

ANNUAL REPORT 2015





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VISION, MISSION & GOALS

The KCM (Kentucky Center for Mathematics), established by the Kentucky General Assembly in 2006, supports diverse teacher and student populations across the Commonwealth. The vision of the KCM is a world in which everyone is mathematically enlightened and empowered.

This annual report contains highlights of the KCM's statewide work from July 1, 2014 to June 30, 2015. The mission of the KCM is to advance the knowledge and practice of effective mathematics teaching and learning encompassing early childhood through adult education. We provide and develop statewide leadership, facilitate professional learning experiences, and cultivate innovation with the goal of improving mathematics education, practice, and policy. We promote environments which engage learners, allowing them to make sense of mathematics. We are grounded in research, centered on practice, and focused on learners.

GOALS

1. LEADING

Inform, collaborate and cultivate leadership to improve education in mathematics.

2. LEARNING

Prepare and develop educators to improve achievement in student mathematics.

3. INNOVATING

Strengthen and advance mathematics education practice and policy through research and resource development.

CONNECT WITH KCM



Kentucky Center for Mathematics



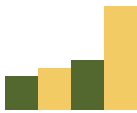
@KyCenterforMath

KCM Website: kymath.org

2014-2015 HIGHLIGHTS



KCM facilitators provided more than 2,870 hours of professional learning experiences in 2014-15. Over 2,350 Kentucky educators attended at least one KCM professional learning experience in 2014-15. This represents a nearly 62% increase from 1,459 participants in 2013-14.



Over 490 educators attended the 2015 KCM Conference, the highest number of participants since the conference's inception in 2009.



175 administrators from across the state participated in KCM-provided professional learning experiences in conjunction with teachers from their schools in a spirit of both support and collaboration.



Since 2006, KCM has worked with educators in 117 of Kentucky's 120 counties.



The new Kentucky Family Math website launched in January 2015 drew 11,326 page views from 4,170 unique users.



The KCM sponsored the award-winning KET children's program, *Peg + Cat*, which explores early numeracy concepts for young mathematicians.



The total number of registered users of the Kentucky Numeracy Project Intervention Guide increased to 1,386. This is a 61% increase, as compared to 863 users in 2013-14.



The KCM technology team created a new online system, Abacus, to streamline the collection of program specific data.



284 teachers administered 12,234 KCM Fluency Assessments to 2,849 students across the state.



KCM Faculty Associate, Dr. Jonathan Thomas, and his colleagues were awarded nearly \$500,000 from the National Science Foundation to continue their work in improving preservice teacher education.

LETTER FROM THE EXECUTIVE DIRECTOR



“ All of us here at the KCM are extremely proud of how far we have come together and grateful to have had the opportunity to work with such outstanding educators in Kentucky. We truly believe that our 10th year will be the best year yet! ”

Dear Fellow Kentuckians,

This is truly a time of celebration as we enter into our 10th year as the Kentucky Center for Mathematics!

While it's hard to believe, in our first year, 2006, we worked with fewer than 50 elementary school educators! **Since 2006, KCM has worked with educators in 117 of Kentucky's 120 counties.**

With help and support from the KDE (Kentucky Department of Education), the CPE (Council on Postsecondary Education) and the wonderful educators of Kentucky, in this last year, 2014-15, **KCM provided more than 2,870 hours of professional learning experiences for 2,358 Kentucky educators. This represents a nearly 62% increase in educators attending KCM events, compared with 1,459 participants in 2013-14.**

The professional learning experiences we offer for Kentucky reflect this growth! From initially concentrating on PLEs (professional learning experiences) for K-3 teachers in 2006 through our Primary Mathematics Intervention Program, we have grown to offer PLEs to Pre-K teachers through our K-EEMC (Kentucky Erikson Early Mathematics Collaborative) program, to 4th and 5th grade teachers through our MaRTI-Plus (Mathematics Response to Intervention Plus) program, to middle school teachers through our MaRTI Middle-6th (Mathematics Response to Intervention 6th Grade) program, to high school teachers through our collaboration with NKU (Northern Kentucky University) in the Project FLIP program and to Adult Education instructors through our new M4AE (Mathematics for Adult Educators) program. At the same time our offerings for K-3 have been expanded to include our EERTI (Enacting Effective Response to Intervention) and K-Plus (Kentucky Numeracy Project Intensive

Plus) programs. In addition, we now offer two content coaching programs for intermediate and middle grades teachers and our online resources have over 1,300 Kentucky users!

This wonderful work by educators in Kentucky has been capturing national attention as well:

- For three consecutive cycles, members of the KCM community have received the bi-annual elementary grades PAEMST (President's Award for Excellence in Mathematics and Science Teaching) in 2008, 2010 and 2012.
- The American Association of State Colleges and Universities selected the Primary Mathematics Intervention Program and the K-EEMC Initiative of the KCM as Research and Regional Stewardship Innovative Programs.
- KCM staff and faculty associates have published over 20 articles in peer reviewed academic journals.
- KCM has been invited to present at the national meeting of the Association of State Supervisors of Mathematics and participate in panel discussions at the National Governors Association.

All of us here at the KCM are extremely proud of how far we have come together and grateful to have had the opportunity to work with such outstanding educators in Kentucky. We truly believe that our 10th year will be the best year yet!

A handwritten signature in black ink that reads "Daniel McGee". The script is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Daniel McGee, PhD
Executive Director

PRESCHOOL

KENTUCKY ERIKSON EARLY MATHEMATICS LEADERSHIP INSTITUTE

For the 2014-15 academic year, the KCM added six new fully-trained K-EEMC (Kentucky Erikson Early Mathematics Collaborative) facilitators. The six new leaders attended three in-person leadership sessions (July 2014, November 2014 and June 2015) facilitated by Dr. Mary Hynes-Berry and Dr. Lisa Ginot of the Erikson Institute. In addition to the leadership training sessions, each new leader observed eight full sessions led by an experienced K-EEMC facilitator, co-led eight full sessions with another new leader, and led eight full sessions independently. New leaders were mentored by the existing K-EEMC leaders (KCM Regional Coordinators) and communicated regularly with both the KCM and Erikson support teams.



KCM EEMC Leadership Team

Mary Helen Hodges, KCM Regional Coordinator
Beth Miracle Meiman, KCM Regional Coordinator
Selisa Adams, KCM Regional Coordinator
Julie Adams, Preschool Teacher, Lewis County
Jennifer Martin, Mathematics Intervention Teacher, Madison County
Tonda Thompson, Mathematics Intervention Teacher, Clinton County
Elizabeth "Jean" Bingham, Mathematics Intervention Teacher, Knox County
Donna Howard, Preschool Teacher, Daviess County
Belle Rush, Mathematics Intervention Teacher, Logan County
Meredith Brewer, KCM Associate Director

The KCM EEMC leadership team poses with facilitators from the Erikson Institute at the Kentucky Erikson Early Mathematics Leadership Institute in July 2014.

NATIONAL GOVERNORS ASSOCIATION CONFERENCE (ST. LOUIS)

KCM's Senior Director, Alice Gabbard, was an invited panelist for the National Governors Association Mathematics Policy Consultation Project Cross-State Meeting held on May 27, 2015 in St. Louis, Missouri. The panel discussion, titled, "Policies and Strategies for Effective Support Systems for Early Math Instruction," was moderated by Albert Wat, Senior Policy Analyst, National Governors Association. Other panelists were: Doug Clements, University of Denver; Jennifer McCray, Erikson Institute; and Eric Liebermann, Massachusetts Department of Early Education and Care.

