.36
w. Relationships with research partners	4.86	0.38
x. Attending the Thinking Symposium	3.94	1.18
y. Ministry resources (e.g., literature, research, documents, videos)	4.00	1.15
z. Non-ministry resources (e.g., literature, research, documents, videos)	4.25	1.00
aa. Formal time to collaborate with other facilitators/consultants/coaches/coordinators	4.44	0.81
bb. Informal time to collaborate with other facilitators/consultants/coaches/coordinators	4.31	1.20
cc. Trusting relationships with your inquiry team	4.56	0.73
dd. Other (please rate and describe)	n/a	n/a
4. To what extent do you agree with the following statements regarding your work in the EOSDN Math Project? (*1 = not at all, 5 = a great deal*)	**Mean**	**SD**
a. I have sufficient fluency with big idea of proportional reasoning in math to benefit from the math project.	4.31	0.79
b. The math project would be of greater use if it also focused on developing educators' math fluency.	4.38	0.50
c. The math project has introduced new math instructional strategies.	4.50	0.63
d. The math project has given me the confidence to support administrators' and teachers' implementation of new instructional practices in math around the *big ideas* of proportional reasoning in math.	4.50	0.63
e. The math project has given me support to introduce new instructional strategies around the *big ideas* of proportional reasoning in math in my board.	4.25	0.86
f. The math project has given me confidence to provide feedback to administrators and teachers regarding math instruction and learning.	4.38	0.62

g. The math project has helped me to be comfortable asking questions of administrators and teachers regarding math teaching and learning.	4.38	0.62
h. The math project has helped me to facilitate math learning with administrators and teachers that promotes further thinking.	4.50	0.52
i. The administrators and teachers I work with are willingness to learn new things in math.	4.44	0.51
j. I am afraid I may be wasting instructional time by participating in the math project.	1.19	0.40
k. The inquiry groups I work with in the math project is willing to listen to different ideas.	4.31	0.48
l. I have identified an area of facilitator inquiry within the math project.	3.88	0.81
m. I collect evidence of administrator, teacher, and/or student learning in math to support my facilitator inquiry within the math project.	3.88	0.96
n. I analyze evidence of administrator, teacher and/or student learning in math to support my facilitator inquiry within the math project.	3.88	0.96
o. I use evidence of administrator, teacher, and/or student learning to make instructional decisions in math.	4.31	0.48

5. Moving forward into 2017/2018, what would help make the EOSDN project more beneficial to you as a facilitator/consultant/coach/coordinator?

6. Please add any other comments or feedback that would be important to direct ongoing efforts to support students' learning in math.

Demographic Information

7. a. I have been a facilitator/consultant/coach/coordinator for the following years:

- **i.** In total: _____ [Mean = 4.97, SD = 3.05, Range 1-13yrs]
- **ii.** In math: _____ [Mean = 4.44, SD = 3.31, Range 0-13yrs]

b. I have been involved in collaborative professional learning for _____ years. [Mean = 10.25, SD = 3.38, Range 5-16yrs]

c. I have been involved in collaborative professional learning focused on math for _____ years. [Mean = 7.44, SD = 4.07, Range 1-15yrs]

d. I have been involved in the EOSDN Math Project for _____ years. [Mean = 2.94, SD = 1.21, Range 1-4yrs]

8. I have completed the following:

- **a. Additional Qualifications in math** [11]
- **b. Additional Qualifications Specialist in math** [9]
- **c. Master's Degree** [0]
- **d. Doctoral/PhD** [0]

Teacher Survey

The purpose of this survey is to learn about your experiences in the EOSDN Closing the Gaps in Math Project. Please respond to the questions based on your experiences during the 2016/2017 school year. This survey will take approximately 15 minutes to complete. We greatly appreciate your time and insights.

