Critical Transitions in Mathematical Development
CoP ANNUAL IMPLEMENTATION AND ANNUAL REPORT COMPONENTS
November 1, 2016 – August 31, 2017

PRINCPLES

How did the CoPs address the 3 principles of the MKN?

Addressing Teacher Identified Needs

- Annual surveys of, and annual interviews with, teachers and school (CoP)
    - Survey questions about identified needs
    - Annual feedback from teachers involved
- Assess the extent to which CoP activities addressed teacher identified needs reported in the annual survey (CoP)
    - Survey questions about the alignment of the teacher-identified needs to CoP activities
- Assess the extent to which teachers, both those in the CoP and beyond the CoP, were involved in CoP activities (CoP)
- Membership of the CoP to be specified
- Instances of annual collaboration and planning meetings will be reported

Implementation Plan

Project Focus	PreK – K and K - 1	8 - 9	9 - 10	12 - postsecondary
Anticipated Outcomes (See Appendix A)	- Gain an understanding of the self-identified math education needs of ECEs, Kindergarten teachers, and Grade 1 teachers - Encourage college instructors and faculty who support early learning to include math education in their courses - Plan professional development for ECEs, Kindergarten teachers, Grade 1 teachers for September 2017	-Gain an understanding of issues related to the Grade 8 to Grade 9 transition in math - Identify potential strategies to help teachers foster a successful transition for students	-Gain an understanding of what's happening in Grade 9 locally developed math classes in Ontario -Develop resources based on the needs of students and teachers -Provide teachers with a set of strategies and resources to help students who struggle with math (e.g., learning difficulties and formal or informal IEPs)	-developing conceptual knowledge in high school students that they need to be successful with postsecondary math -helping high school students develop mathematical thinking

Activities (e.g., events, resource development, meetings etc.)	- Online ECE/ teacher survey - Meetings with steering committee to plan professional development - One-day conference for ECE college instructors and faculty of education instructors - collaboration with Kindergarten teams and Grade 1 teachers from the Greater Essex County District School Board to develop early math education professional development	-review of the research literature on transitions because there is not much available that is math specific - interviews with about the transition for students between Grade 8 math and Grade (e.g., principals, math department heads, parents, consultants, research partner)	- case studies of sample classrooms -resource development -evaluation of the effectiveness of the resources (September, 2017)	-development of enrichment math modules at the high school level -collaboration with students and teachers in the development of modules through workshops and field testing
Anticipated Outputs (if applicable)	- report/paper about the math education needs of ECEs and teachers - Workshops from the one-day conference will be video recorded	-research synthesis on transitions -report and recommendations based on interviews -strategies for helping with transition from Grade 8 to Grade 9 math	-report/paper about the math education needs of students and teachers in locally developed Grade 9 math courses -resources to support students and teachers in Grade 9 math locally developed math courses	Transformations 10 unit for Grade 10 math
Number and type of participants (if applicable)	- Approximately 100 ECEs - Approximately 30 Kindergarten Teachers - Approximately 30 Grade 1 Teachers - Approximately 30 college and faculty of education instructors - 10 steering committee members - 1 Researcher	-40 teachers -40 parents -40 students -5 consultants -1 research partner	-20 students -2 teachers -2 research assistants	-The module will be field tested for one-month in an Academic Grade 10 class in Kingston (30 students) -3 researchers will observe the process
Anticipated Timeline	-The survey will be released in May, 2017 -The college and faculty of education instructor one-day conference will take place in August, 2017	End of August, 2017	End of August, 2017	The module will be field tested in May, 2017
Monitoring and Evaluation (Required: Surveys and interviews for teachers, parents, etc.)	Workshop and one-day conference evaluations by college instructors and faculty of education instructors	Teachers will be asked for input about the proposed strategies for helping with the transition from Grade 8 to Grade 9 math	Resources will be pilot tested in September, 2017	-Researchers will observe the student experience -Students will be surveyed about their experience

Report

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Changing Attitudes in Mathematics