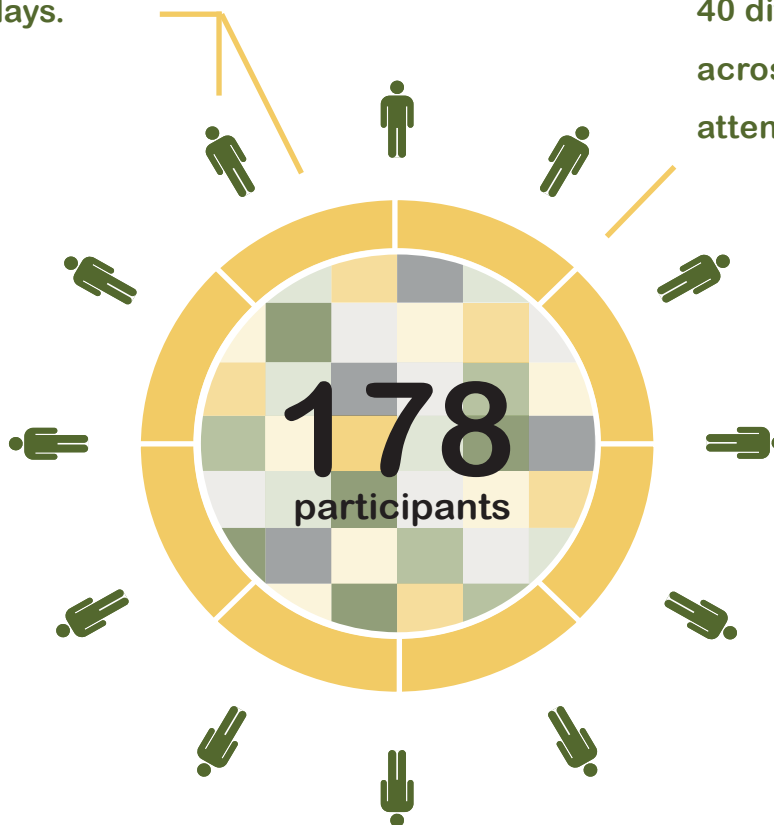
PRESCHOOL

KENTUCKY ERIKSON EARLY MATHEMATICS COLLABORATIVE

The K- EEMC (Erikson Early Math Collaborative) professional learning experience features content developed by the Erikson Institute, leaders in early childhood education. The professional learning experience highlights the “Big Ideas” in early mathematics which include sets, number sense, counting, number operations, pattern, measurement and shape. Participants use children’s literature to spark mathematical learning through developmentally appropriate exploration, discussion and activity.

During the 2014-15 school year, 12 cohorts of K-EEMC met for 8 half-days.

178 participants from 40 different counties across the Commonwealth attended K-EEMC.



Kentucky Erikson Early Math Collaborative Cohort Locations



Campbell County

Leader: Beth Meiman

Fayette County

Leaders: Martin/J. Adams

Logan County

Leader: Belle Rush

Clinton County

Leader: Tonda Thompson

Fleming County

Leader: Julie Howard

Lyon County

Leader: Mary Helen Hodges

Daviess County

Leader: Donna Howard

Knox County

Leader: Jean Bingham

Madison County

Leader: Jennifer Martin

Estill County

Leader: Selisa Adams

Laurel County

Leaders: Bingham/Thompson

Muhlenberg County

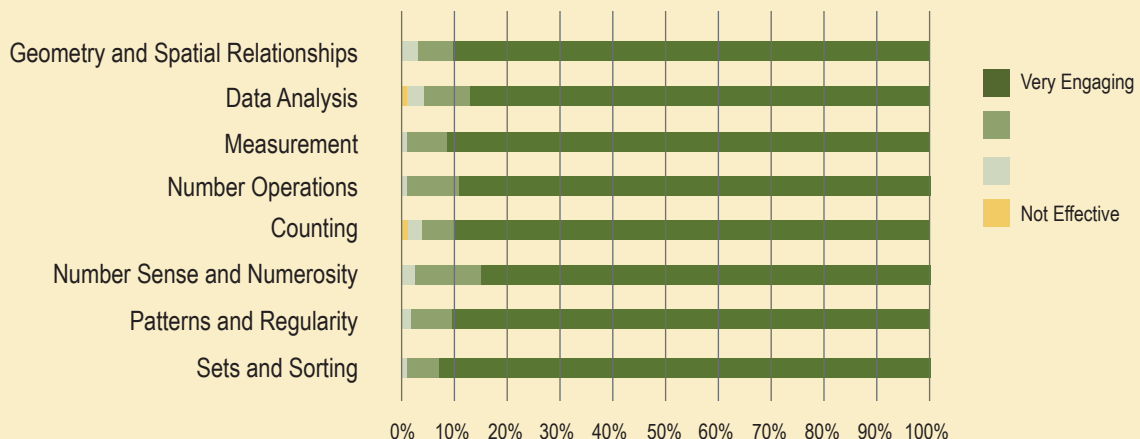
Leaders: Howard/Rush

“ [K-EEMC] changed the way I viewed math in the preschool learning environment. [It is] one of the best professional developments I have ever had (and I am a National Board Certified teacher so I have attended hundreds of PDs)! ”

IMPACT DATA FOR K-EEMC

In 2014-15, participants were asked to complete a survey reflecting upon their K-EEMC experience by session topic.

EEMC 2014-15 SESSION REFLECTIONS



ELEMENTARY

MATHEMATICS ACHIEVEMENT FUND

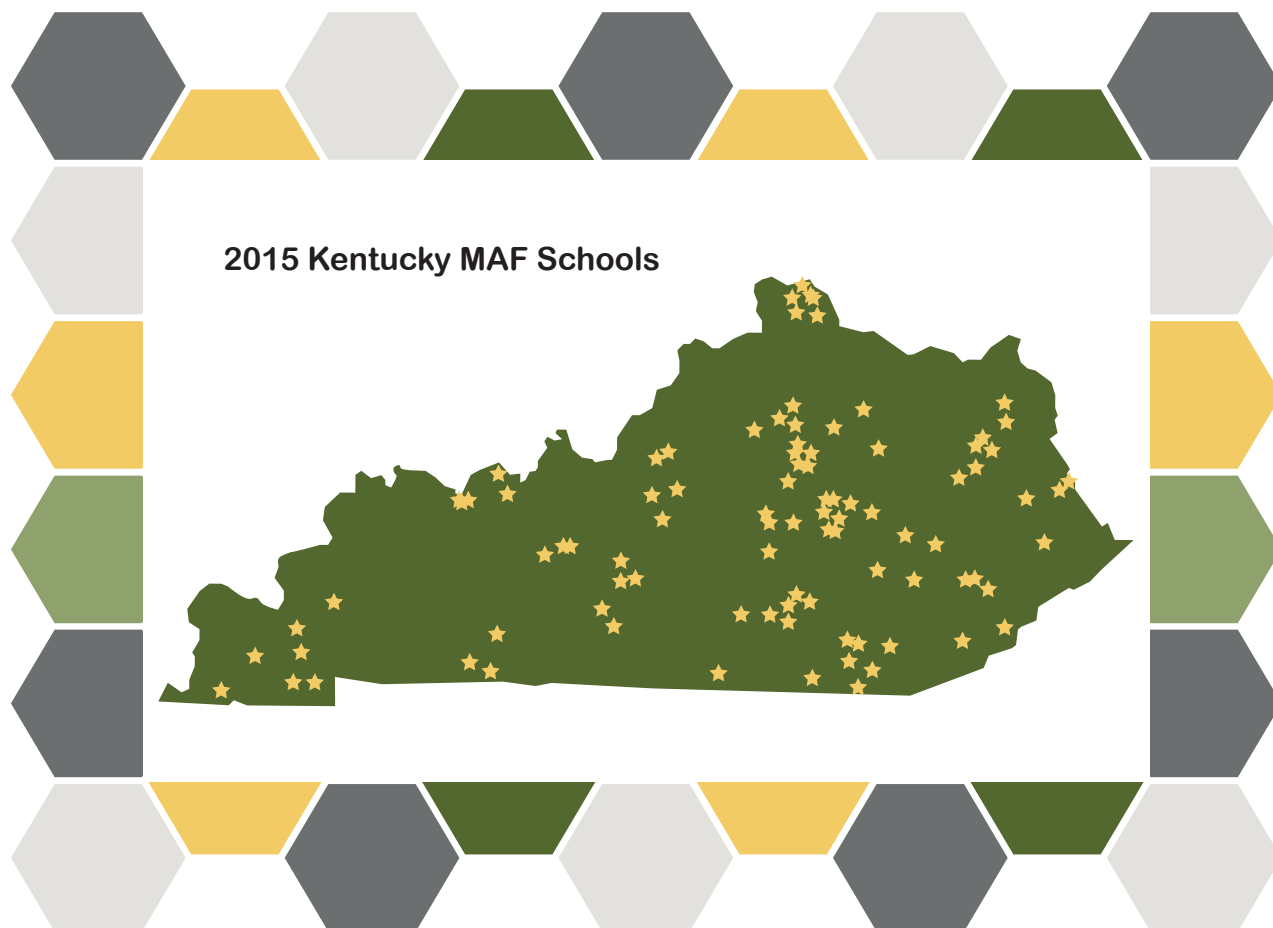
During 2014-15, 110 participating schools received \$41,000 in MAFs (Mathematics Achievement Funds) for paying and supporting a primary grades (K-3) MIT (Mathematics Intervention Teacher), including costs of salary, benefits, training, travel, and materials. At the end of December 2014, the KDE (Kentucky Department of Education) announced the 4th round MAF grant recipients who will receive funding July 1, 2015 to June 30, 2017. Of the 4th round MAF schools, 55 were continuing in the program and 58 were new, bringing the new total number of participating schools to 113. Less than half of the 2014 MAF applicants received the grant.

