



PROFESSIONAL DEVELOPMENT PLAN

MODULES AND SEQUENCE

Math in a Cultural Context (MCC) is an effective supplemental elementary school program that can improve your students' conceptual math understanding. MCC has improved Alaskan students' math performance in rural and urban areas and it is a program that has been rigorously studied (see data and national recognition of this program at the end of this document). It has also been effective with novice and experienced teachers. Its effectiveness with novice teachers is particularly important in school districts with high teacher turnover rates.

MCC is a long-term collaborative project between the University of Alaska Fairbanks, elders, teachers, and mathematicians. This slow and steady collaboration has resulted in 9 published math modules that integrate literacy, social studies, and, at times, science for grades 1-7. The modules also include supporting materials such as children's stories, a guide to effectively using MCC, and DVD case examples of teachers effectively implementing it. An important part of this program is its professional development component. The project has shown that with limited inservicing it can result in increasing teachers' conceptual math knowledge which correlates into stronger student math performance. Because our past work has demonstrated improving students' mathematical knowledge when compared to students using math curricula such as *Saxon*, *Harcourt*, *Trailblazers*, and *Everyday Math* to name a few, the project has received funding for two additional awards that allows us to strengthen our approach to working with districts.

MCC fits well with districts' School Improvement Plans (SIP) and we believe that DEED will view the plans described below as educational worthy under NCLB. MCC's professional development component is [data-driven, evidenced-based] approach to using student assessments as part of an instructional system. The project's data management system allows MCC to be responsive to teacher and districts needs in ways that national math curricula cannot. We will provide teachers with a class profile highlighting students' mathematical knowledge on the specific math concepts of the module, and a plan for improving students' math performance based on this data. Teachers and districts who participate in either module with courses and/or receive MCC's Professional Development sequence will gain this feature. We will provide teachers with their students overall pre/post test scores, subscale scores, item analysis, and a small report on how to improve instruction for students and/or classes that are performing below, at, and above expectations.. This part of MCC's program can be part of a district's SIP. MCC aligns well with Alaska's Grade Level Expectations (GLE's),

MCC provides a variety of ways for districts to engage with MCC depending on their needs and commitment to MCC's approach. In other words, a district may choose to have a teacher "tryout" a module, to teachers using one or more modules and taking the module with a course,.

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and to participating more fully in a variety of Professional Development opportunities. In the past MCC's module with minimal professional development produced solid improvement in student performance and we believe that with additional support student should perform even better. The plan below creates a variety of options or ways for districts to work with MCC

MCC'S INSTRUCTIONAL AND ASSESSMENT MODEL

The following are the options for your district to engage with MCC

1. Modules Only
2. Modules with Course including student assessments
3. Professional Development including workshops/in-services, Professional development course assessments, and onsite visits including mentoring, coaching, model lessons etc. depending on the number of teachers involved in the project.
 - Other Professional Development Opportunities include:
 - Leadership Training in MCC
 - Professional Development for two 6th grade MCC modules
 - Summer Math Institute
4. Introductory Workshops—a sampler to help district determine their interest in MCC
5. None

Each option is described and explained below, including the benefits and requirements of your district for each option.

1. MODULES ONLY

Benefits:

MCC's supplemental math modules help improve students' math performance in the concepts covered by the modules. We will provide a limited set of materials for district's interested in using or determining if they will use MCC as a supplemental math program.

Requirements:

None

2. MODULES WITH COURSE INCLUDING STUDENT ASSESSMENTS (see course details below)

Benefits:

MCC's supplemental math modules help improve students' math performance in the concepts covered by the modules. By participating in a professional development course that focuses specifically on the math of the module and the students' knowledge of the math

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teachers will gain the advantage of diagnostic assessment connected to instruction. The first course session includes dynamic assessment and instruction, followed by the second session on implementing the module and effective strategies, and the third session reviews student progress and follow up suggestions. The course provides suggestions for using the module effectively, differentiating instruction, and collaborating with teachers within and across districts. Course enrollment will be 15 teachers per module.

Requirements:

Courses will be offered on a regular schedule and teachers would need to sign up in advance to be enrolled. The course consists of three two hour long conferences; therefore attendance on the audioconference or eluminate (<http://www.illuminate.com/>) is mandatory as is submitting pre and posts tests. Pre and post tests generate the data used throughout the course.