1. a. What has been your level of direct involvement in the EOSDN Math Project? *(1 = not at all, 5 = extremely)*	**Mean** 3.48	**SD** 0.83
b. How many years have you been involved in the EOSDN Math Project? (0-1, 1-2, 2-3, >3)	1.33	0.73
2. To what extent has the EOSDN Math Project impacted your: *(1 = not at all, 5 = a great deal)*	**Mean**	**SD**
a. Knowledge around math teaching and learning	3.38	0.89
b. Confidence to teach math	3.21	1.11
c. Fluency with *big ideas* in the math curriculum (e.g., proportional reasoning)	3.19	0.93
d. Ability to assess students' representations of mathematical thinking	3.33	0.83
e. Ability to use questioning to reveal students' current level of understanding in math	3.27	0.84
f. Ability to use students' responses to your questions to guide your teaching	3.37	0.97
g. Ability to provide feedback in math class to guide students' thinking and learning	3.37	0.96
h. Ability to facilitate math learning with students that promotes further thinking	3.41	0.98
i. Use of manipulatives in math class to support students' learning	3.51	1.12
j. Ability to collective evidence to assess the impact of your teaching on students' learning in math	3.50	0.98
k. Ability to analyze evidence to assess the impact of your teaching on students' learning in math	3.44	0.96
l. Students' numeracy skills	3.19	0.95
m. Students' quality of thinking during math-related classroom activities	3.39	0.96
n. Students' quality of communication during math-related classroom activities	3.37	0.99
o. Students' abilities to monitor their own learning	2.71	1.03
p. Students' achievement in math	3.17	0.88
q. Classroom culture around math learning (e.g., math talk, student engagement)	3.44	1.00
r. Comfort in discussing math teaching and learning with other teachers	3.62	1.19
s. Comfort in discussing math teaching and learning with your administrator(s)	3.47	1.10
t. Comfort in discussing math teaching and learning with your project facilitator (e.g., consultant, coach, coordinator)	3.76	1.21
u. Other (please rate and describe on reverse)	n/a	n/a
3. To what extent have the following supported your learning in the EOSDN Math Project? *(1 = not at all, 5 = a great deal)*	**Mean**	**SD**
a. Focused learning goals (e.g., proportional reasoning)	3.44	0.92
b. Alignment of EOSDN learning goals with other professional learning initiatives in your school and/or board	3.47	1.01
c. Co-learning with program facilitators/consultants/coaches/coordinators	3.81	1.02
d. Co-learning with administrators	3.13	0.99
e. Co-learning with other teachers	3.92	0.90
f. Collaboratively identifying an area of inquiry based in student data	3.38	1.05
g. Co-planning math lessons with your inquiry team	3.52	1.13

h. Co-teaching math lessons with your inquiry team	3.42	1.20
i. Gathering evidence of students' learning in math through artifacts (e.g., student work)	3.85	0.96
j. Gathering evidence of students' learning in math through videos/photos	3.70	1.15
k. Gathering evidence of students' learning in math through surveys/exit cards	3.04	1.22
l. Gathering evidence of students' learning in math through teacher observations	3.84	0.94
m. Gathering evidence of students' learning in math through written teacher reflections (e.g., journals)	3.82	0.91
n. Co-analyzing evidence gathered with colleagues to make instructional decisions in math	3.42	1.15
o. Co-analyzing evidence gathered to improve your teaching practice in math	3.56	1.12
p. Co-analyzing evidence gathered to refine your teacher inquiry in math	3.55	1.02
q. Collaboratively identifying new teacher inquiries in math with your inquiry team	3.35	1.08
r. Attending large group sessions with math experts	3.67	1.23
s. Attending small group sessions with math experts	3.92	1.11
t. Ministry resources (e.g., literature, research, documents, videos)	3.36	1.13
u. Non-ministry resources (e.g., literature, research, documents, videos)	3.38	1.12
v. Formal time to collaborate with colleagues	3.54	1.15
w. Informal time to collaborate with colleagues	3.42	1.16
x. Trusting relationships with your inquiry team	3.98	1.01
y. Other (please describe)	n/a	n/a
4. To what extent do you agree with the following statements regarding your work in the EOSDN Math Project? *(1 = not at all, 5 = a great deal)*	**Mean**	**SD**
a. I have sufficient fluency with *big idea* of proportional reasoning in math to benefit from the math project.	3.96	0.80
b. The math project would be of greater use if it also focused on developing teachers' math fluency.	3.26	0.99
c. The math project has introduced new math instructional strategies.	4.02	0.89
d. The math project has given me the confidence to try new instructional strategies in math around the *big ideas* of proportional reasoning in math.	4.00	0.89
e. The math project has given me support to try new instructional strategies in math around the *big ideas* of proportional reasoning in math.	3.96	0.84
f. The math project has given me confidence to provide feedback to students regarding math learning.	3.90	0.83
g. The math project has helped me to be comfortable asking questions of students regarding their math learning and understanding.	3.91	0.80
h. The math project has helped me to facilitate math learning with students that promotes further thinking.	4.04	0.71
i. My students are willingness to learn new things in math.	4.06	0.64
j. I am afraid I may be wasting instructional time by participating in the math project.	1.82	0.94
k. The inquiry group I work with in the math project is willing to listen to different ideas.	4.26	0.68
l. I have identified an area of teacher inquiry within the math project.	3.85	0.84
m. I collect evidence of student learning in math to support my teacher inquiry within the math project.	4.20	0.69

n. I analyze evidence of student learning in math to support my teacher inquiry within the math project.	4.13	0.65
o. I use evidence of student learning to make instructional decisions in math.	4.30	0.51

5. Moving forward into 2017/2018, what would help make the EOSDN project more beneficial to you as a teacher?

6. Please add any other comments or feedback that would be important to direct ongoing efforts to support students' learning in math.