MITs participate in intensive training in the first year that includes sustained, job-embedded professional learning experiences: 10 days of training spaced throughout the year; coaching visits from KCM Regional Coordinators; quarterly in-person collegial team meetings; and weekly online meetings. Experienced MITs select from a variety of continued professional learning experiences

and participate in monthly online meetings. Experienced MITs also select and deliver a KCM Community service project, such as a conference presentation, resource development, or leading a course for colleagues.

The 2014 MIT Handbook, containing details of program requirements and expectations may be found at http://www.kentuckymathematics.org/docs/MIT_Handbook_2014.doc.

To maximize program impact, MIT leadership was supported through a one-day principal and MIT meeting where they collaborated on improving their school's comprehensive mathematics education program. Regarding the MIT leadership experience, one said, "I was thrilled with how often our principal and district curriculum director reached out to me about math concerns and questions. I am glad they see me as a reliable resource to our district!"



ELEMENTARY

MATHEMATICS RESPONSE TO INTERVENTION PLUS

MaRTI Plus (Mathematics Response to Intervention Plus), funded by a Mathematics Science Partnership grant, involved 57 elementary certified teachers and 34 administrators from 33 elementary schools in 23 Kentucky school districts (21 of which were high-need). Approximately 1,450 intermediate grades (3-5) students were affected as their teachers implemented strategies and tools for developing foundational conceptual-based fluency, acquired throughout the 20-day, job-embedded professional learning experience. Additionally, over 450 teachers each received at least 6 hours of professional development delivered by participating MaRTI Plus teachers at their schools.

The primary goals of this project were to serve schools' needs to implement the Kentucky Academic Standards for Mathematics and Response to Intervention while improving teacher practice, leading to gains in student achievement. In order to meet this goal, MaRTI Plus facilitated: shifts in educators' pedagogical content knowledge; transformations in attitudes and beliefs about the teaching and learning of mathematics; heightened competencies for professional noticing; and improved practice.

Results on the Learning Mathematics for Teaching measure showed that 70% of the participants made some gain in their pedagogical content knowledge and 50% made significant gains. Analysis of student growth, as measured by the MAP (Measures of Academic Progress) assessment, showed 60.64% of students of participating teachers and 54.77% of students of non-participating teachers achieved some gain in their percentiles from fall to spring—a significantly higher result for the participants ($p\text{-value} = 0.043$).

“Throughout this experience, I have had more in-depth exposure to the standards and progressions. It is my belief that it has been the work with the process of breaking down the standards, by looking at the progressions and phases, that has given me a deeper understanding of how to analyze student learning and use this assessment to search for ‘next steps’ to assist the students in reaching a deeper understanding of numbers and relationships.”
- Teacher Participant



MaRTI Plus participants and administrators from all 5 cohorts gathered to launch their culminating projects during 5 breakout sessions presented at the KCM Conference on March 10, 2015 in Lexington, KY.

ELEMENTARY

PRIMARY MATHEMATICS INTERVENTION PROGRAM

The goal of the state mathematics diagnostic intervention program is to expand the capacity of teachers to assess a child's current level of understanding and adjust instruction accordingly. KCM provides highly effective research-based training for MITs (Mathematics Intervention Teachers) at 110 schools in Kentucky in order to develop expertise for best practices for teaching mathematics and specialized knowledge for assessing and advancing foundational fluency. MITs are funded by the MAF (Mathematics Achievement Fund), appropriated by the KDE (Kentucky Department of Education).

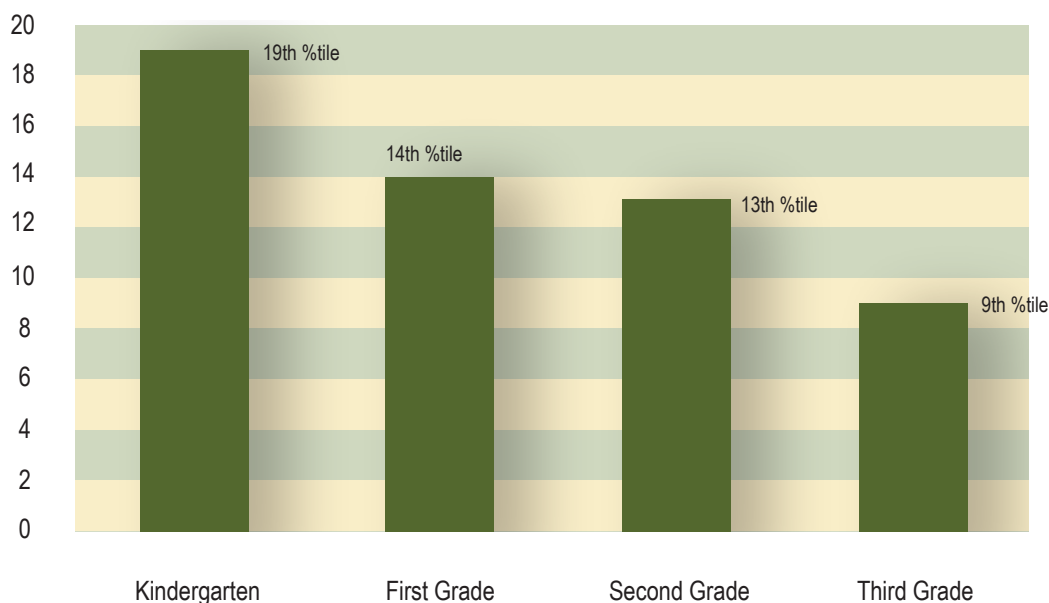
MITs provide intensive intervention to over 3,837 students per year, improving mathematical fluency and achievement. MITs indirectly service more than 43,206 students annually by sharing their passion and knowledge with colleagues. Collectively MITs provided approximately 1,525 hours of professional development during 2014-15.

Students receiving intervention from KCM-supported MITs and assessed by the MAP (Measures of Academic Progress) test made impressive growth compared to national norms for mathematics achievement. Primary grades students receiving intervention in 2014-15 gained, on average, 9.69 percentile points with 56.7% of all primary grades intervention students exceeding the expected gains on MAP.

As indicated in the chart below, data confirms that when students receive mathematics intervention early in their education, the intervention is most effective.



2014-15 MAF Intervention Students' Average Percentile Gain from Fall to Spring



Primary Mathematics Intervention Program Impact 2014-15

What type of impact has the intervention program had on the overall mathematics achievement of participating students?