- Show evidence that the work of the CoP has a mathematical focus that is conceptually rich for students and teachers – each CoP identifies such activities
- The design of student experiences creates opportunities for students to share their learning (especially in the form of mathematical surprises and conceptual insights) with family, friends, and the wider community
    - Annual survey will also include data about the extent to which activities of the CoP engaged family and the wider community (CoP)
- Any instances of student-level impact will be reported (CoP)
    - Survey questions about attitudes toward mathematics (drawn potentially from EQAO questions)
- Evidence of artifacts (actionable resources, case stories, etc.) that were shared on the MKN website that reflect the above criteria
    - Data collected on number of artifacts created and shared

Implementation Plan

Project Focus	PreK – K and K - 1	8 - 9	8 - 9	12 - postsecondary
Anticipated Outcomes (See Appendix A)	-Greater understanding of the need for balanced numeracy instruction in the early years -Development of a balanced numeracy website for early math education with resources for educators	- Greater understanding of the need to support the transition from Grade 8 to Grade 9 math -Strategies for supporting the transition from Grade 8 to Grade 9 math	-Students and teachers will experience more productive time in locally developed Grade 9 math course -Potential increase in student achievement	Students will have deeper conceptual knowledge of mathematics and feel better equipped for postsecondary math -Teachers will have needed resources to deepen conceptual understanding
Activities (e.g., events, resource development, meetings etc.)	- resource compilation - website development	-review of the research literature on transitions because there is not much available that is math specific - interviews with about the transition for students between Grade	-resource development to support students and teachers in Grade 9 math locally developed math courses	-development of student survey to identify changes in their mathematical thinking -development of teacher interview questions - development of culminating task to assess

		8 math and Grade (e.g., principals, math department heads, parents, consultants, research partner)		students' conceptual understanding
Anticipated Outputs (if applicable)	Balanced numeracy website	-research synthesis on transitions -report and recommendations based on interviews -strategies for helping with transition from Grade 8 to Grade 9 math	-resources to support students and teachers in Grade 9 math locally developed math courses	-student survey results to be shared on the MKN website
Number and type of participants (if applicable)	1 research assistant 1 graphic designer		Resources will be piloted in one or two classrooms and shared with other at the Fields Education Forum	-one class of Grade 10 students -three researchers
Anticipated Timeline	Storyboards for the website will be developed by the end of August, 2017	End of August, 2017	Pilotting of resources to take place in September, 2017	May, 2017
Monitoring and Evaluation (Required: Surveys and interviews for teachers, parents, etc.)	We will send out a beta version for review and input from ECEs, teachers, and college and faculty of education instructors	Teachers will be asked for input about the proposed strategies for helping with the transition from Grade 8 to Grade 9 math	Pilotting of resources (September, 2017) will be followed by teacher interviews and student survey about their effectiveness	Teacher interview and student survey

Report

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Fostering Inclusion

- Annual surveys of, and annual interviews with, teachers and school (CoP), compiled annually (MKN). Survey diverse groups engaged in the activities (CoP)
- Report on how the design of student experiences foster differentiated learning
- Differentiation levels of artifacts and quantity of artifacts reported. Sow evidence that the design of student experiences fosters differentiated learning: for example, student experiences have a low floor

(allowing engagement with minimal prerequisite knowledge) and a high ceiling (offering connections to more complex relationships and more varied representations).

Implementation Plan

Project Focus	PreK – K and K - 1	8 - 9	9 - 10	12 - postsecondary
Anticipated Outcomes (See Appendix A)	Increased awareness of the need for well-aligned curriculum between preschool, Kindergarten, and Grade 1	This project will identify strategies for helping students transition from elementary to secondary mathematics, which is a subject area that many students have difficulty with and anxiety about	-This research will identify the needs of students and teachers in locally developed Grade 9 classrooms, which has not been done before -These students tend to be a diverse group that has diverse learning needs	Students from diverse backgrounds will actively participate and be successful with the Transformations 10 enrichment module because it is inquiry-based and has a low floor and a high ceiling
Activities (e.g., events, resource development, meetings etc.)	Review of current early learning courses in college ECE programs and faculty of education programs to see the extent to which early math education curriculum is included	-review of the research literature on transitions because there is not much available that is math specific - interviews with about the transition for students between Grade 8 math and Grade (e.g., principals, math department heads, parents, consultants, research partner)	-case study of one or two locally developed Grade 9 classes -resource development to meet the needs of students and teachers in locally developed Grade 9 math courses	-survey development -training of Grade 12 student mentors
Anticipated Outputs (if applicable)	-report of findings -paper/ recommendations for Deans of faculty of educations and Principals of colleges	-research synthesis on transitions -report and recommendations based on interviews -strategies for helping with transition from Grade 8 to Grade 9 math	-case study summary of one or two locally developed Grade 9 classes -resources to support students and teachers in Grade 9 math locally developed math courses	-survey results will incorporate demographic data to speak to the achievement and attitudes of diverse learners -researchers will observe interaction between the students and peer mentors; students and instructors
Number and type of participants (if applicable)	2 research assistants	-40 teachers -40 parents -40 students -5 consultants -1 research partner	-one to two Grade 9 classrooms	-one Grade 10 class -3 researchers
Anticipated Timeline	End of August, 2017	End of August, 2017	End of August, 2017	End of August, 2017