3. PROFESSIONAL DEVELOPMENT

Benefits:

MCC's workshop stress a conceptually oriented, hands-on approach coupled with challenging math, accessible to students through our pedagogical approach which builds on students' cognitive strengths. This approach when implemented with fidelity in the classroom correlates well with improving students' mathematical understandings. Combining modules with a course, assessment tools, and professional development workshops provides the strongest approach to improving students' mathematical achievement. Those districts that become involved in Leadership Training build their long-term capacity to use MCC effectively as well as other conceptually oriented math programs. Leadership Training occurs twice a year on two weekends one in the fall and one in the spring.

Requirements:

Sufficient numbers of teachers and/or paraprofessionals using MCC materials; or adopting MCC as a supplemental curriculum; and/or administrative support. All professional development inservices will be mutually agreed upon.

- **Leadership Training in MCC**

MCC will provide training to administrators/teachers/or paraprofessionals.

Benefits:

Receive leadership training--occurs twice a year—once in the fall and in the spring on weekends.

Build districts' capacity to teach math in a systematic and consistent way.

Connect local knowledge, and pedagogy to schooling.

Requirements:

Districts that are committed to adopting and adapting MCC shown by districts' school board officially adopting MCC as a supplemental math curriculum; and/or "large" number of teachers actively implementing MCC; and/or districts supporting the use

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of MCC such as writing MCC into the district's School Improvement Plan using the features indicated in number 3.

- **Summer Math Institute**

MCC will provide training to administrators/teachers/or paraprofessionals.

Benefits:

Builds districts' and teachers' capacity to teach math.

Connect local knowledge, and pedagogy to schooling.\

Provides teachers with core principles and practice in teaching inquiry-oriented and problem solving. MCC's pedagogical approach can be used when teaching science, social studies, and to a limited extent in literacy.

Requirements:

First priority is to districts that are committed to adopting and adapting MCC demonstrated by districts' school board officially adopting MCC as a supplemental math curriculum; and/or "large" number of teachers actively implementing MCC; and/or districts supporting the use of MCC such as writing MCC into the district's School Improvement Plan using the features indicated in number 3.

4. INTRODUCTORY WORKSHOPS

To provide districts with a two-hour to a day long workshop to introduce MCC to prospective districts.

Benefits:

A district determines if and how it wants to engage in MCC. MCC provides a variety of introductory workshops.

Requirements:

Having a sufficient number of teachers, staff, administrators, and community members interested in participating

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COURSE DETAILS

The professional development sequence/course should provide districts and teachers with the most effective approach to using these materials.

Teacher benefits:

- 500 level credits available 1 credit per course (teacher pays)
- ½ day to 1 day Basic Workshop or 2-day More Comprehensive Workshop—Key Math Concepts, Pedagogy, and Culture; the role of assessment for strengthening instruction
- After receiving pre test from teacher, MCC will provide an instructional assessment to each teacher. The first report will include: gain score overall, subscale gain score, and instructional suggestions
- Audioconference #1 – using assessment to adapt teaching and strategies for adapting teaching and the curriculum (1.5 hours to 2 hours)
- Audioconference #2 –implementation, sharing, what’s working/not, student work—artifacts, math/cognitive strategies that students use, how to have students problem solve...(1.5 hours to 2 hours)
- Face to face visits organized with school districts that have a sufficient number of teachers using a module; site visits and instructional can be coordinated with other districts via audioconference or eluminate. See <http://www.elluminate.com/>
- MCC will send second report to the teachers that shows how well students’ learned the material in the module (gain score), subscale gain score, and offer further suggestions for improving students’ math performance.

Teacher requirements:

- Pre test students
 - Score
 - Submit scores electronically to MCC
- Teach a module in the recommended sequence (see below). This allows MCC to organize the course of instruction.
- Implement Module
- Submit a Teacher Log to MCC
- Post test students
 - Score
 - Submit scores electronically to MCC

Module and Course Sequence

- 2nd grade: Picking Berries (Fall 2008), Patterns and Parka (Winter 2008-2009), and Egg Island (Spring 2009)
 - 3rd to 5th grade: Designing Patterns (Winter 2008-2009), and Elastic Geometry (Spring 2009)
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6th grade opportunities:

MCC will provide one workshop on the September 26-28, 2008 for the Kayak and Star Navigation and other on January 23-25, 2009 for other two 6th grade modules (teachers will only teach one of those modules and act as a control for the other).