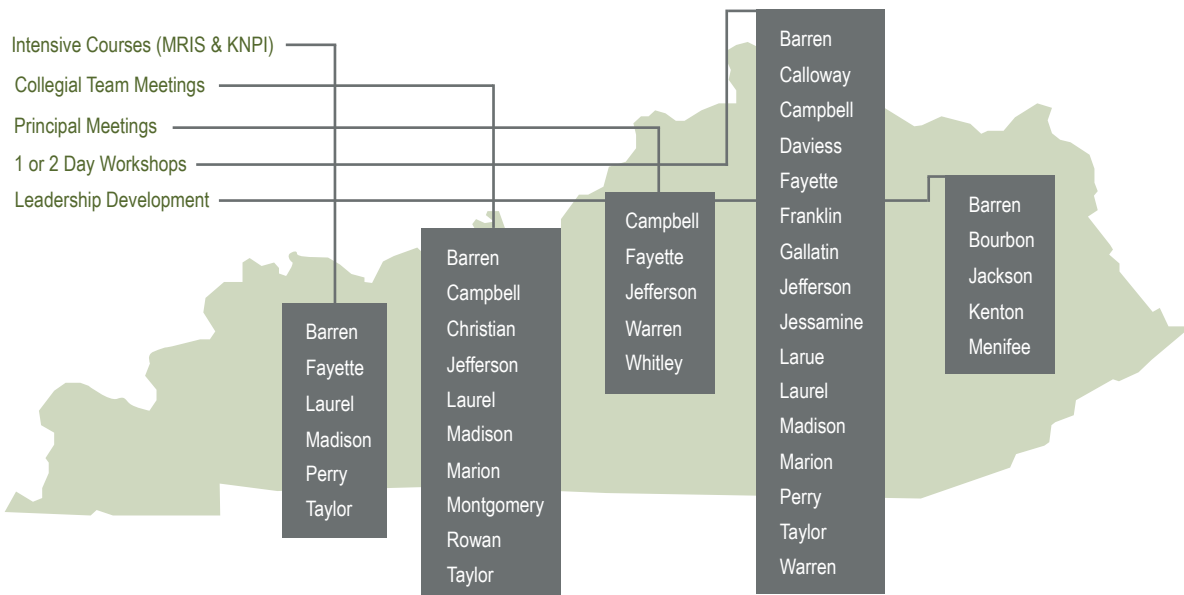


What type of impact has the intervention program had on the participating students' attitudes and beliefs about mathematics?



“Classroom teachers have expressed that skills we work on in the Response to Intervention classrooms have allowed students to be more successful in the regular math classroom.”

During 2014-15, KCM's eight Regional Coordinators provided sustained, job-embedded professional learning experiences for 693 teachers, including activities shown on the chart, as well as regular online meetings and coaching visits. The counties listed below indicate locations throughout the state where in-person, group professional learning experiences took place.



ELEMENTARY

ENACTING EFFECTIVE RESPONSE TO INTERVENTION

Since 2012, KCM has partnered with the KDE (Kentucky Department of Education) to offer EERTI (Enacting Effective Response to Intervention) for educators across the Commonwealth. EERTI exists to grow teachers' understanding of early numeracy development and their abilities for establishing in students strong foundations for fluently adding and subtracting. EERTI, therefore, supports the KDE's statewide initiatives to develop highly effective teaching and learning in Kentucky classrooms that will lead to the success of all Kentucky students.



FOR 2014-15:

- 18 Cohorts of EERTI were offered.
- 19 Experienced MITs (Mathematics Intervention Teachers) led EERTI cohorts.
- Each EERTI cohort met 3.5 days.
- 209 participants representing 42 different Kentucky counties attended.

For interested EERTI graduates, EERTI Continuing offered an EERTI extension that allows participants to continue meeting with the professional learning community formed through the EERTI experience. In 2014-15, 79 participants participated in one of 12 cohorts of EERTI Continuing, which met for four half-days.

EERTI PROFESSIONAL LEARNING EXPERIENCES HELD ACROSS THE STATE

Barren County
Leader: Shannon Miller

Bourbon County
Leader: Bethany Neel

Boyle County
Leader: Helen Blevins

Bullitt County
Leader: Teresa Cooksey

Calloway County
Leader: Beth Wood

Christian County
Leader: Nicque Wood

Clark County
Leader: Melissa Dicken

Elliott County
Leader: Angie Lewis/
Jady Skaggs

Fayette County
Leader: Julie Brown

Jefferson County
Leader: Linda Jewell

Kenton County
Leader: Kris Jarboe

Knox County
Leader: Jean Bingham

Menifee County
Leader: Melissa Justice

Monroe County
Leader: Shelly Scott

Montgomery County
Leader: Dawn Justice

Perry County
Leader: Rhoda Bryant

Scott County
Leader: Olivia Winkle

Warren County
Leader: Belle Rush

To what extent has the KCM EERTI professional learning experience received this year helped you in the following areas:

EERTI End of Course Survey

Focus instruction on a problematic area of a child's mathematical thinking.



Use professional development materials to make evidence-based instructional decisions.



Understand how to support children's construction of mental arithmetic strategies.



Understand and act upon connections between fluency and Response to Intervention.



Identify and understand key fluency benchmarks within the Kentucky Academic Standards.



“Teachers in Kentucky are eager to learn ways to improve their instruction by increasing student engagement. EERTI encourages a cultural shift in mathematics teaching that directly benefits the students of our state.”

- EERTI Participant

ELEMENTARY

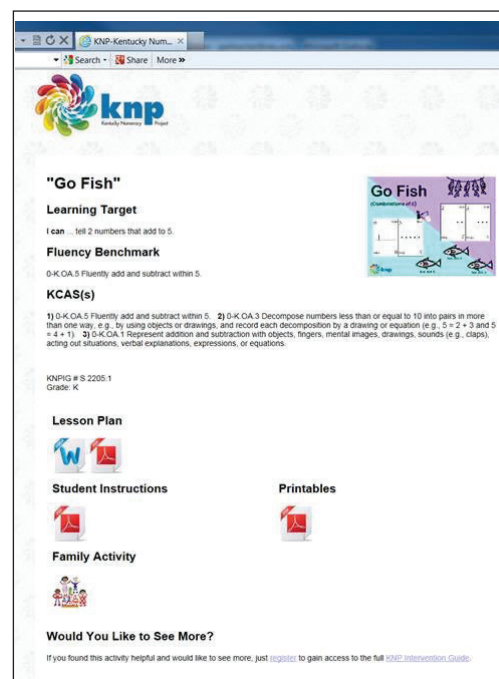
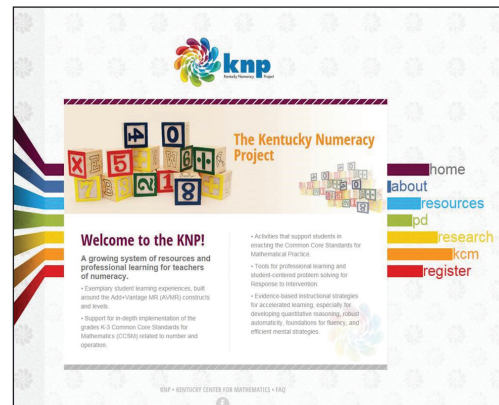
KENTUCKY NUMERACY PROJECT

Realizing the urgency to extend the KCM professional learning community and support participating teacher leaders, the KCM created the KNP (Kentucky Numeracy Project) with assessments and instructional activities tied to the Math Recovery Learning Framework in Number and the Kentucky Academic Standards for Mathematics for grades K to 3. Aligned to the shifts required in the standards, KNP focuses on the major work of number and operation, provides differentiated versions tied to coherence within the standards, and addresses all three facets of rigor, including conceptual understanding, procedural fluency, and application.

During 2014-15, the total number of official, registered Kentucky KNP users increased to 1,386. This is a 61% increase, as the number of official, Kentucky KNP users in 2013-14 was 863. In addition, 1,266 non-Kentucky users are also registered users of the KNP site and include educators from across the United States, as well as several different countries including Australia, Ireland, Canada, and India.