Monitoring and Evaluation (Required: Surveys and interviews for teachers, parents, etc.)	Report findings back to college ECE and faculty of education instructors at the August one-day conference to ask for input about this	Teachers will be asked for input about the proposed strategies for helping with the transition from Grade 8 to Grade 9 math	Pilotting of resources (September, 2017) will be followed by teacher interviews and student survey about their effectiveness	Student survey

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ACTIVITIES/OUTCOMES

What activities have the CoPs engaged in to achieve network outcomes through their work?

CoPs will produce/report on the following annually:

Resource Production

1. Actionable evidence-informed, differentiated resources
    - Lesson plans/supporting resources
    - One case study/CoP
    - One research mini/CoP
2. Research Syntheses
    - One plain language summary/CoP

Implementation Plan

Project Focus	PreK – K and K - 1	8 - 9	9 - 10	12 - postsecondary
Anticipated Outcomes (See Appendix A)	Accurate portrait of early math education across the province of Ontario	- Greater understanding of the need to support the transition from Grade 8 to Grade 9 math -Strategies for supporting the transition from Grade 8 to Grade 9 math	-Description of math education needs in one or two Grade 9 locally developed classes -Resources to support students and teachers in Grade 9 locally developed courses	-Report on the success of the Transformations 10 enrichment module -Revised version of the Transformations 10 enrichment module -Training on the Teacher's Manual
Activities (e.g., events, resource development, meetings etc.)	-Steering committee meetings to discuss and analyze survey results and results of review of the inclusion of early math education curriculum in ECE and faculty of education programs	review of the research literature on transitions because there is not much available that is math specific - interviews with about the transition for students between Grade 8 math and Grade (e.g., principals, math department heads, parents, consultants, research partner)	-case study of one or two locally developed Grade 9 math classes -resource development to meet the needs of students and teachers in locally developed Grade 9 math courses	-meetings to analyze student survey results -revision of the enrichment module as needed -meetings to develop a Teacher's Manual -Meetings to plan for teacher training on the Teacher's Manual
Anticipated Outputs (if applicable)	-research summary of the inclusion of early math education curriculum in ECE and faculty of education programs -results from online educator survey -preliminary feedback from beta testing of website	-research synthesis on transitions -report and recommendations based on interviews -strategies for helping with transition from Grade 8 to Grade 9 math	-case study summary of one or two locally developed Grade 9 classes -resources to support students and teachers in Grade 9 math locally developed math courses	-revised version of the Transformations 10 enrichment module - development of a Teacher's Manual for the module
Number and type of participants (if applicable)	-10 steering committee members -2 research assistants		-one to two Grade 9 classrooms	-up to10 teachers
Anticipated Timeline	End of August, 2017	End of August, 2017	End of August, 2017	June, 2017
Monitoring and Evaluation (Required: Surveys and interviews for teachers, parents, etc.)	-Peer review -Feedback from colleagues	Teachers will be asked for input about the proposed strategies for helping with the transition from Grade 8 to Grade 9 math	Pilotting of resources (September, 2017) will be followed by teacher interviews and student survey about their effectiveness	Pilot of the Teacher's Manual with up to 10 teachers

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Capacity Building

2 Networking and scaling up (meetings, conferences, additional funding, etc.)

- Number of first-time teacher participants
- Number of teacher participants who have participated in other provincial initiatives beyond CoPs
- Number of extended projects
- Number of potential leveraging grants