Teacher requirements:

- Teachers may choose to attend both workshops and teach one module, pre and posttest students on both modules or just attend one workshop and pre and posttest students on both modules.
- Pre test students
 - Score
 - Submit scores electronically to MCC
- Teach a module in the recommended sequence
- Implement Module
- Submit a Teacher Log to MCC
- Post test students
 - Score
 - Submit scores electronically to MCC

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COURSE SEQUENCE

Grade Level	Fall 2008	Winter 2008-2009	Spring 2009
2 nd grade	<p><i>Picking Berries:</i> Representation, Measuring, and Data</p> <p>First audio conference on September 30, 2008 at 4pm</p>	<p><i>Parkas and Patterns:</i> Geometry, Patterns, Properties, Proof, and Fractions</p> <p>First audio conference on <u>November 18, 2008 at 4pm</u></p>	<p><i>Egg Island:</i> Grouping, Place Value, and Numeration</p> <p>First audio conference on: pending</p>
3 rd to 5 th grade		<p><i>Designing Patterns:</i> Patterns, Fractions, Area, Property and Proof (more advanced than Parkas and Patterns)</p> <p>First audio conference on <u>November 18, 2008 at 4pm</u></p>	<p><i>Elastic Geometry:</i> Geometry, Logical Thinking, Proof and Reasoning</p> <p>First audio conference on: pending</p>
6 th grade	<p>Star Navigation: Angles and measuring; and/or Kayak: Data Collection and Analysis</p> <p>(random assignment to Star or Kayak)</p> <p>Workshop: Sept 26-28, 2008 in Anchorage</p>		<p>Building a Smokehouse: The Geometry of Prisms</p> <p>Salmon Fishing: Investigations into Probability</p> <p>Workshop for teachers on <u>January 23-25, 2009</u> in Anchorage.</p>
	<p><i>Fish Rack:</i> Properties, Proof, Perimeter and Area—available throughout the year—not supported this year by workshop or course</p>	<p>Leadership training <u>November 7-9, 2008</u>, Fairbanks</p>	<p>Leadership training <u>April 1-12, 2009</u> in Fairbanks</p>
6 th graders	Summer 2009	Summer Math Institute	<p>May 31 –June 12, 2009 Leaders June 2-11, 2009 teachers</p>

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MCC’S INSTRUCTIONAL AND ASSESSMENT MODEL

Please select the level of support wanted for your school district

MCC will provide your school district:

- 1. Modules Only –up to 30 complete packages free of charge (maybe your school District already got some of the packages)
- 2. Modules with Course including student assessments
- 3. Professional Development including workshops/in-services, professional development course assessments, and onsite visits including mentoring, coaching, model lessons etc. depending on the number of teachers involved in the project.
 - o Other Professional Development Opportunities include:
 - Leadership Training in MCC
 - Summer Math Institute
- 4. Introductory Workshops—a sampler to help district determine their interest in MCC
- 5. None

Each option is described and explained above, including the benefits and requirements of your district for each option. MCC will pay for sponsored activities within the limits of the resources.

School District: _____

Signature
Superintendent or Designee

Print name

Date

Contact phone number

e-mail address

Please fax this page to (907) 474-7270 or mail to us as soon as possible, thanks.

**Jerry Lipka
Principal Investigator**

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AWARDS AND RECOGNITION FOR MCC

- 2006 MCC's grant proposal to U.S. Department of Education AK. Native Education
 - Best Proposal (Ranked Number 1)
www.ed.gov/programs/alaskanative/s356a060004.pdf
- 2006 MCC's grant proposal to U.S. Department of Education, Institute of Educational Sciences (new 6th grade study), ranked number 1 in a nation-wide competition
- The BEST (Building Engineering and Science Talent) Initiative Report (tasked by Congress) acknowledges Yup'ik Math Project (developed by Jerry Lipka) as notably effective in increasing math performance of under-represented (Alaska Native) pre-K through 12 students. http://www.bestworkforce.org/PDFdocs/BESTPre-K12Rep_part2_Apr2004.pdf
- 1999—Prestigious American Book Award for Transforming the Culture of School: Yup'ik Eskimo Examples. Mahwah, NJ Lawrence Erlbaum & Associates. This book laid out the foundation for MCC.
- <http://www.bookweb.org/btw/awards/The-American-Book-Awards---Before-Columbus-Foundation>
- Submitted to the What Work's Clearinghouse for Effective math programs
- Education Week, January 7, 2008 article by Mary Ann Zehr. Embedded in the text is a recent article about culturally relevant research and MCC is mentioned as the only evidence based project in the U.S.
- Keeping with the mandates of President George W. Bush's Executive Order 13336: U.S. Department of Education's American Indian and Alaska Native education, MCC was nominated as an exemplary program and is now under consideration for participation in a program evaluation initiative under the Office of Indian Education. —just notified