The KCM designed the Fluency Assessments to assess student mathematical knowledge and fluency rather than computational speed or memorization. They are research and evidence-based and are appropriate for diagnostic intervention, progress monitoring, and assessment of instructional readiness.

During 2014-15, 284 teachers accessed and administered 12,234 (up from 7,672 in 2013-14) of the online Fluency Assessments to 2,849 students, producing valuable evidence of student progress and need with graphs for individual student performance and student groupings according to mastery of numeracy standards. Additionally, the collection of 466 KNP Intervention Guide differentiated tasks were accessed 16,561 times, including 6,489 hits from the KCM Pinterest site. In addition, 69 new Family Math Fun activities, which were adapted from the KNP Intervention Guide, were accessed 688 times.



“ These activities have been wonderful for our students to stay engaged and to also learn the foundational skills necessary to be part of classroom discussions. ”
- KNP User

“ [The] KNP Intervention Guide helps me find the right activity at the right level for my students. Then, it allows me to gradually release that support and encourage students to work independently...[and] they’re having fun! ”
- KNP User

Progression of the Kentucky Numeracy Project

2009

KNP IS BORN

November 2009, the KCM began building the Kentucky Numeracy Project in response to a critical need of MITs (Mathematics Intervention Teachers) who wished to support each other and spread their acquired expertise to more teachers, for the benefit of all Kentucky students.

2012-2013

KNP GROWS

The number of online KNP users grows and MITs record and submit classroom videos which are then embedded into the KNP Intervention Guide. Work progresses toward vetting the Fluency Assessments as reliable and valid measures of student progress and need.

2014-2015

KNP EXPANDS

KNP Intervention Guide entries are made more accessible through KCM's social media sites, especially Pinterest. In addition, KNP Intervention Guide entries are expanded to include Family Math Fun webpages, which can either be directly accessed by parents and/or printed and sent home by teachers. Fluency Assessment use increases with the implementation of the Fluency Development Leader Institute, where MITs are trained in how to administer the tests, and then share this knowledge with other teachers in their schools. During 2014-15, 284 teachers accessed and administered 12,234 Fluency Assessments to 2,849 students.

2011-2012

KNP IS LAUNCHED

February 7, 2011, the restricted, KNP resource page is launched. The page, which includes the KNP Intervention Guide and KNP Webinar Series, is accessed about 3,000 times by approximately 700 educators between the launch date and June 30, 2012.

2013-2014

KNP GOES NATIONAL

The KNP Intervention Guide grows to include 415 tasks that support in-depth understanding and skill. In fall 2013, the KNP becomes freely available to all educators across the nation, resulting in users from 48 out of the 50 states. The Fluency Assessments become available online to Kentucky teachers trained to use the assessments, and the related printable materials are made tablet-friendly.



ELEMENTARY

FAMILY MATH

The newest addition to the KNP Intervention Guide, the Kentucky Family Math website, kyfamilymath.org, features activities for families based on popular activities from the Intervention Guide. Additionally, the new website includes exemplar websites and online games for students as well as resources for parents to help facilitate mathematical conversations at home.



ASSOCIATION OF STATE SUPERVISORS OF MATHEMATICS

KCM's Executive Director, Daniel McGee, and Senior Director, Alice Gabbard, were invited presenters of a session, titled, "K-4 Numeracy Development Initiatives," at the Association of State Supervisors of Mathematics 2015 Annual Meeting in Boston, Massachusetts on April 12, 2015. The Association of State Supervisors of Mathematics is an organization comprised of current or previous state or provincial supervisors of mathematics whose mission is to increase the capacity of mathematical leaders to advance quality mathematics education.

FLUENCY DEVELOPMENT LEADER INSTITUTE

In order to support school-based teacher leadership for assessing and advancing foundational mathematics fluency with number and quantitative reasoning, the KCM conducted a FDL (Fluency Development Leadership) Institute, during which experienced Fluency Assessment users gained tools and strategies for sharing with colleagues at their schools. The FDL Institute established sustainable job-embedded professional learning, facilitated by a specialized school-based leader focused on conducting tiered, evidence-based mathematics response to intervention in alignment with the Kentucky Academic Standards, leading to improved student achievement in mathematics.

The FDL Institute, involving 11 primary grades teacher leaders from 11 school districts and two postsecondary faculty members working with preservice teachers from two state universities, took place during three different in-person meetings, and two separate one-hour online meetings. In addition, Fluency Development Leaders facilitated a monthly one-hour school-based Fluency Development Collegial Team Meeting. In addition, the KCM shared the Fluency Assessments and teaching resources with two classes of preservice teachers at Eastern Kentucky University.

ELEMENTARY

K PLUS

K Plus (Kentucky Numeracy Project Intensive Plus), funded by a Mathematics Science Partnership Grant, is a 20-day professional learning experience for 16 primary grades teachers and 14 administrators from 15 schools. All but one of the participating schools are from high-need districts and are geographically distributed in 10 school districts throughout Kentucky. Course content includes eight days of the AVMR (Add+Vantage Math Recovery) program, delivered by KCM Regional Coordinators who have completed rigorous requirements, earning official designations as AVMR Champions. The additional 12 course days are designed and delivered by KCM Regional Coordinators.

During the 2014-15 school year, participants implemented Kentucky Academic Standards-aligned assessments and instructional resources for addition and subtraction, multiplication and division, and algebraic reasoning. The course will conclude in the following school year with a phase focused on measurement, presentation of culminating projects at the KCM Conference, and a teacher leader institute with mini-grants for school-based leadership projects.

IMPACT ON STUDENT ACHIEVEMENT AND ATTITUDES

“The transformation of students to being such independent thinkers and problem solvers has been such a tremendous change in the past couple of years. It is great seeing (and hearing) students that LOVE math!”

- Administrator

IMPACT ON SCHOOL CULTURE

“The information as well as materials our participating teachers receive has been a huge asset for our school. Our participating teachers come back to school eager to share the information they have learned with the entire staff. This has been beneficial to all parties.”

- Administrator

IMPACT ON INSTRUCTION

“I now have the ability to have my students work in math centers due to the materials I have gotten through KCM. I know that students need to understand the basic math strategies before they are able to use the algorithm. I use the centers during my math intervention time and also use the materials to help my students to understand their core math lessons.”

- Teacher Participant



ELEMENTARY & MIDDLE

MATHEMATICS CONTENT COACHING

For the past three years, KCM has partnered with the KDE (Kentucky Department of Education) to offer Mathematics Content Coaching PLEs (professional learning experiences) for educators across the Commonwealth. Content Coaching provides mathematics coaches, teacher leaders, and administrators with job-embedded learning opportunities that are aimed at initiating profound, sustainable, school-wide improvements in teaching and learning. The focus of the Content Coaching model is to cultivate a shared understanding of effective mathematics instruction with the goal of establishing a collective clarity about how to engage students in learning mathematics through well-designed learning tasks and activities.

In 2014-15, KDE grant funds provided support for five cohorts of educators: three cohorts for coaches/teacher leaders and two cohorts for administrators. All of the Content Coaching participants observed a master teacher as they co-planned with a teacher, co-taught mathematics lessons and then debriefed the lessons. Participants were able to go into live classrooms to observe the impact of effective mathematics teaching as modeled by a master teacher. The Content Coaching PLE provided unique opportunities for educators to examine these questions:

- How can coaches and administrators support teacher growth?
- What does it mean to plan and implement an effective mathematics lesson?
- What does it look like in a classroom where the Standards for Mathematical Practice are naturally occurring?

PARTICIPANT NUMBERS

63

ELEMENTARY

38

MIDDLE SCHOOL

46

ADMINISTRATORS

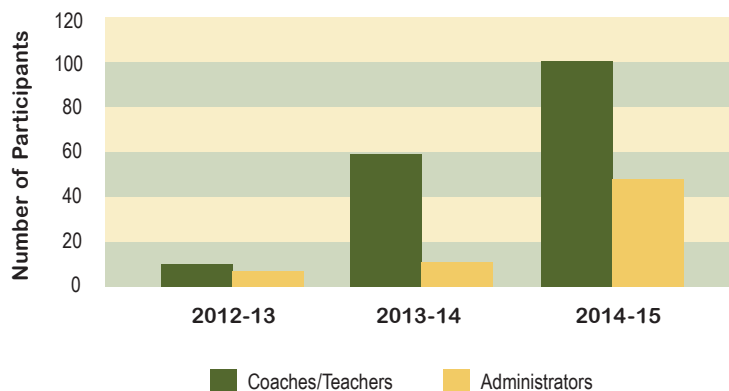
“As a coach, I have had no other opportunities to grow that can compare to this – it is ‘real.’ It is our work.”