3 CoP-led workshops (4 annually)

- Number of teacher participants
- Number of math-teacher lead participants
- Number of administrator participants
- Number of participants outside of the CoP
- Overall number registered to attend

Implementation Plan

Project Focus	PreK – K and K - 1	8 - 9	8 - 9	12 - postsecondary
Anticipated Outcomes (See Appendix A)	-one-day conference for ECE college and faculty of education instructors -planning of professional development for ECEs, Kindergarten, Grade 1 teachers, and principals in the Greater Essex County School Board for September, 2017 -additional SSHRC Connection funding	-Greater understanding of the need to support the transition from Grade 8 to Grade 9 math -Strategies for supporting the transition from Grade 8 to Grade 9 math	Resources will be shared with teachers who work in Grade 9 locally developed math courses	-Recruitment of teachers to take-part in an Ontario-wide trial of the module -Training on the Teacher's Manual
Activities	-planning meetings for	-review of the research	Resource development	-planning for training on

(e.g., events, resource development, meetings etc.)	the one-day conference in August and the 2 days of professional development in September -SSHRC proposal planning	literature on transitions because there is not much available that is math specific - interviews with about the transition for students between Grade 8 math and Grade (e.g., principals, math department heads, parents, consultants, research partner)	and sharing	the Teacher's Manual
Anticipated Outputs (if applicable)	-videos from the conference to post on TVO's TeachOntario website and the Math Knowledge Network website -Balanced Numeracy website -online educator survey results -research summary of the inclusion of early math education curriculum in ECE and faculty of education programs -SSHRC Connection proposal	-research synthesis on transitions -report and recommendations based on interviews -strategies for helping with transition from Grade 8 to Grade 9 math	Resources will be made available on TVO's TeachOntario website, the MKN website, and the Fields Education Forum	-recruitment of teachers at the annual OAME meeting -teacher workshops on the Transformations 10 Teacher's Manual
Number and type of participants (if applicable)	30 ECE college and faculty of education instructors 10 steering committee members	Teacher candidates and teachers		
Anticipated Timeline	End of August, 2017	End of August, 2017	January, 2018	-OAME annual meeting- May, 2017 -Teacher's Manual workshops- July, 2017
Monitoring and Evaluation (Required: Surveys and interviews for teachers, parents, etc.)	-feedback on SSHRC proposal -evaluation of conference by instructors -follow-up online survey to instructors about their inclusion of early math education in their courses	Teachers will be asked for input about the proposed strategies for helping with the transition from Grade 8 to Grade 9 math	Teachers and students will be asked for feedback about the effectiveness of the resources (e.g., surveys and interviews)	Teacher's Manual workshop evaluations

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Knowledge Dissemination

4 Arts-informed knowledge dissemination
- One story-based research mini
- Up to one research song
- Post-concert/activity surveys

5 TeachOntario
- CoPs utilize TeachOntario as a digital space for KM and collaboration – report on number of instances of collaboration
- CoPs make use of existing resources available on TeachOntaio – report on number of artifacts posted

6 Publications
- One article/CoP for each of the target audiences (practitioners, scholarly community)

7 Conferences
- One conference/CoP per year

Implementation Plan

Project Focus	PreK - K and K - 1	8 - 9	9 - 10	12 - postsecondary
Anticipated Outcomes (See Appendix A)	Increase in knowledge and understanding of the importance of early math education, self-identified math education needs of educators (ECEs, Kindergarten teachers, and Grade 1 teachers), and the nature of early math education in colleges and universities	-Greater understanding of the need to support the transition from Grade 8 to Grade 9 math -Strategies for supporting the transition from Grade 8 to Grade 9 math	-Increase in knowledge and understanding of the math education needs of teachers and students in locally developed Grade 9 math classes -Resources to support students and teachers in Grade 9 locally developed courses	Sharing results of the Transformations 10 enrichment module pilot
Activities (e.g., events,	-Balanced numeracy diet website development	-Workshop planning -Workshop -Web-friendly version	Presentation at the Canadian Math Education Study	Meetings about the presentation of the pilot and the written