Demographic Information

7. a. This year I teach (check all that apply):

i. Primary [22]
ii. Junior [15]
iii. Intermediate [11]
iv. Senior [1]
v. Other (SST, ELL, etc.) [9]

b. I have taught the following years:

i. In total_____ [Mean = 14.46, SD = 7.31, Range 4-32yrs]
ii. At the current grade_____ [Mean = 4.88, SD = 4.73, Range 1-17yrs]
iii. At the current school_____ [Mean = 7.14, SD = 5.17, Range 1-18yrs]
iv. As a board facilitator/consultant/coach_____ [Mean = 1.18, SD = 4.27, Range 0-27yrs]
v. As a resource teacher/SST_____ [Mean = .14, SD = .36, Range 0-1yr]

c. I have been involved in collaborative professional learning for _____ years. [Mean = 6.75, SD = 6.04, Range 0-32yrs]

d. I have been involved in collaborative professional learning focused on math for _____ years. [Mean = 2.14, SD = 1.81, Range 0-10yrs]

8. I have completed the following:

a. Additional Qualifications in math [11]
b. Additional Qualifications Specialist in math [2]
c. Master's Degree [6]
d. Doctoral/PhD [0]

School Administrator Survey

The purpose of this survey is to learn about your experiences in the EOSDN Closing the Gaps in Math Project. Please respond to the questions based on your experiences during the 2016/2017 school year. This survey will take approximately 15 minutes to complete. We greatly appreciate your time and insights.

1.	**a. What has been your level of direct involvement in the EOSDN Math Project? *(1 = not at all, 5 = extremely)***	**Mean** 3.56	**SD** 0.78
	b. How many years have you been involved in the EOSDN Math Project? (0-1, 1-2, 2-3, >3)	1.44	0.86
2.	**To what extent has the EOSDN Math Project impacted your: *(1 = not at all, 5 = a great deal)***	**Mean**	**SD**
a.	Knowledge around math teaching and learning	3.67	0.59
b.	Confidence in your role as an instructional leader in math	3.65	0.61
c.	Fluency with *big ideas* in the math curriculum (e.g., proportional reasoning)	3.33	0.69
d.	Ability to ask questions of teachers regarding math teaching and learning	3.61	0.78
e.	Ability to provide feedback to teachers regarding math teaching and learning	3.44	0.78
f.	Ability to facilitate math learning with teachers to promote further thinking	3.72	0.75
g.	Ability to support teachers in their collection of evidence of the impact of their teaching on students' learning in math	3.72	0.83
h.	Ability to support teachers in their analysis of evidence of the impact of their teaching on students' learning in math	3.50	0.79
i.	Ability to collect evidence of the impact of this project on math teaching and learning in your school	3.61	0.85
j.	Ability to analyze evidence to assess the impact of this project on math teaching and learning in your school	3.33	0.77
k.	Teachers' knowledge around math teaching and learning	3.83	0.62
l.	Teachers' instructional practice in math	3.94	0.73
m.	Teachers' willingness to try new instructional strategies in math	4.06	0.87
n.	School's culture around math learning (e.g., math talk, student and teacher engagement in math learning)	3.94	0.64
o.	Comfort in discussing math teaching and learning with your teachers	3.83	0.86
p.	Comfort in discussing math teaching and learning with other administrators	3.72	0.83
q.	Comfort in discussing math teaching and learning with project facilitators (e.g., consultant, coach, coordinator)	3.94	0.80
r.	Ability to support the Renewed Math Strategy in your school	3.89	0.68
s.	Other (please rate and describe)	n/a	n/a
3.	**To what extent have the following supported your learning in the EOSDN Math Project? *(1 = not at all, 5 = a great deal)***	**Mean**	**SD**
a.	Focused learning goals (e.g., proportional reasoning)	3.50	0.73
b.	Alignment of EOSDN learning goals with other professional learning initiatives in your school and/or board	4.31	0.60
c.	Co-learning with program facilitators/consultants/coaches/coordinators	4.44	0.51
d.	Co-learning with other administrators	3.63	1.02
e.	Co-learning with teachers	4.13	0.62
f.	Collaboratively identifying an area of inquiry based in student data	3.88	0.72
g.	Co-planning math lessons with your inquiry team	3.38	1.20
h.	Co-teaching math lessons with your inquiry team	3.50	1.37
i.	Gathering evidence of teacher and/or student learning in math through artifacts (e.g., student work)	3.81	0.75