- Coaching Participant

“[Content Coaching] allowed me to reflect on practices building in math that are not student-based or helpful.”

- Administrator

The graph below shows the phenomenal growth KCM has experienced in the Mathematics Content Coaching program over the past three years.



MIDDLE SCHOOL

MATHEMATICS RESPONSE TO INTERVENTION MIDDLE SCHOOL

Mathematics Response to Mathematics Intervention for Middle School, MaRTI Middle 6th, provided middle school educators with a greater understanding of sixth grade content and strategies for assessing and teaching that content. MaRTI Middle is an upward extension of the KCM's successful implementation (June 2006 to present) of sustained, job-embedded professional learning experiences, previously for primary and intermediate grade teachers working to build strong foundations for fluency.

MaRTI Middle participants explored how sixth grade students learn mathematics, evidence-based intervention strategies for use with tiered intervention, and resources and professional knowledge for in-depth implementation of the Kentucky Academic Standards and the Standards for Mathematical Practice. Participants were given ideas on how to approach grade-level standards in rigorous and engaging ways. Teachers learned effective ways to scaffold and differentiate instruction to better accommodate student needs via a learning climate that welcomes questions, opinions, and participation of all students.

A three-day Summer Institute was held in June 2014 for MaRTI Middle participants to deeply explore sixth grade math content. During the 2014-15 school year, five cohorts of MaRTI Middle 6th met for five days each. Cohort meetings were held in Hopkinsville, Frankfort, Hazard, London, and Mt. Sterling. A total of 71 teacher participants attended these learning experiences. In addition, 36 administrators participated in the first cohort meeting along with their teacher(s).



IMPACT

In 2014-15, KCM Professional Learning Experience Surveys were completed across all five cohorts regarding the impact of this program. Almost 95% of the participants in the MaRTI Middle 6th Program reported that the experience was very impactful to their professional development.

MaRTI Middle 6th participants representing various areas throughout the state attended this professional learning experience, as indicated by the stars on the map (left).

“This has been so useful. Each day has been full of ideas that I take and directly implement in my room.”

– MaRTI Middle Participant



MIDDLE SCHOOL

MaRTI MIDDLE SUMMER INSTITUTE (JUNE 2015)



In addition to the five cohort meetings, this KDE (Kentucky Department of Education) grant provided funding for a three-day MaRTI Middle Summer Institute. This Institute was held in June of 2015 with 109 educators attending.

The goal of the Summer Institute was for middle school educators to gain a greater understanding of both sixth and seventh grade content and strategies for assessing and teaching that content, particularly to students who are struggling. The Summer Institute focused on the “Big Ideas” of sixth and seventh grade mathematics, including topics such as proportional reasoning, rational numbers, equivalence, expressions and equations, exponents, etc. In addition, participants who attended the Institute explored instructional strategies that could improve critical thinking, problem solving, and classroom discourse.

In the coming year, attendees from the 2015 Summer Institute will be participants in a new offering of MaRTI Middle, focused on sixth and seventh grade, that will be released during 2015-16. Plans are to offer two cohorts for MaRTI Middle 6th and four cohorts for MaRTI Middle 7th. Six meetings for each cohort will take place throughout the 2015-16 school year. The sessions will explore materials and methods to strategically and explicitly help students better understand mathematical content related to sixth and seventh grade Kentucky Academic Standards including: rational number operations, proportional reasoning, geometry, equations & expressions, and algebraic reasoning.

HIGH SCHOOL

FLIP

With the support of the KCM and the CPE (Council on Postsecondary Education), Northern Kentucky University continued its outreach to Kentucky schools and teachers through the FLIP and FLIP-EKY (FLIP-Eastern Kentucky) Projects.

The FLIP project was initially funded in 2013 with a \$130,000 grant from CPE. Based upon the results of the first year of the grant, the grant was renewed in 2014 for an additional \$120,000. During the summer of 2014, nearly 70 middle and high school math teachers spent three-to-four days of training at Murray State and Northern Kentucky universities to flip their classrooms. In a flipped classroom, teachers use video cameras or video recording software to develop content lessons and then deliver these lessons as YouTube videos (or some other video sharing site) - where students review the lesson the night before the class as homework. The next day when students come to class, teachers can use class time to do things that are more integrated - classroom discussions, hands-on activities, answering questions, or dividing the class into small groups. Teachers can then work with students that need additional help or offer extensions to advance student learning.

During the 2014-15 school year, data was collected from approximately 40 participants of the FLIP project. This data included teachers' perceptions of the effectiveness of the flipped classroom, students' perspectives, achievement data on the unit that was flipped, historic achievement data from the unit (for comparison purposes), student engagement data, and data on teachers' instructional practices. This data suggests that: (1) the project is having a positive impact on teachers' use and confidence with classroom technology; (2) teachers enter with high expectations regarding the effectiveness of flipped instruction and its impact on student learning and engagement, and these perceptions remain high after a year with the project; and (3) students appreciate the greater access to teacher feedback and teacher-specific resources that flipping affords.

The impact on student achievement, while generally positive, depends upon many factors. Most notably, those that implement flipped instruction with high expectations for student involvement



Staff, teacher leaders, and participants at the FLIP-EKY Summer 2015 Flipped Classroom Training on the Prestonsburg Campus of Big Sandy Community and Technical College.

and utilizing classroom sessions that are coordinated with the video lesson are experiencing significant student gains. Flipped classroom strategies also resulted in significantly increased use of student-centered instruction in all of the observed classrooms.

Based upon the positive results and feedback of the FLIP project, Year 1 of the FLIP-EKY project was funded with a \$135,000 grant from the CPE. Like the FLIP project, FLIP-EKY participants are to flip at least 10 lessons, preferably from the same unit of study, during the 2015-16 school year. With the support of Northern Kentucky University faculty, KVEC (Kentucky Valley Educational Cooperative) staff, and five teacher leaders (and FLIP project participants), teachers in eight eastern Kentucky districts will pilot the use of flipped units and the flipped classroom strategy in their classroom during the 2015-16 school year.

POSTSECONDARY TECHNO

The goal of the Project TECHNO (Technology-Centered Mathematical Noticing) is to develop technologically-centered learning modules for use in online teacher preparation contexts that will positively affect preservice teachers' capacity to professionally notice and respond appropriately to children's mathematical thinking along learning trajectories in numeracy and early-algebra. This project was awarded nearly \$500,000 by the National Science Foundation in the summer of 2014.

This construction of innovative learning materials builds upon the successful N3 (Noticing Numeracy Now) endeavor which was also funded by the National Science Foundation. The N3 project aimed to specifically enhance professional noticing capacities of preservice elementary teachers in the area of early numeracy. For Project TECHNO, teachers will adapt and develop their professional noticing skills in new, technology-driven, mathematical contexts organized around promoting rich algebraic thinking among children.

The project team completed their first year of funded activity on Project TECHNO in the summer of 2015. During this year, project leaders in different areas of Kentucky coordinated with practicing classroom teachers to co-teach a series of innovative algebraic lessons which were video-recorded. In the fall of 2015, the project team is piloting and evaluating these instructional materials with preservice elementary teachers.