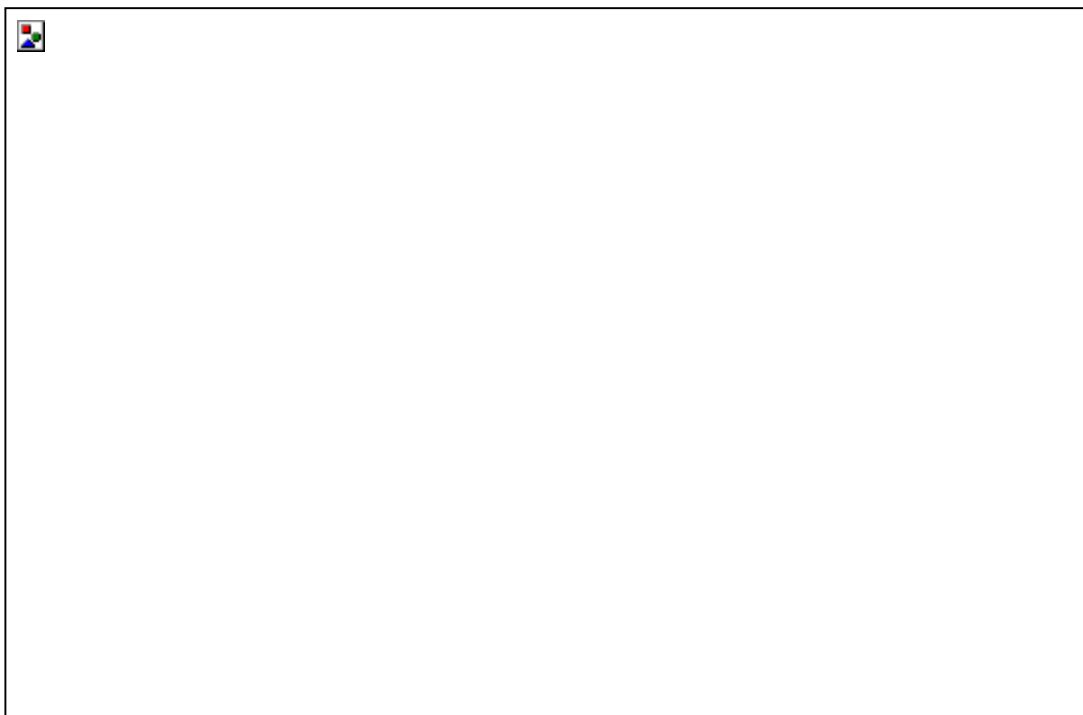
References:

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MCC DATA



HLM IMPACT RESULTS: TOTAL SCORES				
	Student-Level Unadjusted Means		Estimate from HLM	
Outcome Gain Scores	Control Group	Treatment Group	Impact Adjusted for clustering	Effect Size
Gain in Fall Test Scores Fall 2005 Picking Berries	M 9.62% pts SD 12.96 N 461	M 21.92% pts SD 13.02 N 233	10.35% pts (p=.000)	0.82 ***
Gain in Spring Test Scores Spring 2006 Going to Egg Island	M 6.80% pts SD 19.52 N 467	M 15.54% pts SD 20.44 N 236	9.74% pts (p=.001)	0.39 ***
Retention Items from Picking Spring 2006	M 18.76% pts SD 22.57 N 454	M 27.76% pts SD 24.42 N 226	7.77% pts (p=.014)	0.53 *

*** p<.002

** p<.01

* p<.05

Note: The impacts were estimated using 2-level hierarchical linear models (HLM) that controlled for the blocking variables.