Gathering evidence of teacher and/or student learning in math through videos/photos	3.56	1.03
j. Gathering evidence of teacher and/or student learning in math through surveys/exit cards	3.56	0.96
k. Gathering evidence of teacher and/or student learning in math through observations	4.00	0.52
l. Gathering evidence of teacher and/or student learning in math through written reflections (e.g., journals)	4.06	0.57
m. Co-analyzing evidence gathered to make instructional decisions in math	3.81	1.05
n. Co-analyzing evidence gathered to improve your practice as an instructional leader in math	3.69	1.01
o. Co-analyzing evidence gathered to refine your inquiry question with your inquiry team	3.63	0.89
p. Collaboratively identifying new inquiry questions in math with your inquiry team	3.63	0.81
q. Attending large group sessions with math experts	3.81	1.22
r. Attending small group sessions with math experts	3.88	1.09
s. Attending large group sessions with research partners (e.g., Queen's)	3.56	1.09
t. Attending small group sessions with research partners (e.g., Queen's)	3.31	0.95
u. Attending the Thinking Symposium	3.44	0.81
v. Ministry resources (e.g., literature, research, documents, videos)	3.31	1.01
w. Non-ministry resources (e.g., literature, research, documents, videos)	3.38	0.72
x. Formal time to collaborate with other administrators	3.31	1.20
y. Informal time to collaborate with other administrators	3.33	1.11
z. Trusting relationships with your inquiry team	4.19	0.91
aa. Other (please rate and describe)	n/a	n/a
4. To what extent do you agree with the following statements regarding your work in the EOSDN Math Project? *(1 = not at all, 5 = a great deal)*	**Mean**	**SD**
a. I have sufficient fluency with *big idea* of proportional reasoning in math to benefit from the math project.	3.80	0.77
b. The math project would be of greater use if it also focused on developing teachers' math fluency.	3.07	0.88
c. The math project has introduced new math instructional strategies.	4.07	0.70
d. The math project has given me the confidence to support teachers' implementation of new instructional practices in math around the *big ideas* of proportional reasoning in math.	4.07	0.80
e. The math project has given me support to introduce new instructional strategies around the *big ideas* of proportional reasoning in math in my school.	3.93	0.62
f. The math project has given me confidence to provide feedback to teachers regarding math instruction and learning.	4.13	0.52
g. The math project has helped me to be comfortable asking questions of teachers regarding math teaching and learning.	4.27	0.59
h. The math project has helped me to facilitate math learning with teachers that promotes further thinking.	4.20	0.86
i. My teachers are willingness to learn new things in math.	4.33	0.98
j. I am afraid I may be wasting instructional time by participating in the math project.	1.29	0.47
k. The inquiry group I work with in the math project is willing to listen to different ideas.	4.40	0.83

l. I have identified an area of administrator inquiry within the math project.	3.77	0.93
m. I collect evidence of teacher and/or student learning in math to support my administrator inquiry within the math project.	3.77	0.83
n. I analyze evidence of teacher and/or student learning in math to support my admin inquiry within the math project.	3.54	0.78
o. I use evidence of teacher and/or student learning to make instructional decisions in math.	4.20	0.41

5. Moving forward into 2017/2018, what would help make the EOSDN project more beneficial to you as an administrator?

6. Please add any other comments or feedback that would be important to direct ongoing efforts to support students' learning in math.

Demographic Information

7. a. I have been an administrator for the following years:

vi. In total_____ [Mean = 7.32, SD = 6.14, Range 1-25yrs]

vii. At the current school_____ [Mean = 2.40, SD = 2.40, Range 0-10yrs]

b. I have been involved in collaborative professional learning for _____ years. [Mean = 7.71, SD = 4.30, Range 0-15yrs]

c. I have been involved in collaborative professional learning focused on math for _____ years. [Mean = 3.07, SD = 2.62, Range 0-10yrs]

d. I have been involved in the EOSDN Math Project for _____ years. [Mean = 1.44, SD = 0.86, Range 1-4yrs]

8. I have completed the following:

a. Additional Qualifications in math [1]

b. Additional Qualifications Specialist in math [0]

c. Master's Degree [7]

d. Doctoral/PhD [0]

Appendix G: Selected Artifacts

Regional Steering Committee Meeting
June 8, 2017

Regional DSB Teams Consolidation
May 9, 2017

ALCDSB

CDSBEO


HPEDSB


LDSB


OCDSB


OCSB


RCCDSB


RCDSB


Upper Canada District School Board
UCDSB