PROJECT MEMBERS

Jonathan Thomas <i>University of Kentucky & KCM</i>	Janet Tassell <i>Western Kentucky University</i>
Molly Fisher <i>University of Kentucky</i>	Margaret Yoder <i>Eastern Kentucky University</i>
Edna O. Schack <i>Morehead State University</i>	Alice Gabbard <i>KCM</i>
Cindy Jong <i>University of Kentucky</i>	Tracy Goodson-Espy <i>Appalachian State University</i>
Teri Murphy <i>Northern Kentucky University & KCM (external evaluator)</i>	Lenore Kinne <i>Northern Kentucky University (external evaluator)</i>



KMED

The KMED (Kentucky Mathematics Educator Development) group is a newly established group of stakeholders in mathematics teacher preparation in Kentucky. The group's purpose includes disseminating research and effective mathematics teacher education practices, establishing collaborative working groups of mathematics teacher education professionals, informing mathematics education policy, and advocating for high quality mathematics education for all.

KMED held its inaugural conference in April 2015 with the goal that it would serve as the commencement of the group and its activities, which are currently supported by the KCM. There were speakers from six of Kentucky's public universities, the Kentucky Department of Education and several Kentucky public school districts who presented on a variety of mathematics education topics focused across the grade bands.



POSTSECONDARY

TEPST

TEPST (Transdisciplinary Experiences for Preservice Secondary Teachers) is a professional learning experience supported by the KCM that is aimed at preparing preservice teachers to integrate STEM (science, technology, engineering and mathematics) in their future classrooms. The week-long professional development allowed participants to witness examples of teaching STEM integration and learn how to implement it into the classroom. Four days included faculty lead presentations, activities, and discussions. The final day consisted of a culminating experience where the preservice teachers prepared a STEM lesson in groups and presented it to the rest of the participants. The goals for the preservice teachers were to develop: (1) positive attitudes and perceptions of STEM integration, (2) an appreciation for STEM content areas outside their own discipline, (3) knowledge for collaborating with other STEM teachers, and (4) an understanding of the connections between the NGSS (Next Generation Science Standards) and the Kentucky Academic Standards.

Twenty preservice teachers participated in the program, seven males and thirteen females. Seven of the participants were students from Northern Kentucky University and thirteen were students from the University of Kentucky. Participants' STEM content focus was as follows: nine biology, one chemistry, one physics, two earth and space science, and seven mathematics.

“ I really think that one of the valuable aspects of this workshop is that it brought a group of people together that were at a wide variety of stages in their careers. This included participants and facilitators alike. I think that this was an important element of the workshop. ”

- TEPST Participant

Results from pre- and post-surveys indicate the preservice teachers increased their confidence in their ability to integrate STEM in their future classrooms. The participants responded higher agreeance with planning to use STEM standards outside their discipline when teaching and being aware of integrated curriculum. Overall, after the program participants believed integrated teaching was more beneficial for students than they had previously thought.

Data collected from the participants' blog entries provided additional insight into their opinions of the program. Numerous participants commented that they enjoyed discussing with STEM preservice teachers that had different backgrounds than their own and the knowledge gained from these social interactions. One participant wrote, “I enjoyed working with the people in the beginning of their programs and their willingness to learn and understand the process. It was great to share.” Another wrote, “It was interesting to work not only with others from different points in their teacher preparation programs, but also from two different programs.”



Preservice teachers attending the TEPST workshop learn about the engineering design process by testing the durability of aluminum boats.

COLLABORATIONS

PIMSER

In 2014-15, the KCM provided support to the University of Kentucky's PIMSER (Partnership Institute for Math and Science Education Reform). KCM staff provided assistance with PIMSER's TMI (Timely Mathematics Interventions at the Classroom Level) project. TMI is a two-year, grant-funded professional learning experience for teachers in grades 6-9. The goal of the program is to assist classroom teachers in developing a deeper understanding of strategies and tools used for Tier I mathematics intervention.



SMART BOOKS

A joint collaboration between the Collaborative Center for Literacy Development, Eastern Kentucky University, the University of Louisville, Kansas State University, and the KCM, the SMART Books (Support Mathematics and Reading through Books) exists to help teachers learn how to use a mathematical lens to incorporate high-quality literature into math instruction. The project originated at Kansas State University led by Dr. Jennifer Bay-Williams, Dr. Sherri Martinie, and Dr. Lori Norton-Meier. The new collaboration looks to expand upon the existing database of lesson plans as well as work with teachers through professional learning opportunities.



IPAC

KCM's Senior Director served as a member of the Kentucky Department of Education IPAC (Instructional Practices and Academic Content) Team, a statewide effort dedicated to selecting, vetting, and preparing to pilot school wide professional learning experiences to drive the adoption and scale-up of evidence based practice for the teaching and learning of mathematics, grades 4-8.



ADULT EDUCATION

KYAE

In 2014-15, the KCM worked collaboratively with KYAE (Kentucky Adult Education) to lend our support to their work with adult education instructors. KCM was involved in two projects:

(1) KCM provided on-site support for KYAE's Mathematics Curriculum Collaborations. In these professional learning experiences, adult educators worked collaboratively to develop clear, targeted, student-centered lesson plans. KCM staff and Regional Coordinators served as resources for adult educators as they strove to create rich lesson plans that addressed College and Career Ready Standards and the Standards for Mathematical Practice.

(2) KCM also provided support for the KYAE Lesson Bank project. The Lesson Bank is a repository of high-quality, standards-based lessons created by and for KYAE instructors. It is designed as a one-stop shop for instructors to find high-quality lesson plans and resources for their standards-based classroom. A KCM staff member served as a reviewer for the math lessons submitted to the KYAE Lesson Bank.



KCM CONFERENCE

The KCM hosted its seventh annual conference on March 9 and 10 in Lexington, Kentucky. The theme of the conference “Engage!” encouraged attendees to both engage with their passionate and knowledgeable colleagues while also acquiring the tools and strategies to engage students in the learning of rich and interesting mathematics.

Over 490 educators attended the conference, representing preschool through postsecondary education, from 83 different Kentucky school districts and 10 Kentucky postsecondary public and private institutions. In addition, 82 breakout sessions were offered throughout the two day conference with a total of 164 speakers and co-speakers presenting these sessions.

The KCM conference also played host to Dr. William McCallum, one of the lead writers for the Common Core State Standards in Mathematics. Dr. McCallum participated in a panel discussion on Monday, March 9, titled, “Implementation of the Common Core,” where panelists responded to questions from audience participants as well as questions provided in advance from teachers and other mathematics stakeholders in Kentucky.

The second annual “Celebration Dinner” was also held on Monday, March 9, where Kentucky educators were celebrated for their excellent work across the state, while reflecting on next steps for continued improvement. Attendees were joined by several special guests including Robert King, President of the Kentucky Council on Postsecondary Education, who welcomed attendees and discussed the “Kentucky Rising” initiative; Dr. McCallum, who provided a fascinating look at how to analyze different student approaches to solving the same problem; and Dr. Katherine Frank, Dean of the College of Arts and Sciences at Northern Kentucky University, who shared her excitement about the KCM and the work of Kentucky teachers.

“ I am so appreciative that the KCM offers this conference. It is enjoyable to discuss new trends, implementation, and general Q&As involving mathematics. Thanks so much! ”

- 2015 KCM Conference Attendee



Dr. William McCallum, a lead writer for the Common Core State Standards in Mathematics, addresses conference attendees at the Celebration Dinner.



Conference attendees engage with one another during a hands-on activity at one of the 82 conference sessions offered.

DATA & TECHNOLOGY

ABACUS

KCM's technology team developed and deployed Abacus, a web-based application, to track and manage assignments and submissions by participants in the various KCM PLE (professional learning experience) programs. Abacus replaced a jumble of emails, faxes and snail mail submissions combined with manual status tracking. Now with Abacus, participants and leaders have a shared view of assigned activities. Participants complete activities by providing information through online forms and file uploads. Leaders monitor the submissions and send out error reports and late notices. KCM Data Steward, Jennifer Martinez, said, "Abacus has transformed the KCM's approach to data collection. Not only does it give users a secure environment to submit data, it also allows them to check assignment status in real time, and even upload documents using their smart phones."