resource development, meetings etc.)	-report/paper writing -one-day conference in August, 2017 - develop a research mini	of presenting strategies will be developed - develop a research mini	group - develop a research mini	pieces that will follow - develop a research mini
Anticipated Outputs (if applicable)	-Balanced Numeracy Diet website -Commentary on the state of early math education in Ontario and recommendations for change in reports and papers (e.g., *ECE Link, OAME Gazette, Professionally Speaking*) -Videos of workshops from the one-day conference - research mini in the form of an infographic	-Workshops on Grade 8 to Grade 9 Math Transition strategies for teacher candidates at Queen's University and Nippising University -Strategies for helping with the Grade 8 to Grade 9 transition in math will be made available on TVO's TeachOntario website, the MKN website, and the Fields Education Forum - research mini in the form of an infographic	-case study summary of one or two locally developed Grade 9 classes -presentation at the Canadian Math Education Study group - resources will be made available on TVO's TeachOntario website, the MKN website, and the Fields Education Forum - research mini in the form of an infographic	-presentation about the pilot at the annual meeting of the OAME -summary of pilot results on the MKN website -research paper on the pilot -Enrichment module (lesson plans) and Training Teacher's Manual made available through Teach Ontario and the MKN and try and make it available through the Math Coordinators' Association and the Fields Education Forum - research mini in the form of an infographic
Number and type of participants (if applicable)	-30 ECE college and faculty of education instructors -educators who access the Balanced Numeracy Diet website	200 teacher candidates	-60 people at the presentation	-100 people at the OAME meeting
Anticipated Timeline	End of August, 2017	End of August, 2017	Presentation- June, 2017 Resource Development- August, 2017	End of August
Monitoring and Evaluation (Required: Surveys and interviews for teachers, parents, etc.)	-evaluation of conference by instructors -follow-up online survey to instructors about their inclusion of early math education in their courses -Hits and downloads from websites	-evaluation of workshops by teacher candidates -Hits and downloads from websites	Teachers and students will be asked for feedback about the effectiveness of the resources (e.g., surveys and interviews)	-Hits and downloads from websites -survey made available on the website to give feedback about the usefulness of the enrichment module and teacher's

	-survey made available on the website to give feedback about the usefulness of the website and areas for improvement			manual and areas for improvement

Report

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ADDITIONAL INFORMATION

1. List and attach copies of any other relevant final documents or other products including marketing and promotional materials; media coverage; developed resources; testimonials; participant feedback, surveys, analysis, and other performance measurement tools/mechanisms, and so forth, that demonstrate the success and achievements of the CoP.
2. List any adjustments to the annual knowledge mobilization plans.
3. Highlight some promising practices that have shown evidence of improving mathematics outcomes for students.
4. Provide any OTHER information that may be relevant to this report and/or demonstrate the success of the CoP.
5. Provide details of any challenges/barriers faced while implementing CoP activities or working towards achieving network outcomes. Include steps taken to address them. Highlight issues of continuing concerns and potential solutions to them.
6. Lessons Learned: Based on your experience in implementing CoP activities and working towards achieving network outcomes, provide details on what can or should be done differently and why.

Report

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Appendix A
Anticipated Outcomes

1. Increased awareness, understanding, use and sharing of evidence-informed practices for mathematics by engaging teachers in co-designing mathematical learning experiences for students that offer surprise and conceptual insight, and opportunities to share their learning with family, peers, and the wider community, changing mindsets around professional learning and attitudes towards mathematics;
2. Enhanced capacity of school districts, organizations and universities in Ontario to collaborate, to access existing, as well as generate new, evidence-based knowledge that can positively impact the teaching and learning of mathematics, and efficiently meet the goals and directions of Ontario curriculum and policy;
3. Increased collaboration, partnerships, and networking between and among the Ministry, organizations, communities, networks and associated communities of practice across the education sector;
4. Improved student engagement, and equity of outcomes and well-being for marginalized students by enhancing learning and participation opportunities;
5. Advanced mathematics learning for First Nations, Métis and Inuit students, built on ways that have been identified through traditional technologies and design, as well as expanding the lens of educators to deepen their understanding of the benefits of integrating Indigenous "ways of knowing" into their practice; and
6. Sustained growth, in breadth and depth, of networks that provide evidence-based knowledge sharing to inform mathematics program, policy, and practice, based on existing and other sources of funding.