FAMILY MATH PAGES

Working with the program staff, the KCM tech team produced a new web-based resource for families. The Kentucky Family Math resource website (kyfamilymath.org) provides parents with links to KCM-vetted materials that engage children in fun and educational ways to help them make sense of problems and persevere in solving them.

CERTIFICATES

The KCM tech team also implemented another staff productivity enhancement with the new Certificates application. This application extracts data from the KCM event management system to create and email certificates to PLE participants, reducing a task that typically took several hours to complete to only a few minutes.



FLUENCY ASSESSMENT IMPROVEMENTS

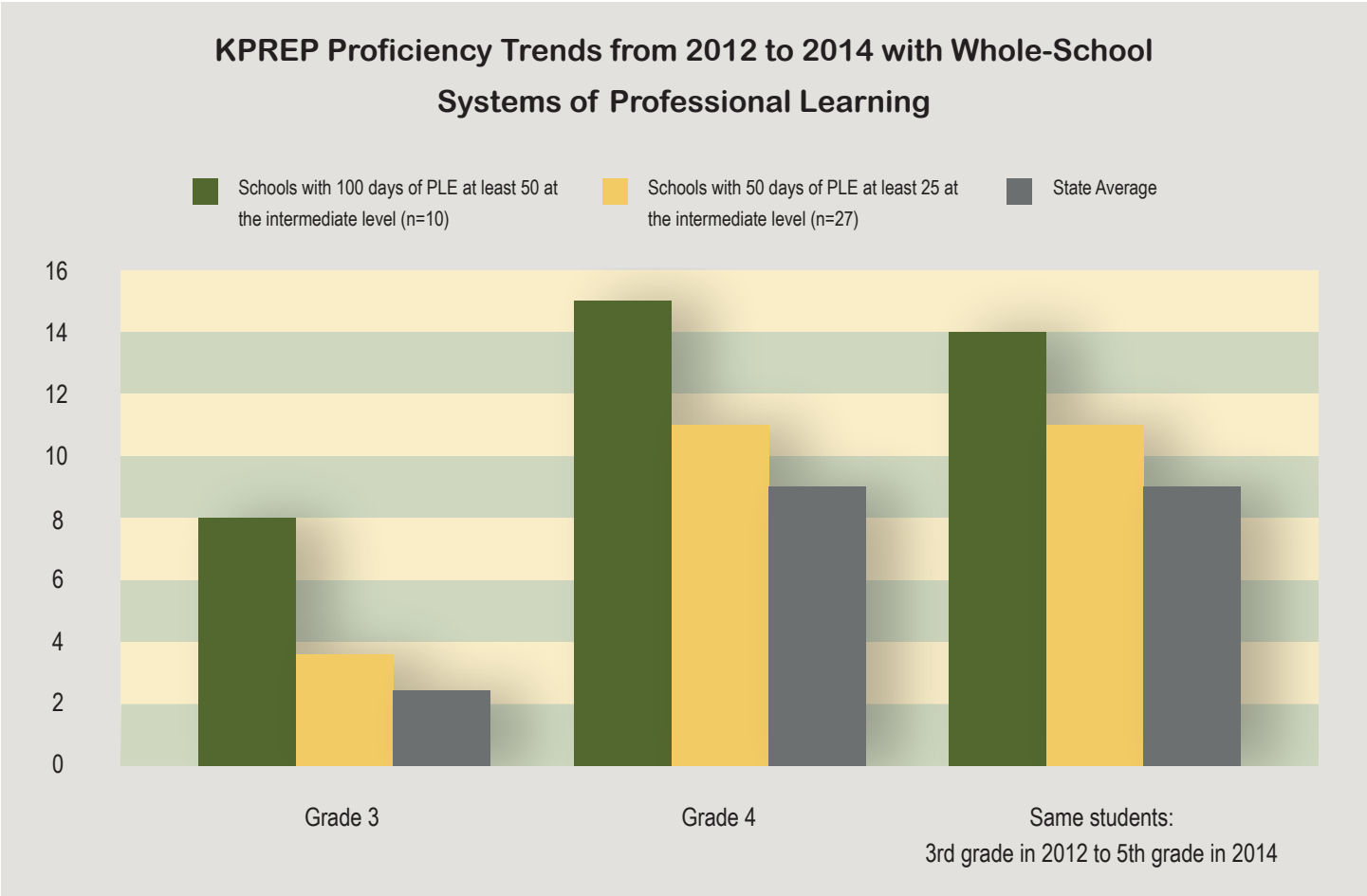
The Fluency Assessments application was redeployed to a more stable platform, decreasing the access problems previously experienced by teachers. Two assessments for fractions were added and the results reporting improved to include group reports and associate standards with individual questions.

PROFESSIONAL LEARNING EXPERIENCE SYSTEMS ANALYSIS

KCM's system of complimentary PLEs (professional learning experiences) contributes to the transformation of school culture as mathematics teachers from a school participate in a variety of rich, ongoing, and different, but related, courses, establishing an informed and advancing professional learning community, leading to student engagement, sense making, and success. KCM's system of complimentary PLEs includes:

- Math Recovery Intervention Specialist Course
- Add+Vantage Math Recovery
- Student Numeracy Assessment Progressions
- Enacting Effective Response to Intervention
- KCM Annual Conference & Post-Conference Day
- MaRTI (Mathematics Response to Intervention)
- Elementary Grades Content Coaching
- AdMIT (Administrator and Mathematics Intervention Teacher) Day
- KNPI (Kentucky Numeracy Project Intensive) Plus
- K-EEMC (Kentucky Erikson Early Math Collaborative)

This graph compares the growth in proficiency rates among (1) schools with a significant whole school dedication to KCM PLEs, (2) schools with a modest whole school dedication to KCM PLEs and (3) the average for the state. As can be seen, school-wide dedication to KCM PLEs results in significantly higher school-wide growth in KPREP (Kentucky Performance Rating for Educational Programs) proficiency rates for (1) third graders in 2012-13 to third graders in 2013-14, (2) fourth graders in 2012-13 to fourth graders in 2014-15 and (3) the same students at a given school as they proceeded from the 3rd grade in 2011-12 to the fifth grade in 2013-14.



BUDGET

FISCAL YEAR 2015 FUNDING

Personnel

Expenditures

KCM Personnel Salary (Full-Time and Part-Time Staff)	\$ 326,322
KCM Personnel Fringe Benefits	\$ 230,897
Faculty (Executive Director, Faculty Associates, Faculty Support for projects such as FLIP, FORCE, etc.)	\$ 170,777
TOTAL STAFF & FACULTY	\$ 727,996

Other Personnel (Student Workers)	\$ 55,740
Regional Coordinators across the State of Kentucky	\$ 433,606
Other Contracted Personnel (Evaluators, Trainers)	\$ 138,985
TOTAL OTHER PERSONNEL	\$ 628,331

SUBTOTAL PERSONNEL **\$ 1,356,327**

Operating **\$ 316,674**

TOTAL EXPENDITURES FY 2015 **\$ 1,673,001**

In addition to the above expenditures, the following external projects were entrusted to KCM:

Grant Funding Recieved

MSP (Mathematics and Science Partnership) - MaRTI Plus (Mathematics Response to Intervention Plus) Grant	\$ 117,000
Kentucky Department of Education - Mathematics Content Coaching	\$ 49,981
Kentucky Department of Education - EERTI (Enacting Effective Response to Intervention)	\$ 99,999
Kentucky Department of Education - MaRTI Middle (Mathematics Response to Intervention Middle School)	\$ 99,981
Kentucky Department of Education - K-EEMC (Kentucky Erikson Early Mathematics Collaborative)	\$ 50,000
MSP - K Plus (Kentucky Numeracy Project Intensive Plus) Grant	\$ 160,000
Council on Postsecondary Education - Senate Bill 1 Clinical	\$ 50,000
Council on Postsecondary Education - Senate Bill 1	\$ 35,277

Subtotal Grants **\$ 662,238**

***FY 2015 is from July 1, 2014 through June 30, 2015.**





THE KENTUCKY CENTER FOR MATHEMATICS

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